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QUALIFIED DOCTORS VERSUS COMPETENT DOCTORS

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To believe that if we continue going on the same path, we would reach our destination, is an assumption which has gained validity over past few centuries of evolution of medical practice. This would remain valid as long as our destination does not change.

However, in today's realm of medical practice, we have been witnessing change of goal posts. Medical education which has been disease centric for ages, suddenly finds itself confronted with a medical practice which has been increasingly growing into a patient centric service. With increased awareness of the impact of diseases in terms of health economics, the practice moves into realm of community awareness and intervention, and on a larger scale, when it affects the growth and development of nations, it ceases to be an individual problem, or a physician's domain of responsibility.

At a micro level, each individual who walks into a medical practice, or a hospital, does not come as a case of Diabetes or Interstitial lung disease, or Cancer, he comes with a plethora of needs. His/her needs may be as simple as not being able to sleep properly because he/she needs to visit toilet more frequently, a fact which impairs his/her performance, and productivity at his/her work and which might be affecting his/her career prospects along with financial implications, and casting a shadow on his/her family requirements and commitments.

However, the doctor he/she consults, is a qualified and registered medical graduate, who has been trained to make a provisional diagnosis, run a battery of investigations to confirm the diagnosis and rule out other differential diagnoses, and manage the patient's condition. However the doctor has not more than 5-10 minutes of consultation time to do all these, and while disease is being addressed, patients needs may not necessarily be getting due importance.

We have the Doctors who are qualified, but are we helping them gain competencies to handle these situations. Going beyond just qualification and license to practice medicine, we need to understand the competencies required for gaining the trust and faith of patient and accept that these are factors which contribute to healing in a big way in changing environment where Psychosomatic factors play a much bigger role. Given the breakdown of joint family system and values in our society, the role of Doctors in a supporting role has grown but the skills are yet to be incorporated in our training.

The future of medicine lies in the technological advancements, with the new disruptor- Artificial Intelligence and Machine learning bringing in a paradigm shift, in the way the medicine needs to be practised. The promise of devices that could pick up sounds that one may not be able to pick up through a stethoscope, and more importantly analyse it to interpretations which may be better than what we learn over years. How do we sensitise the future generations of medical students to such developments, and more significantly are we thinking about these? Yet, in the maze of all these advances and giant leaps in medicine and technology, how do we ensure that the medical students and budding Physicians don't lose sight of the fact that we are treating a human being, and not

a machine that would respond to algorithms inbuilt in the systems. It may not be possible for the machine and the technology to discern that human beings are driven by different needs. It is what I learnt while providing care to elderly patients at home, that there may be times, when an elderly bedridden patient asks for a glass of water, he may not necessarily be thirsty. It may well be the need to reassure himself that there is someone caring for him, about him. Is now the time that we plan something to build up these competencies in caregivers, be it a doctor, Nurse a paramedic, or an Emergency medical technician who can treat with compassion, ethics, accountability, and proper communication skills, or do we need to build up a culture of medical practice encompassing all. Everyone would agree that these competencies are non-negotiable, and yet what may be open to discussion would be whether they should be taught or be a part of culture through immersive techniques.

We need to ensure that we are all actively engaged in capacity building for these competencies. There could be different ways of addressing these issues. It could be made a part of curriculum, we can think of conducting specialised trainings and workshops, It could be an Immersive approach, but most importantly, and the one most likely to be successful would be to create a culture and work ethics. The issues are many, but none that cannot be resolved. The idea behind this write up is to stimulate a debate amongst the medical fraternity so that the doctors of future are better equipped and competent.

Because when the science of healing is not tampered by humane skills, it may not be complete.

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MRI EVALUATION OF THE CEREBRAL LESIONS EXHIBITING RESTRICTION ON DIFFUSION WEIGHTED IMAGES AND ITS CORRELATION WITH APPARENT DIFFUSION COEFFICIENT VALUE

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Abstract

Introduction: Diffusion Weighted Images is conventionally used to identify acute ischemic lesions. It has now become a routine technique in the magnetic resonance protocols for the evaluation of stroke patients. The aim of this study is to correlate MRI findings of such lesions with clinical findings and radiological diagnosis.

Material & Methods: This prospective study was done in the Department of Radiodiagnosis, Chhatrapati Shahuji Maharaj Medical University (upgraded King George's Medical University), Lucknow, over the period of one year from August 2008 to July 2009. The study comprised of subjects which were showing intra-cerebral lesions with restriction on DWI in MRI study. Total 93 subjects with restricted diffusion with age range of (3 to 95 years) were included. Data were analyzed using statistical software package, STATA 9.2 and the difference was considered to be significant if 'p' value was found to be <0.05.

Results: As the time increases the percentage decrease in ADC value of infarcts decreases in a linear relationship. It comes to normal after 1 week. Most the cases of infarcts in which MRI was done within 48 hours had their ADC value less than $400x10^{-6}$ mm^2/ s. Lesions of encephalitis were found to be appearing on DWI even earlier than other MR sequences. All the 100% cases of abscess and GBM on surgical diagnosis were correctly diagnosed on MRI.

Conclusion: MRI with DWI and ADC values are functional in temporal evolution of infarcts. ADC values may not be a good predictor in diagnosis and differentiating bleed, ADEM and glioblastoma multiforme.

Keywords: Apparent Diffusion Coefficient, diffusion weighted images, magnetic resonance imaging

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INTRODUCTION

Acute cerebral infract is characterized by hyper intensity on Diffusion Weighted Images (DWI) and low Apparent Diffusion Coefficient (ADC) values. Many theories were proposed to explain the diffusion restriction in acute cerebral ischemia. Decrease in ADC speed in brain tissue is a sensitive indicator of presence and severity of ischemic changes.[1]The most probable theory is that the changes are due to increase in the intracellular-extra cellular water ratio secondary to disruption of intracellular energy metabolism and loss of ionic gradient with cellular swelling, there is reduction in extra cellular space and increased tortuosity of extra cellular space pathways. Increased intracellular viscosity is due to dissociation and fragmentation of intracellular components. An important event in the patho physiological cascade that leads to infarction following ischemia is net movement of water from extra cellular space into intra cellular compartment without increase in total water content in the affected zone. Hence Y2 weighted image will be normal at this stage. Later on, when endothelial breakdown leading to vasogenic edema and total

increase in water content occurs, the T2 weighted image will show bright signal. On the other hand DW imaging is capable of identifying the infarct even before the appearance of vasogenic edema.[2,3] Chronic infarcts are characterized by elevated diffusion and appear hypo, iso or hyper intense on DW images and hyper intense on ADC maps.[4]All the lesions with diffusion restriction may not progress to complete infarction. There are few reports of normalization of initial diffusion restriction in well- controlled animal models of ischemia and in human studies. At the same time, as their experience demonstrates, DWI data alone does not allow differentiation between benign astrocytoma and anaplastic tumours, or between anaplastic astrocytoma and glioblastoma.[5]The information concerning the spreading of infiltrating and growing brain neoplasm is more interesting. The aim of this study is to correlate MRI findings of such lesions with clinical finding and radiological diagnosis with diagnosis after surgery /biopsy whenever undertaken.

MATERIAL AND METHODS

The prospective study done at M.R.I. unit of Department of Radio diagnosis, C.S.M. Medical University, Lucknow during a period of one year from August 2008 to July 2009.Where radiologist evaluating the Magnetic resonance imaging (MRI) was blinded for the clinical data of the patient. Subjects who were showing intra-cerebral lesions with restriction on DWI in MRI study. All those patients were included who referred to Department of Radio Diagnosis for MRI Brain showing restriction on DWI. Total 93 subjects with restricted diffusion with age range of 6 years to 95 years were included.

Technique and Investigation of data:

Conventional T2 Weighted MRI was performed on SIGNA EXCITE 1.5 T GEMSOW (GE) MR SCANNER installed in the department of Radiodiagnosis, C.S.M. Medical University, and Lucknow. A standard head coil with standard restraints was used to fix the subject's head. In addition to axial DW images, conventional fluid-attenuated inversion recovery (FLAIR) T1-, T2-, and proton density-weighted images were obtained. All imaging studies were completed without any adverse effect or complication.

DWI was performed with a spin-echo echo-planar imaging sequence having a repetition time of 4000 ms, an echo time of 103 ms, and a gradient strength of 25 mT/m covering 19 slices 5 mm thick (interslice gap 1.5 mm, field of view 230x230 mm2, and matrix size 96x128 interpolated to 256x256). Diffusion was measured in 3 orthogonal directions (x, y, and z) with 2 b values (b=0 and b=1000 s/mm2). The total acquisition time of the DW images was 20 seconds.

DW images were relocated to a discrete workstation for data analysis. First, the images in the 3 orthogonal directions were co registered. The natural logarithms of the images were averaged to form a rotationally invariant resultant image. With a linear least-squares regression on a pixel- by-pixel basis, the resultant image and the natural logarithm of the reference T2-weighted image (b=0) were fitted to the b values, where the slope of the fitted line was ADC av. The calculations were performed with a commercially available software program (Functool). Range of ADC values in different brain lesions shall be measured and its Distribution in different cerebral lesions shall be determined. ADC values in normal appearing white matter on conventional MR1 were measured.ADC map were obtained by spin echo T2 Echo Planar Imaging sequences made sensitized to random diffusion of water molecules using “pulsed magnetic gradient”.

Diffusion-Weighted Imaging: Methodology

- Human axial images with increasing diffusion weighting over a range of b values are acquired sequentially.
- The signal change resulting from diffusion is fitted to a single exponential of signal intensities against the h value, the slope of the change being the ADC.
- Resulting computed ADC map is composed of the slopes for all pixels in the original images.

Differences can be noted in the last and slow diffusion rates (E.g., between cerebrospinal fluid and gray matter) are best visualized at higher b values, given sufficient signal-to-noise ratios. DW examination must contain both a low b values and high b values.[6,7]

Statistical analysis

Data were analyzed using statistical software package, STATA 9.2 The proportion was reported with its 95% Confidence Intervals (95% CI). Chi square test statistics was applied to test the association between two categorical variables. Two sample t-test was applied to test the difference between the mean of two different groups, it data was normally distributed otherwise Mann Whitney test was applied and the difference was considered to be significant if 'p' value was found to be <0.05.

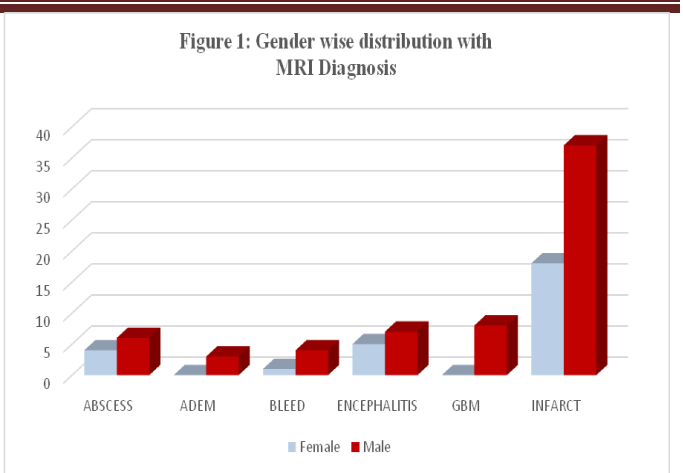
RESULTS

Study included 93 subjects with restricted diffusion with age range of 6 years to 95 years. The study comprised of subjects which were depicting intra-cerebral lesions with restriction on DWI in MRI.

Table 1: Age wise distribution with MRI Diagnosis

Age group	Abscess		ADEM		Bleed		Encephalitis		GBM		Infarct	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<18	4	40.0	2	66.7	0	0.0	8	66.7	0	0.0	2	3.6
18 to ≤60	6	60.0	1	33.3	3	60.0	4	33.3	8	100.0	32	58.17
>60	0	0.00	0	0.00	2	0.0	0	0.00	0	0.0	21	38.17
Total	10	100.0	3	100.0	5	100.0	12	100.0	8	100.0	55	100.0

Table 1 shows that the Majority of Encephalitis cases were seen in young age group less than 18 year of age (66.7%).Most of the infarct cases are seen in more than 18 years and less than equal to 60 years of age (58.17%). 38.17% of cases of total DWI restriction cases above 60were contributed by infarct. All the cases of ADEM were of below 60 years of age. All the GBM cases were belongs to more than 18 years and less than equal to 60 years.



All the cases of GBM, ADEM are male. 80% cases of bleed were seen in male. Infarct is more common in male. (Figure 1)

Table 2: Distribution of Clinical Diagnosis with MRI Diagnosis

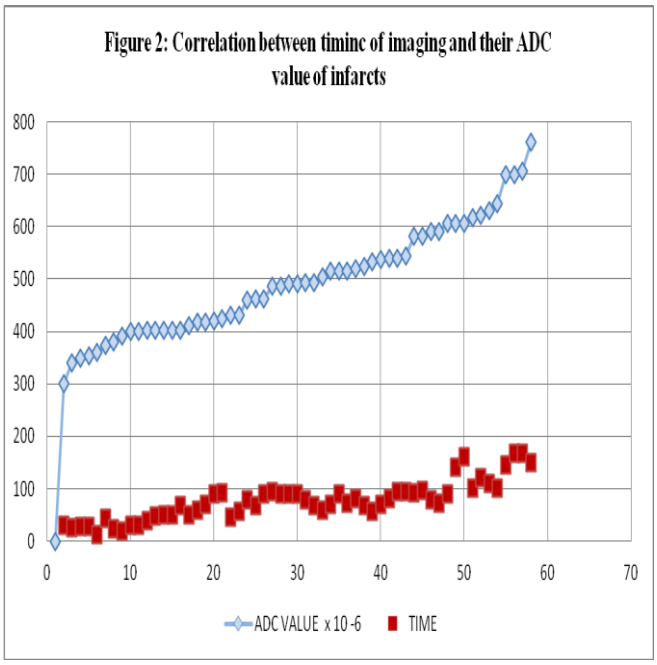
Clinical Diagnosis	ABSCESS	%	ADEM	%	BLEED	%	ENCEPHALITIS	%	GBM	%	INFARCT	%
Abscess	7	70.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ADEM	0	0.0	1	33.3	0	0.0	0	0.0	0	0.0	0	0.0
Bleed	0	0.0	0	0.0	3	60.0	0	0.0	0	0.0	2	3.6
Encephalitis	0	0.0	2	66.7	0	0.0	8	66.7	0	0.0	4	7.3
Meningitis	0	0.0	0	0.0	0	0.0	4	33.3	0	0.0	0	0.0
SOL	3	30.0	0	0.0	0	0.0	0	0.0	7	87.5	0	0.0
Stroke	0	0.0	0	0.0	2	40.0	0	0.0	1	12.5	49	89.1
Total	10	100.0	3	100.0	5	100.0	12	100.0	8	100.0	55	100.0

Above table 2 illustrates that the distribution of clinical diagnosis with MR diagnosis. 7 out of 10 cases of abscess lamination and rest 3 cases diagnosed as intracranial neoplasm. On clinical examination total 10 cases had given possibility of intracranial neoplasm of which 7 diagnosed as GBM and 3 as abscess on MR evaluation. However 7 out of 8 cases of GBM (on MR diagnosis) had given the possibility of intracranial neoplastic pathology

Table 3: Correlation between timing of imaging and their ADC value of infarcts

Time After Infarct	No. of cases	Average ADC 10^{-6} mm ^{2}/s	% Decreased ADC value
<48 hours	10	374.40	57%
48-96 hours	35	493.11	38%
96 hours-7days	10	650.00	18%

Maximum decrease in ADC value was seen in first 48 hours (57%). ADC value approached near normal value up to 7 days after infarct, (average decrease in ADC value 18%).



Above figure 2 comprised 55 infarct patients. Ten patients underwent imaging during the first 48 hours after clinical stroke, 35 patients between 48 and 96 hours, and ten patients between 4 and 7 days. The trace value of the estimated diffusion tensor was used for each ADC measurement, representing the average of region-of interest values along the three principal diffusion axes. On the average, ADC values decreased by about 35%. ADC values were initially falling by approximately 60% but returning nearly to normal by the end of the 1st week. In first 48 hours the ADC value decreased by 57 %, in next 48 hours by 38% in our study and it returns up to normal at the end of 1st week .

Table 4: Correlation between Surgical and MRI diagnosis

SURGICAL DIAGNOSIS	MRI DIAGNOSIS	
	ABSCESS	GBM
ABSCESS	5(100%)	0(0.0%)
GBM	0(0.0%)	5(100%)

All the 100% cases of abscess and GBM on surgical diagnosis were correctly diagnosed on MRI (table 4)

DISCUSSION

This prospective study was done at M.R.I. Unit of Department of Radio diagnosis, C.S.M. Medical University, and Lucknow during a period of one year from August 2008 to July 2009. In present study, 12 cases of encephalitis were diagnosed correctly on clinical examination. 4 cases of encephalitis were diagnosed as meningitis on clinical evaluation. On clinical examination total 10 cases had given possibility of intracranial neoplasm of which 7 diagnosed as GBM and 3 as abscess on MR evaluation. However 7 out of 8 cases of GBM (on MR diagnosis) had given the possibility of intracranial neoplastic pathology. 94% cases were diagnosed as stroke on clinical examination. 3 out 5 cases bleed were diagnosed correctly on clinical evaluation. In addition, study performed by, Jonathan H. Burdette et al[8] reported that MR imaging results each infarction imaged during the Is1 week was noted to be markedly hyper intense to normal brain on DW images. However, the relative values of ADC differed markedly as a function of time during this period. Thus on comparison with this study, present finding shows agreement in temporal evolution of infarct and change in their ADC value along with time. At the end of one week ADC value come to near normal value and diffusion hyper intensity mainly contributed by the T2 shine through effect. In that sequence, present stated that reliable time of clinical ictus could be established in all patients to within plus or minus 6 hours. Each infarction imaged during the 1st week was noted to be markedly hyper intense to normal brain on DW images. Examination of the time course of these changes is even more informative. Our findings shows that with use of current diffusion gradients with maximum b values of 1,000 sec/mm2, for the first 2-3 days, the increased SI on DW images

results principally from restricted diffusion (i.e. shortening of ADC). Thereafter, T2 effects provide the dominant mechanism of image contrast. Correlation between MR diagnosis and surgical/ histopathological diagnosis. Surgical / histopathological diagnosis was available in 10 out of 93 cases. In which 5 cases were of abscesses, 3 of GBM and 2 of high grade glioma. All the 100% cases of abscess and GBM on surgical diagnosis were correctly diagnosed on MRI. Furthermore, McCabe et al[9] stated after study that DWI could be positive in the early disease phase, even when PCR findings are negative. Lesions could be recognized as early as 40 h after symptom onset in adults. In present study earliest lesion appears on DWI is 48 hours after onset of symptoms. However the lesion is not appeared on other sequences. Thus, present study shows agreement with above study. Sener[10] demonstrated decreased ADC values in diseased parenchyma in encephalitis and, in my study, the apparent diffusion coefficient values were decreased in the cortical lesions of all cases compared with normal tissue. Thus present study is showing concord with his findings.

CONCLUSION

As the time increases the percentage decreases in ADC value of infarcts decreases in a linear relationship. It comes to normal after 1 week. Most the cases of infarcts in which MRI was done within 48 hours. MRI with DWI and ADC values are functional in temporal evolution of infarcts. ADC values may not be a good predictor in diagnosis and differentiating bleed, ADEM and glioblastoma multiforme.

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STUDY OF MANDAKINI OFF LOADING OF DIABETIC FOOT ULCERS AMONG LOW SOCIOECONOMIC STATUS PATIENTS

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ABSTRACT

Introduction: Offloading is an essential treatment modality that is a key in preventing and healing of ulcers in the foot of diabetes patients. Various different offloading modalities exist with each having their own advantage and disadvantage. The aim of present study is to assess the economical suitability of Mandakini off loading in the treatment of diabetic foot ulcer among low socio-economic status patients.

Material and Methods: The diabetic foot ulcer cases were randomly taken from the out and in patient departments of Medicine and Surgery of Darbhanga Medical College and Hospital, Laheria Sarai, Bihar. The patients selected were put to use Mandakini off loading device. After taking written consent, they were examined in detail and appropriate investigations were done. Results were analyzed and presented in number and percentages.

Results: Out of 50 patients, 35 were males and 15 were females. Majority (62%) of patients were of low socioeconomic status. The mean duration of hospital stay for patients who had undergone offloading was 20.10 days and the mean cost of Hospital stay for the offload group was Rs. 1136.

Conclusion: Mandakini offloading device is effective, feasible, with shorter hospital stay, has lesser number of dressings required, lesser doses of antibiotics and lesser economic burden on the patient.

Keywords: Offloading; diabetic ulcers; mandakini offloading , socio-economic status

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INTRODUCTION

India has the largest number of people with diabetes in the world. Today Indian Diabetic population is about 61.3 millions [1] that means total 122 million foot is at risk of getting Diabetic Foot Ulcer (DFU). It is also expected that this figure in 2025 will reach to 73.5 million.[2] Every 3 sec a new case of diabetes is diagnosed and every 30 sec a lower limb is amputated somewhere due to diabetes.[3] Worldwide, more than 1 million amputations are performed each year with up to 70% of these amputations related to diabetes. Foot problems are common, complex, and costly problem in a patient with diabetes. [4-7] It is a commonest cause of hospital admissions for people with diabetes.[8] It is estimated that 15% of patients with diabetes will develop a lower extremity ulcer during the course of their disease.[9] Diabetic patients are 17 times more likely to develop gangrene of the foot than are persons without diabetes, and gangrene of the lower extremity occurs in 20%-30% of patients with maturity onset diabetes.[10] DFU is basically a pathophysiologic problem in biomechanics of foot. Due to pan neuropathy in diabetes there is altered biomechanics and insensate foot does not appreciate the pressure at planter level and ultimately land up with a diabetic planter ulcer. Offloading is the major solution for healing of this plantar lesions along with adequate blood supply, control of infection, excellent wound care.[11,12] The available Offloading techniques are: Bed rest, cutout felt pads, crutches, wheelchairs, zimmer frame, temporary shoes, ortho wedge shoes like rocker-bottom wedge design shoes and total contact casting.[13-15] These devices are expensive. Above all procedures have many advantages towards healing, but disadvantages towards patient compliance & cost factor. Indian rural population does not allow their wide usage. It does notpermit our patient to take complete bed rest. They have to work for their

livelihood.[16] The aim of present study is economical Mandakini off loading suitable for low socio-economic status in the treatment of diabetic foot ulcer.

MATERIAL AND METHODS

The cases were randomly taken from the out and in-patients department of Medicine and Surgery of Darbhanga Medical College and Hospital, Laheria sarai, Bihar, duration 2012 to 2013. Five hundred patients having diabetes and coming to the OPD or emergency for some or the other reasons were examined and observed after taking a detailed history. Of these patients, 50 patients had been selected to use Mandakini off loading device which needed admission. After taking written consent, they were examined in detail and appropriate investigations were done.Cases were inquired about their age, sex, occupation, residence, duration of diabetes, presenting complaints, past medical and surgical history, addictions, socioeconomic status, behaviour, family history, allergies and past treatment history.

Inclusion Criteria

Patient with type 1 and type 2 diabetes mellitus having ulcer in the plantar aspect of foot involving not more than half of surface.

Exclusion Criteria

Diabetic foot ulcer with osteomyelitis.
Diabetic foot ulcer with peripheral vascular disease.
Larger ulcer involving more than half of the plantar ulcer of foot.
Plantar ulcer other than diabetic ulcer like Hansen disease

RESULTS

These patients came with different sets of complaints not necessarily diabetic ulcers of these 50 patients had diabetic foot affections which needed admission and these patients were investigated and assessed in details.

Table 1: Gender wise distribution of subjects

Gender	Off loaded	Percentage (%)
Male	35	70%
Female	15	30%
Total	50	100%

Out of 50 patients off loaded, 35 were males and 15 were females.

Table 2: Distribution of subjects with respect to socio-economic Status

Socio-economic status	Off loaded	Percentage
Lower Gross income <Rs. 4555/month	31	62%
Middle Rs. 4555-15000/month	13	26%
Upper> 15000/month	6	12%

Out of 50 patients who were offloaded 31 patients were of low socioeconomic status, 13 patients were of middle and 6 patients belonged to upper socio-economic status.

Table 3: Duration of Hospital Stay of subjects

Duration of Hospital Stay	Off loaded	Percentage
<20 days	32	64%
20-30 days	13	26%
>30 days	5	10%
Total	50	100%

Among the patients studied the mean duration of hospital stay for patients who had undergone offloading was 20.10 days.

Table 4: Number of Dressings

No. of Dressings	Off loaded	Percentage
1-5	34	68%
6-10	13	26%
10+	3	6%
Total	50	100%

Most of the patients who had undergone Mandakini offloading device required 1 to 5 dressing.

Table 5: Duration of antibiotics given to subjects

Number of days of antibiotics given	Off loaded	Percentage
<15 days	15	30%
15-30 days	29	58%
>30 days	6	12%
Total	50	100%

Among patients who had undergone offloading mean duration of antibiotics administered was 21.7 days.

Table 6: Cost Effectiveness in Hospital stay

Cost of Hospital stay (in Rs.)	Off loaded	Percentage (%)
<1000	31	62%
1001-1500	15	30%
>1501	4	8%
Total	50	100%

Among the patient studied the mean cost of Hospital stay for the offload group was Rs. 1136/-

DISCUSSION

The present study determined effectiveness of Mandakini Offloading device. Out of 50 patients selected for study 35 patients (70%) belong to male and 15 patients (30%) belong to female. In addition, in the comparative study did by Ansari and Kumar[17] between Mandakini off loading and conventional, includes male and female sex ratio is 63.3% and 36.7 % in mandakini off loading. According to Kuppuswami[18] classification socio-economic status of patient was divided into three categories. Most of diabetic foot patient are belong to low socio-economic status (62%). William and pickup (2004)[19] pointed out that limited knowledge, poor foot care practices and cultural belief endangers the poor socioeconomic population to diabetic foot. Whereas, Bolzoni et al (2004)[20] in his study found in 76% of patient poor socioeconomic status as a risk factor for the foot complication of diabetes. Socioeconomic status has got bearing with the incidence of diabetic foot. As diabetic toot occurs mostly in case of diabetes mellitus that is either uncontrolled or poorly controlled. The economical weaker section is ignorant of this ominous complication of diabetes mellitus, at the same time they have difficulty in controlling their diabetic state because of poverty and financial constrains if they have medically advised about complication of diabetes mellitus. Duration of hospital stay, in the present study who had undergone offloading had shorter duration of stay mean 20.1 dy. Study conducted by Gayle E. Rieber et al [21] show that mean length of hospital stay was around 20.6 days for diabetic patients with foot ulcer. Therefore duration of hospital stay is lesser in Mandakini offloading device. In the present study patient who had undergone offloading 34/50 (68%) patient required 1-5 dressing. Sunil V. Kari[22] in his study concluded that, number of dressing used for offloading diabetic foot ulcer were significantly lesser than as compared to non offloaded groups. Duration of antibiotic given, in the present study patient who had undergone offloading required lesser duration of antibiotic administered. Sunil V Kari[22] in his study concluded that duration of antibiotic given was significantly lesser than as compared to non offloaded groups. Mean duration of antibiotic administered was 21.7 days. While consider the expenditure of hospital stay, average expenditure of hospital stay for patient who have undergone offloading was Rs. 1136/-. Sunil V. Kari[22] in study mention that total expenditure for offloaded patient was much lesser, as the total length of hospital stay and number of dressing used were also low, and hence be recommends that using offloading technique, for diabetic plantar ulcers is economical.

CONCLUSION

Hence the present study favors the off loading technique for plantar ulcers in diabetic patients as this technique is more tolerable, has shorter hospital stay, requires lesser number of dressings, requires lesser doses of antibiotics and lesser economic burden on the patient.

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STUDY OF EFFICACY AND COMPLICATIONS ON FOLLOW UP OF POST-PARTUM IUCD (PPIUCD) IN A TERTIARY CARE HOSPITAL OF DELHI

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ABSTRACT

Introduction: In Indian set up contraception is the most important but least discussed topic between a patient and a health care provider. Post-partum period is very important for providing proper contraceptive counselling to the new mother because at this time they are highly in need of contraception and very motivated. PPIUCD has been launched few years back by Indian government which can be used in the immediate post-partum period and is long acting. This study was undertaken to study the efficacy and complications encountered on the follow up of PPIUCD (Cu T 380 A).

Material & Methods: This was a prospective cohort study conducted in Hindu RaoHopsital for a period of 18 months where 650 women coming for PPIUCD follow up in family planning OPD were included. The follow up was done at 6 weeks, 6 months, 1 year and 2 years post insertion. The complaints were recorded and percentage was calculated. Also for women wanting PPIUCD removal, analysis for reason of removal was done.

Results: Majority of the females who came for PPIUCD follow up were in age group of 25-34 years, second or third para and educated upto high school. The complications on follow up were as follows- no complication (50%), missing thread (25%), menorrhagia (11%), infection (3%), pain (5%), expulsion (5%) and failure (1%).

Conclusions: PPIUCD is a very safe and effective means of contraception with the advantage of immediate post-partum use, no hindrance with breast feeding, no compliance required and reversibility. With improved training programmes, the complications can further be lessened and if proper counselling is done it can prove out to be a great success.

Key words: PPIUCD, post-partum, complications

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INTRODUCTION

Post-partum period is a highly vulnerable period where mothers can easily be motivated to use contraceptive measures. There are many types of contraceptive methods available. Statistics suggests that in India the methods used by people for family planning are-tubal sterilization as the most popular method used by 34% of couples, 4% use oral contraceptive pills, 6% condom, 4% intrauterine contraceptive device (IUCD), 1% male partner sterilization while 46% are not using any type of contraception[1]. Studies suggest that 65% of women have an unmet need of family planning in the first five postpartum years[2]. For these women the best type of contraception can be IUCD as its efficacy is comparable to tubal sterilization with the additional benefit of reversibility and cost effectiveness[3]. Moreover it does not hinder with breast feeding and doesnot require compliance. Also the recommencement of ovulation after delivery is very unpredictable which can be very well taken care by IUCD insertion during puerperium[4]. In developing countries like India, post-partum period is sometimes the only time of contact between the patient and the health care provider and the chances of returning back for contraception advice are very uncertain. Worldwide 127 million users are present who are using IUCD as the most common method

of reversible contraception[5]. Post-partum IUCD is labelled when inserted within 10 minutes after expulsion of placenta up to 48 hours. It has been seen that couples willing for IUCD as contraception drop down from 95% to 45% when shifted from post-partum insertion to interval insertion[6]. Compared to interval IUCD, PPIUCD carries high risk of spontaneous expulsion but it has been seen to decrease when insertion is done by trained personnel[2,7,8]. Recently, post-partum IUCD program was started by Government of India, Ministry of health and family welfare to provide free of cost IUCD insertion(Cu T 380A) to the target couples with the aim to prevent unintended pregnancies, short birth intervals and abortions leading to increased maternal and child morbidity and mortality. Since PPIUCD is a new method, not many studies are available on its follow up. Thus this study was being conducted to find the efficacy and complications of PPIUCD.

MATERIAL AND METHODS

This was a prospective cohort study conducted in Hindu Rao Hospital of Delhi for a period of 18 months after taking due clearance from ethical committee.

Inclusion criteria: All the patients coming to family planning OPD for PPIUCD follow up till 2 years post insertion were included in the study after informed and written consent.

Exclusion criteria: Those individuals who came for PPIUCD follow up and did not give consent for participating in study were excluded.

To the couples who accepted PPIUCD as the method of contraception, CuT 380A was inserted after delivery or intra-caesarean. The patients were then called for follow up at 6 weeks, 6 months, 1 year and then 2 years post insertion. For each patient, her name, registration number, demographic data, time of visit and complaints were recorded. Subsequent visits of every woman were documented against her previous visit to prevent duplication. For all the patients per- speculum examination was done at each visit to see the presence of Cu T thread in the cervical canal. For those where Cu T thread could not be localized, ultrasound (USG) was done to confirm its presence. Patients with complaints of excessive bleeding per vaginum were offered a course of tranexamic acid 1000 mg thrice daily for 5 days. Tranexamic acid was used as its antifibrinolytic property helps in controlling excessive BPV. Those with vaginal discharge or any evidence of infection were given antibiotic treatment accordingly. Patients complaining of pain were given analgesics.

Statistical analysis: The data was grouped based on complaints encountered at follow up and percentages were calculated to evaluate the results. Software used was IBM SPSS 20.0.0.

RESULTS

In this prospective cohort study, a total of 650 women who came for PPIUCD follow up were included. Majority of the study population belonged to 25-34 years of age and were second or third para. The age distribution and parity wise distribution of the study population is shown in Figure 1 and Figure 2 respectively. Majority of the females who accepted for PPIUCD were educated up to high school, very few illiterate women (only 23%) accepted for PPIUCD. Figure 3 shows the literacy wise status of the study population. The results of the follow up of PPIUCD are as mentioned in Table 1. Majority of women (50%) were found satisfied with PPIUCD with no complaints. A total of 5% women had spontaneous expulsion while 25% had missed thread with PPIUCD in situ where thread got coiled inside. PPIUCD failure also occurred in 6 patients who conceived with PPIUCD in situ. For 94 patients, PPIUCD removal was done because 27 desired next pregnancy and the rest were not wishing to continue with PPIUCD (15 because of BPV, 7 because of vaginal discharge and 18 because of lower abdominal pain and remaining 27 had no clear reasons - Table 2).

Figure 1: Age Distribution of study population

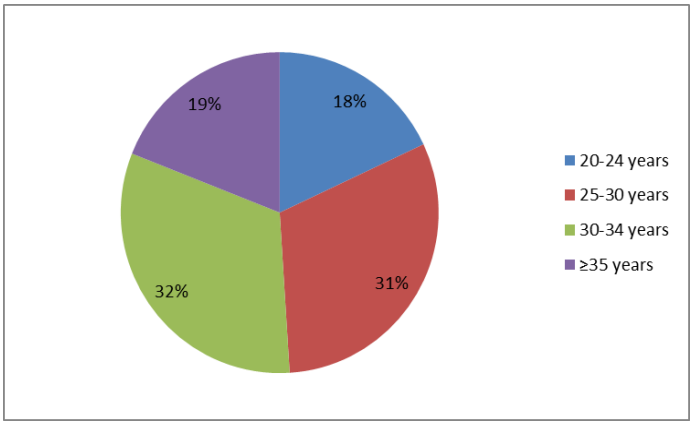

Figure 2: Distribution of study population based on parity

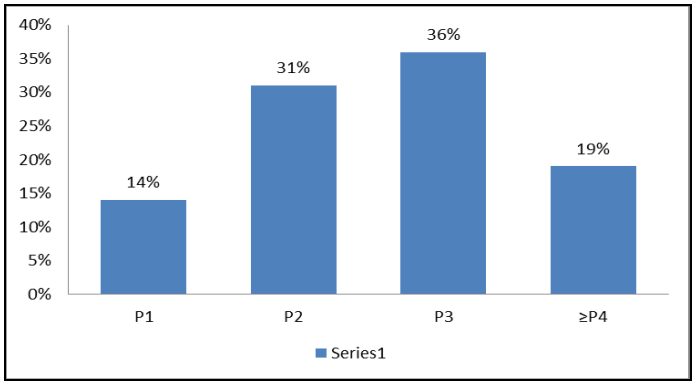

Figure 3: Distribution of study population based on literacy status

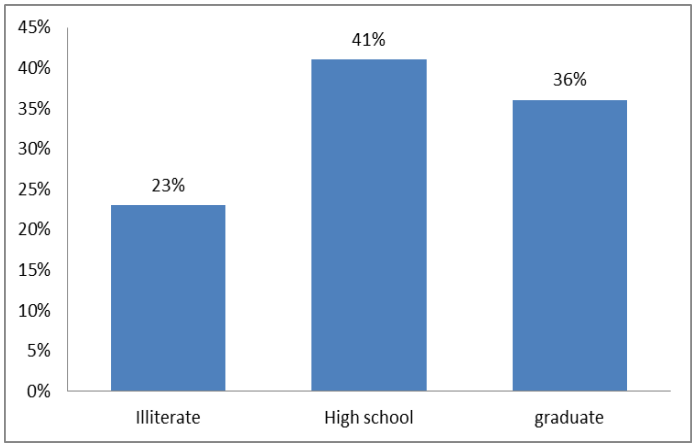

Table 1: Complications on follow up of PPIUCD

Complications	N	%
No complaints	326	50
Missing thread	162	25
Menorrhagia	70	11
Infection	20	3
Lower abdominal Pain	33	5
Spontaneous expulsion	33	5
PPIUCD failure/pregnancy	6	1

Table 2: Reasons for removal of PPIUCD

Reasons	N (Total=94)	%
Next pregnancy desired	27	29
ExcessiveBleeding per vaginum	15	16
Infection	7	7
Lower abdominal pain	18	19
Vague reasons	27	29

DISCUSSION

Post-partum IUCD is a very effective method of contraception that can be offered to target couples in the immediate post-partum period. As the results demonstrate, it is very effective with only 1% failure rate. Majority of the couples are not facing any problem on its continued use. In the present study, PPIUCD was mainly accepted by second or third parous women and less by primiparous. Results showed that 25% of the women had missing thread due to its coiling and Cu T was detected in-situ by ultrasound. This is much higher compared to study done by Bansal et al where rate of missing thread was just 16%[1]. This can be reduced by improved training of the health care workers regarding proper PPIUCD placement. The rate of expulsion is higher than interval IUCD because of large size of uterus in post-partum period but it can be further reduced by conducting training programmes[9]. In the present study the abnormal uterine bleeding complications were 11% which were similar to other studies where also they were found to be the most common complication[1,10]. The rate of infection has been seen to vary a lot amongst different studies. It has been found to be 0.75% in study by Doley et al to 9.5% in study by Bansal etal[1,11]. In our study only 3% of the women complained of infection which suggests that the rate of infection while PPIUCD insertion can be reduced by practicing improved sterility methods. Proper cervical preparation and no touch technique can reduce the rate of pelvic infection post insertion drastically. By reducing the risk of complications we can further increase the acceptability of PPIUCD among the general population. Finally we also observed in the study that 94 females got PPIUCD removed because 27 desired next conception and a similar number got it removed for vague reasons, family pressures and myths. So we need to involve male partner also actively while counselling for PPIUCD to improve its acceptance and for better results.

CONCLUSION

Post-partum IUCD has been a very safe and effective means of contraception. It is providing good success rate and no requirement of compliance with the additional advantage of reversibility. Also in Indian setting where women may contact health

care services only during delivery, it is a good method to provide contraception along with it. As the government strategies are promoting more and more institutional deliveries, PPIUCD can prove to be a very good means of birth spacing and population control in India.

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THE INFLUENCE OF VARIOUS SURGICAL INCISIONS ON EARLY POSTOPERATIVE HYPOXAEMIA IN ADULT PATIENTS UNDERGOING ELECTIVE SURGERY

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ABSTRACT

Introduction: Early postoperative hypoxemia has been a matter of concern for a number of years. However, there is still controversy concerning the relationship between the operative sites and occurrence of early postoperative hypoxemia. Some studies found that the operative site was associated with post-operative hypoxemia but not in the early postoperative period. The aim was to see effect of hypoxemia in early post operative period in different types of incisions in elective surgeries.

Material and Methods: We conducted an observational study in 43 patients admitted in B.R.D. medical college and associated hospitals, Gorakhpur. All patients were examined clinically for cardio respiratory parameters and divided into groups on basis of surgical sites and types of incision. The data was analyzed using SPSS version 22 software. All the data was given as mean± S.D. The statistical evaluation comparison with preoperative value was done by sample 't' test to determine the statistical significance of different groups.

Results: The severity of arterial oxygen desaturation, incidence and duration of hypoxaemia during early postoperative period were closely related to surgical sites and types of incision and they were more pronounced for upper abdominal and thoracic surgery than lower abdominal surgery. Patient having vertical incision were more vulnerable to hypoxaemia than transverse incision. In group I the mean SpO_2 approached to preoperative value after 1 hour postoperative but on statistical evaluation significant decrease in SpO_2 was observed (from 99.583±0.669 to 98.583±0.791, $p<0.05$).) In group II on clinical evaluation SpO_2 increased to preoperative value after 1 hour on statistical evaluation found to be insignificant (99.750±0.452 to 9.667±0.492, $p>0.05$).

Conclusion: The need for respiratory monitoring and oxygen therapy during early postoperative period and early evaluation to pain relief is required even in healthy uncomplicated elective surgery particularly upper abdominal and thoracic surgery to avoid most of the pulmonary complication.

Key words: Early postoperative hypoxaemia , elective surgery , different surgical incision

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INTRODUCTION

Early postoperative hypoxemia has been a matter of concern for a number of years. Because of the introduction of pulse oximeters into clinical practice, the factors that may influence the occurrence of early postoperative hypoxemia, such as age [1-3], gender [3], weight [3,4], intraoperative opioid administration [1-3], smoking [2], duration of anesthesia [2-6], and preexisting heart and lung disease [7,8], have been studied extensively. Obesity, old age, smoking, and preexisting heart and lung disease clearly predispose patients to early postoperative hypoxemia [7]. Postoperative arterial desaturation and mechanical impairment of respiratory function are probably the most frequent for thoracic and upper abdominal surgery versus lower abdominal surgery and peripheral surgery [1,9,10]. However, there is still controversy concerning the relationship between the operative sites and occurrence of early postoperative hypoxemia. Some studies found that the operative site was associated with post-operative hypoxemia [11], but not in the early postoperative period. [12] So by this study we try to find out the

incidence, severity and duration of Early postoperative hypoxemia in other wise in healthy adult patients undergoing different types of surgical procedures, and evaluate the influence of surgical sites and type of incision on incidence and severity of hypoxemia and to compares different mode of therapy to treat hypoxemia.

MATERIAL AND METHODS

This observational study was conducted of admitted patients in B.R.D. medical college and associated hospitals, Gorakhpur and willing to give consent for the study. . Total number of 43 patients were selected of either sex aged 20- 60 years of age admitted in Nehru hospital, B.R.D. medical college Gorakhpur who undergone different types of surgeries according to various types of incisions and surgical sites from October 2002 to October 2004. All Selected patients belonged to American society of anaesthesiologist (ASA) grade I and II. Preoperatively all patients were examine clinically for cardio respiratory parameter like pulse rate, blood pressure, respiratory rate , breath holding time and other relevant systemic examination. patients having any systemic disorder were excluded from the study. Proper permission from ethical was taken. Total number of patient divided according to site of operation and various types of surgical incision used.

According to the site of operation patients divided into two groups. Further they divided into four subgroups i.e. groups Group- I a : Vertical incision, Group – I b : Transverse incision Group – II a: vertical incision and Group – II b: Transverse incision. In the anesthetic room routine monitoring like pulse rate, blood pressure, electrocardiogram and SpO_2 recording were done by multichannel monitor. An intravenous line was secured with appropriate size of cannula. All patients were premedicated with midazolam 2 mg, glycopyrrolate 0.2mg, pentazocine 7.5-15 mg 10 minutes before the induction of general anesthesia.

Balanced general anesthesia was used for all cases. The induction of anesthesia was done with intravenous thiopentone sodium and succinylcholine was used to facilitate the endotracheal intubation, maintenance of anesthesia was done on N_2 O and O_2 , muscle relaxation was given by the non-depolarising muscle relaxant atracurium/vecoronium. Reversal of neuromuscular block was done by intravenous injection neostigmine and glycopyrrolate in appropriate dose.

During preoperative and postoperative period patients were monitored for their cardiorespiratory parameter like pulse rate, blood pressure, respiratory rate and arterial oxygen saturation (SpO2) by using multichannel monitor for observation of hypoxaemia. This was graded as- Mild hypoxaemia 86-90 %, Moderate hypoxaemia 81-85 %, Severe hypoxaemia 76-80 % and Extreme <76 %. When SpO_2 was <90 % continuously for 30 seconds or more in patients was recorded as hypoxaemia.

After thorough assessment of the patients on the basis of above mentioned parameters tabulation was done and the both groups were compared to work out the significance. Statistical calculations were taken to evaluate the different reading. All the data were given as mean± S.D. the statistical evaluation comparison with preoperative value was done by sample 't' test to determine the statistical significance of different groups.

RESULTS

Maximum patients were between 31-50 years in Group I and 21-30 years in Group II .Most of the patients were female in both groups 60.87% and 75 % respectively.

Table 1 shows that most of the cases were operated in group I were cholecystectomy which constitute about 39.13 and in group II exploratory laparotomy with cystectomy and oophorectomy.

It was observed that in Group I vertical incision constitutes 52.17% and transverse incision 47.82% and in Group II vertical incision constitutes 60% and transverse incision 40.0%.

Most of the cases were done in 60-90 minutes i.e. 26.08%.in Group I and 45.0% in Group II.

Table 1: Different surgical procedures with diagnosis

Procedure	No. of cases	Percentage
Group I		
Cholecystectomy	09	39.13
Nephrectomy	01	04.34
Exploratory laparotomy with partial gastrectomy	04	17.39
Pylolithotomy	01	04.34
exploratory laparotomy	02	08.69
Nodule excision	01	04.34
Thoracotomy	01	04.34
Partial nephrectomy	02	08.69
Anteriolateral decompression	02	08.69
Group II		
Total abdominal hysterectomy	02	10.0
Exploratory laparotomy with cystectomy	03	15.0
Iliostomy closure	03	15.0
LSCS	02	10.0
Fenestrine operation	01	05.0
Herniorhaphy	03	15.0
Exploratory laparotomy with oophrectomy	03	15.0
Appendicectomy	01	05.0
Myomectomy	02	10.0

Table 2: Comparison of mean pulse rate and different intervals with preoperative value

Group	Sub-group	Intra-operative after intubation		Intra-operative before extubation		Immediate post operative ½ hour		Post operatively at 1 hour		Post operatively at 2 hour		Post operatively at 3 hour		Post operatively at 5 hour		Post operatively at 6 hour	
		't' value	'p' value	't' value	'p' value	't' value	'p' value	't' value	'p' value	't' value	'p' value	't' value	'p' value	't' value	'p' value	't' value	'p' value
Group I (upper abdominal and thoracic surgery)	Vertical incision (1a)	2.97	<0.05 S↑	0.5666	>0.05 INS	5.112	<0.001 MHS↑	1.146	>0.05 INS	1.188	>0.05 INS	0.539	>0.05 INS	0.231	>0.05 INS	0.268	>0.05 INS
	Transverse Incision (1b)	1.335	>0.05 INS	1.036	>0.05 INS	1.319	>0.05 INS	2.585	>0.05 INS	2.113	>0.05 INS	2.279	>0.05 INS	2.116	>0.05 INS	2.116	>0.05 INS
Group II (Lower abdominal surgery)	Vertical incision (II a)	2.996	<0.01 HS↑	0.106	>0.05 INS	4.058	<0.001 MHS↑	1.302	>0.05 INS	1.178	>0.05 INS	0.0	>0.05 INS	1.561	>0.05 INS	1.56	>0.05 INS
	Transverse Incision (II b)	1.75	>0.05 INS	0.848	>0.05 INS	2.647	>0.05 INS	0.589	>0.05 INS	1.693	>0.05 INS	1.639	>0.05 INS	1.640	>0.05 INS	1.640	>0.05 INS

INS = Insignificant S = Significant HS =Highly significant MHS=Most highly significant

In above table the significant rise in pulse rate was observed just after intubation and just after extubation in all groups.

Table 3: Mean systolic blood pressure changes per minute at different intervals

Groups	Subgroups	Pre-Operative	Intra-operative After intubation	Intra-Operative Before Extubation	Immediate Post Operatively 1/2 Hour	Post-Operatively At 1hour	Post-Operatively At 2hour	Post – Operatively At 3 hour	Post – Operatively At 5 hour	Post – Operatively At 6 hour
Group I (Upper Abdominal and Thoracic Surgery)	Vertical Incision (1a)	110.500± 17.144	142.333± 15.992	124.360± 17.258	146.330± 19.190	121.917± 16.703	122.167± 14.224	119.00± 13.504	118.000± 10.340	115.280± 10.463
	Transverse Incision (I b)	122.624± 16.777	147.727± 19.664	124.364± 17.160	149.545± 11.273	124.273± 15.486	117.909± 16.902	116.545± 15..042	116.455± 15.286	114.818± 12.983
Group II (Lower Abdominal Surgery)	Vertical Incision (II a)	120.417± 17.069	143.750± 11.871	128.050± 13.633	149.50± 12.340	127.083± 15.024	123.417± 12.551	123.003± 09.653	120.250± 07.700	120.083± 08.118
	Transverse Incision (II b)	119.500± 9.607	138.00± 12.031	127.357± 19.947	137.875± 12.443	128.500± 07.091	127.00± 08.552	124.000± 06.118	122.750± 07.815	120.200± 5.776

Above table shows significant increase in systolic blood pressure recorded in both groups after intubation and after extubation, from110.5±17.144 to 142.333±15.992 just after laryngoscope and intubation, and 146.33±17.258 just after extubation in subgroup Ia; from 120.624±16.777 to 117.727±19.064, just after laryngoscope and intubation and to 149.50±12.340 just after extubation. from 120.417±17.069 to 143.750±11.871 just after laryngoscope and intubation and to 141.50±12.340 just after extubation in sub- IIa; and from 119.50±9.607 to 138.00±12.031 just after intubation and to 137.875±443 just after extubation in sub-group IIb.

Table 4: Mean diastolic blood pressure change per minute at different intervals

Groups	Subgroups	Pre Operative	Itra-Operative After Intubation	Intra-Operative Before Extubation	Immediate Post Operative ½ hour	Post Operatively At 1 hour	Post Operatively At 2 hour	Post Operatively At 3 hour	Post Operatively At 5 hour	Post Operatively At 6 hour
Group 1 (upper Abdominal and thoracic Surgery	Vertical Incision (1a)	067.500± 14.222	091..250± 11.545	084.417± 03.899	090..330± 12.093	076.667± 15.156	078.333± 11.300	073.917± 11.626	074.417± 08.607	073.917± 09.539
	Transverse Incision (I b)	082.400± 12.000	087.455± 10.838	078.090± 12.911	096.636± 10.279	079.364± 07.698	073.182± 10.147	074.091± 08.769	071.909± 09.651	071.636± 09.458
Group II (Lower Abdominal Surgery)	Vertical Incision (II a)	080.167± 09.243	091.917± 07.728	080.250± 12.061	096.583± 07.609	080.083± 08.712	077.333± 06.650	077.417± 07.064	076.167± 07.120	076.500± 07.622
	Transverse Incision (II b)	080.375± 08.035	089.111± 10.167	078.375± 09.999	089.750± 12.506	081.500± 03.703	080.875± 02.944	077.750± 06.135	076.125± 07.549	076.625± 5.655

The significant rise in diastolic blood pressure was observed in all both groups from 67.500±14.222 to 91.250±11.545 just after intubation and 90.333±12.093 just after extubation in subgroup Ia; from 82.400±12.000 to 87.455±10.838 just after intubation and to 96.636±10.729 just after just after extubation in in subfroup Ib; from 80.167±9.243 to 95.917±7.728 just after intubation and to 96.583±7.609 just after extubation in subgroup IIa and from 80.375±80.035 to 89.111±10.167 just after intubation and to 89.750±12.506 after extubation in subgroup IIb. The laryngoscopy, tracheal intubation and extubation violets the patients protective airway reflexes leading to sympathetic simulation which cause tachycardia and hypertension immediate after intubation and extubation.

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Table 5: Respiratory rate change per minute at different intervals

Groups	Subgroups	Pre Operative	Immediate Post Operative ½ hour	Post Operatively At 1 hour	Post Operatively At 2 hour	Post Operatively At 3 hour	Post Operatively At 5 hour	Post Operatively At 6 hour
Group 1 (upper Abdominal and thoracic Surgery	Vertical Incision (1a)	18.500± 02.111	28.667± 04.775	26.833± 04.629	24.667± 03.447	23.000± 02.763	22.500± 02.111	21.667± 02.674
	Transverse Incision (I b)	19.273± 02.412	30.000± 07.537	26.909± 05.243	25.636± 03.880	22.909± 04.036	22.909± 02.427	22.182± 1.662
Group II (Lower Abdominal Surgery)	Vertical Incision (II a)	17.833± 1.337	25.667± 04.960	26.667± 04.207	21.000± 03.247	22.667± 03.229	19.833± 02.329	20.000± 03.303
	Transverse Incision (II b)	17.250± 1.488	25.000± 04.781	19.750± 02.915	19.000± 03.040	18.000± 01.512	18.250± 01.669	17.500± 00.926

Significant increase in mean respiratory rate per minute in immediate postoperative period in all groups. In subgroup Ia respiratory rate, it increased from 18.500±2.11 to 28.607; in sub-group Ib from 19.273±2.412 to 30.000±7.737 to 25.667±4.960 and in sub group IIb, from 17.200±1.488 to 25.00±2.781 after extubation.

Table 6 : SpO2 change per minute with standard at different intervals

Groups	Subgroups	Pre operative	Itra-Operative After intubation	Intra-Operative Before Extubation	Immediate Post Operatively 5 minute	Post Operatively 15minute	Post Operatively 30minute	Post Operatively 1 hour	Post Operatively 2 hour	Post Operatively 3 hour	Post Operatively 5 hour	Post Operatively 6 hour
Group 1 (upper Abdominal and thoracic Surgery	Vertical Incision (1a)	099.583 ± 00.669	099.667± 00.492	099.833± 00.389	093.583± 05.712	091.500± 08.868	093.750± 05.496	097.250± 01.288	097.833± 01.193	097.888± 00.937	098.333± 00.778	098.583± 00.791
	Transverse Incision (I b)	099.636 ± 00.674	099.455± 00.688	099.545± 00.668	091.636± 06.990	93.455± 80.050	095.909± 04.300	097.633± 10.270	098.182± 01.250	098.091± 00.831	098.364± 01.120	098.636± 00.674
Group II (Lower Abdominal Surgery)	Vertical Incision (II a)	099.750 ± 00.452	099.833± 0.389	099.750± 00.688	098.583± 1.887	98.917± 01.505	098.917± 01.165	98.583± 01.832	098.583± 01.170	098.833± 01.586	098.917± 00.793	099.667 00.492
	Transverse Incision (II b)	099.750 ± 00763	099.845± 0.354	099.917± 00.280	097.375± 1.928	098.375± 01.589	098.375± 01.768	098.625± 01.506	099.000± 01.604	99.375± 00.916	099.250± 01.035	099.375± 01.061

Table show no significant change (p>0.05) SpO2 during intra operative period and highly significant decrease in SpO2 in immediate post operative was observed in all groups.Significant reduction in SpO2 was observed in groups I than group II at 15 minutes. In group Ia SpO2 decreased from 99.586±0.699 to 93.583±5.712; in subgroup Ib from 99.636±0.674 to 91.636±6.990; in sub group IIa from 99.750±0.452 to 98.583±1.887; insubgroup IIb from 99.750±0.763 to 97.375±1.928 in immediate post operative period.

In our study the more marked decrease in SpO2 in seen upper abdominal and thoracic operation then the lower abdominal operation. in upper abdominal and thoracic group this decrease in SpO2in more marked in operation having vertical incision than transverse incision.the decreased in SpO2 were more marked in immediate post operative with in 30 minute then SpO2 gradually improved with or without oxygen therapy. however SpO2 decrease seen throughout the observation period but not so marked to labelled as hypoxaemia.

DISCUSSION

The present study was done on 43 patients undergoing different types of surgical operations under general anaesthesia. All the patients were divided into two groups according to the site of operation i.e. group I for the upper abdominal and thoracic surgeries and group II for lower abdominal surgeries, both groups were further divided into two subgroups according to the types of surgical incisions, vertical incision and transverse incisions.

The minimum age in this study was 20 years and maximum age was 60 years. The patients between the age group of 31-40 and 41-50 year constituted equally 34.78% in upper abdominal and thoracic surgeries i.e.both groups between 31-40 and 41-50 constitutes 69.6% patients of the total cases. In lower abdominal group, age group between the 21-30% constitutes highest 45% patients and age group between 31-40 years constitutes 35%.

Most of case of in the group I were operated for the cholecystectomy and exploratory laparotomy and in group II most of case were operated for abdominal hysterectomy and exploratory laparotomy.

In our study the significant rise in pulse rate was observed just after intubation and just after extubation in all the groups. In sub-groups I a, it increased from mean value of 92.333±16.751 to 108.00±12.720, just after intubation and to 118.333±16.743 in immediate postoperative and found to be statistically significant.

In subgroups I b mean pulse rate significant from 102±16.174 to 111.273±14.846, just after intubation and to 111.645±16.174, just after extubation. In subgroup II a mean pulse rate rose from 93.167±9.889 to 109.33±14.914, just after intubation and 117.667±17.406, just after extubation in subgroup II b from 101.250±12.553 just after extubation. The pulse rate returned to basal value within one hour in all the groups and persist till observation time. On statistical evaluation no significant changes was found. This increase in pulse rate immediate after intubation and immediate postoperative period is due to the stimulation of the sympathetic nervous system in response to laryngoscopy, intubation and extubation.

Significant increase in systolic blood pressure recorded in both group after intubation and after extubation, from 110.5±17.144 to 142.333±15.992 just after laryngoscope and intubation, and 146.33±17.258 just after extubation in subgroup I a, from 122.624±16.777 to 117.727 ± 19.064, just after laryngoscopy and intubation and to 149.50±12.340 just after extubation in subgroup I b. from 120.417±17.069 to 143.750±11871 just after laryngoscopy and intubation and to 141.50±12.340 just after extubation in subgroup II a and from 119.50±9.607 to 138.00±12.031 just after intubation and to 137.875±12.443 just after extubation. On statistical evaluation after laryngoscopy and intubation and extubation systolic blood pressure rose significantly in all the groups

The significant rise in diastolic blood pressure was observed in all both groups from 67.500±14.222 to 91.250±11.545 just after intubation and to 90.333±12.093 just after extubation in subgroup Ia, from 82.400±12.000 to 87.455±10.838 just after intubation and to 96.636±10.729 just after extubation in subgroup Ib, from 80.167±9.243 to 95.917±7.728 just after intubation and to 96.583±7.609 just after extubation in subgroup IIa and from 80.375±8.035 to89.111±10.167 just after intubation and to 89.750±12.506 after extubation in subgroup IIb. statistical evaluation, we found that almost all the patients were hemodynamically stable throughout the period of observation except just after laryngoscopy and intubation and in immediate post-operative period where significant increase blood pulse rate, systolic blood pressure and diastolic blood pressure observed in all the groups. This increase in hemodynamic status occurred could be due to sympathetic stimulation in response intubation and extubation. charles et al.13 also reported significant rise in systolic and diastolic blood pressure.

There was highly significant increase in mean respiratory rate per minute in immediate postoperative period in all groups but more marked in the respiratory rate seen in upper abdominal group than in the lower abdominal group. In subgroup I a respiratory rate, it increased from 18.500±2.11 to 28.607; in subgroup I b from 19.273±2.412 to 30.000±7.537 after extubation and in subgroup IIa it increased from 17.833±1.337 to

25.667±4.960 and in subgroup IIb from 17.200±1.488 to 25.002.781 after extubation.

Our data evaluate that mean respiratory rate gradually decreased from immediate postoperative period up to [6] hours of observation period, remain higher than basal value thereafter, in upper abdominal, and thoracic surgeries but in lower abdominal, it came to basal preoperative value after 1 hour of the observation period. Zikria et al.[14] reported 50% rise in respiratory rate in upper abdominal and 10% rise in lower abdominal surgeries. Henson EL al. also reported that respiratory rate was significantly in upper abdominal and lower abdominal surgeries.

There were no significant change (p>0.05) SpO2 during intraoperative period and highly significant decrease in SpO2 in immediate postoperative was observed in all groups. Significant reduction in SpO2 was observed in group I than group II at 15 minute. On increasing FiO2 oxygen administration, SpO2 improved in group II but statistically significant decrease in SpO2 was observed in group I.

In subgroup Ia SpO2 decreased from 99.586±0.669 to 93.583±5.712; in subgroup Ib 99.636±0.674 to 91.636±6.990; in subgroup IIa from 99.750±0.452 to 98.583± 1.887; in subgroup IIb from 99.750±0.763 to 97.357±1.928 in immediate postoperative period.

Our data evaluate that in group I the mean SpO2 approaches to preoperative value after 1 hour postoperative but on statistical evaluation significant decreased in SpO2 observed up to observation period (from 99.583±0.669 to 98.583±0.791; in group Ia, 99.636±0.674 to 98.636±0.674 in subgroup Ib) In group II on clinical evaluation SpO2 increased to preoperative value after 1 hour on statistical evaluation found to be insignificant (99.750±0.452 to 9.667±0.492, t=7.412, p>0.05, in subgroup Ia, 99.750±0.765 to 99.375±1.061, t=0.760, p>0.05). Almost similar findings were also reported by Fu S Xue et al15.higher incidence of hypoxaemia in patients after upper abdominal surgery (34.4%) compared with that in patients who underwent peripheral (20.8%) and lower abdominal operation (14.3%)by Meikejohn et al[16], Diament M et al. [17] observed a significant decline in SaO_2 flowing upper abdominal surgery.

Strachan L et al[18] observed some evidence that horizontal incision may be less deleterious in this regard compared with vertical incisions, however the evidence for this is not conclusive. On our study we observed that more marked decrease in SpO_2 seen in vertical incision than transverse incision. Rosenberg J et al [19] They found that immediate postoperative SpO_2 levels were significantly higher in patients who underwent peripheral operation than they were in patients who had thoracic or abdominal surgery. In addition they found that these SpO_2 difference become greater one hour after arrival in recovery room. In our study we observed that decrease in SpO_2 in all groups in immediate postoperative period this decrease in SpO_2 level persisted for longer time in group I (upper abdominal and thoracic surgery), than group II (lower abdominal surgery which came to preoperative value).

Andrey G et al [20] showed that Only 10% in all groups, 4% had their oxygen saturation decrease to less than 90% during this time, then of these have initial O_2 saturation were found at [15] minute and [30] minute. Similar results were also observed in our study i.e. significant decrease in SpO_2 observer within [30] minute. The need for postoperative oxygen therapy involving an incision to the thorax or upper abdominal is well known. Canet et al [21] found that O_2 saturation increased in patients who has peripheral site surgery while they breath 10minutes in PACU. Thus the used for oxygen therapy in those having surgery to the face, neck, lower abdominal in open to questionable.

CONCLUSION

In conclusion we observed that the severity of arterial oxygen desaturation, incidence and duration of hypoxaemia during early postoperative period are closely related to surgical sites and types of incision and they are more they are more pronounced for upper abdominal and thoracic surgery than lower abdominal surgery. Patient having vertical incision are more valuerable to hypoxaemia than transverse incision. These result suggest the need for respiratory monitoring and oxygen therapy during early postoperative period and early emulation to pain relief is required even in healthy uncomplicated elective surgery particularly

upper abdominal and thoracic surgery to avoid most of the pulmonary complication.

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SOCIO-DEMOGRAPHIC DETERMINANTS AND SPUTUM POSITIVITY FOR ACID-FAST BACILLI (AFB) AMONG CHEST SYMPTOMATICS ATTENDING A TERTIARY CARE HOSPITAL IN NORTH INDIA

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ABSTRACT

Introduction: Tuberculosis is a contagious bacterial infectious disease that is considered to be one of the deadliest infectious diseases worldwide. Despite the recent development of more sensitive technologies, diagnosis of TB in most low-income countries continues to rely on sputum smear microscopy due to the fact that smear microscopy is a simple, inexpensive, cost-effective, and accessible tool for early pulmonary tuberculosis diagnosis and treatment monitoring. The present study was carried out to determine the sputum AFB positivity by ZN staining technique among chest symptomatics presenting with cough for 2 weeks or more and to study their socio-demographic profile.

Material and Methods: This cross sectional study was carried out among cases of chest symptomatics attending OPD of TB and Chest diseases, IIMS&R, Lucknow over a period of 6 months, from January to June 2016. A pre-designed and pretested questionnaire was used for data collection. Statistical analysis was done using SPSS software, version 20.

Results: 17.8 % of chest symptomatics were found to be smear-positive on sputum microscopy. Sputum positivity was higher among elderly age group and males were more affected than females. Sputum positive results were maximum among married, lower socioeconomic status and who belonged to rural area. Various risk factors such as family history of tuberculosis, smoking and alcohol were found to be strongly associated with sputum positivity results. Employment status was also significantly associated with sputum positivity results.

Conclusion: In developing countries like India, under resource-limited settings sputum smear microscopy is the most practicable and cheapest tool for demonstration of AFB in sputum. Though culture of mycobacterium is a more sensitive method than smear microscopy but it is time consuming and requires proper laboratory set-ups which is not possible in remote rural areas with poor resource settings.

Key words: sputum positivity, chest symptomatics, tuberculosis, acid-fast bacilli, demographic profile

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INTRODUCTION

Tuberculosis has been a major health problem for developing countries including India. WHO's 2006 report on Global Tuberculosis Control published on March 24th, World TB Day, once again ranks India as the world's most heavily affected country. In the year 2004, it was estimated that there were 1.8 million new TB cases in India; that is, one in five of all cases worldwide. TB primarily affects individuals in their most efficient years of life with vital socio-economic consequences for the family and the disease is even more common among the poorest and marginalized sections of the community. It is a contagious bacterial infectious disease that is considered to be one of the deadliest infectious diseases worldwide. In 1990 "World Health Organization" (WHO) reported tuberculosis as a worldwide burden of disease and seventh most common morbidity-causing disease in the world, and expected to be the same position up to 2020. It is one of the oldest diseases known to affect humans.[1]

Almost 70% of TB patients are aged between the ages fifteen and fifty four years of age. While two thirds of the cases are male, tuberculosis takes a disproportionately larger toll among young females, with more than 50% of female cases occurring before 34 years of age. Mortality due to tuberculosis among women have major implications for child survival and family welfare.[2] Nevertheless, in 2010, the incidence of TB was estimated as 2.15 million in Central Asia, which will be tripled by 2030.[3] In 2014, the World Health Assembly endorsed a new, bold plan referred to as "The End TB Strategy". The vision is "A world free of TB - Zero TB deaths, Zero TB disease, and Zero TB suffering". The goal is to end the worldwide TB epidemic i.e. <10 cases per 100,000.[4]

WHO 2007 "Strategic and Technical Advisory Group for Tuberculosis" (STAG-TB) revised the definition of pulmonary TB (PTB) suspect as any person with cough for 2 weeks or more, which is under operation in India since 1st April 2009.[5] A chest symptomatic (CS) is defined (as under RNTCP) as a person with productive cough for 2 weeks or more, with or without haemoptysis, fever, chest pain, weight loss and/or night sweat.

Early detection and effective treatment of smear positive tuberculosis patients has been found to be the most cost effective strategy for the control of the disease.[6] Patients that are sputum smear-positive are 5–10 times more infectious than smear negative patients untreated or treated with an inappropriate regimen. Sputum positivity is presence of at least one acid-fast bacillus (AFB) in at least one sputum sample. Smear-positivity and grade indicates relative bacterial burden and correlates with disease presentation. Despite the recent development of more sensitive technologies, diagnosis of TB in most low-income countries continues to rely on sputum smear microscopy[7] due to the fact that smear microscopy is a simple, inexpensive, cost-effective, and accessible tool for pulmonary TB diagnosis and treatment monitoring.[8-10] AFB microscopy is the main technique used in Directly Observed Therapy short course (DOTS) programs for diagnosis of TB, follow-up treatment, and curative services for tuberculosis.[11, 12] Acid-fast bacilli (AFB) can be identified with Ziehl-Neelsen (Z-N) staining method in resource- limited settings.[13-16]

The present study was carried out to assess the sputum AFB positivity by ZN staining technique among chest symptomatics presenting with cough for 2 weeks or more and identify the associated socio-demographic determinants.

MATERIALS AND METHODS

Study design and study period

The present study was conducted in the Mycobacteriology section of the Dept. of Microbiology, Integral Institute of Medical Sciences and Research, Lucknow, in collaboration with the TB and Chest Unit of the institute. A prospective, cross sectional analysis of the chest symptomatics having cough for 2 weeks or more, attending OPD of TB and Chest diseases, was carried out over a period of 6 months, from January to June 2016. Sample size was calculated on the basis of a pilot study conducted under RNTCP in the year 2014.

Ethical consideration

This study was approved by the Institutional Research Committee (IRC) and the Ethical Review Committee (ERC).

Study population

Before enrollment in the study, the patients were informed about the study in order to obtain their consent to participate in this study. All adult outpatients with age of 16 years and above, having history of cough lasting for 2 weeks or more were enrolled in the study. Patients having extra pulmonary tuberculosis, diagnosed cases of malignancy and HIV were excluded. Patients on anti-tuberculosis treatment (ATT), previously diagnosed patients of pulmonary tuberculosis and patients not willing to give consent to participate in the study were also excluded from the present study.

Procedure of data collection

Data related to demographic profile, chief complaints and past history of the patients were collected with the help of a pre-designed and pre-tested questionnaire. Various demographic details such as age, gender, socioeconomic status, place of residence and employment status were obtained. Data related to chief complaints such as cough were gathered. Patients were also asked about their past

history of TB, any history of contact with a patient of TB. Clinically suspected cases of pulmonary tuberculosis were subjected to two sputum samples (One spot specimen when the patient first visited the health facility and one next day early morning specimen) for ZN staining followed by AFB examination by microscopy at microbiology laboratory of Integral Institute of Medical Sciences & Research, Lucknow.

Sample collection

Two screw-capped, rigid, clean, transparent, wide-mouthed containers of 50 ml capacity were provided to each patient for collection of two sputum samples per patient. Patients were explained well the reasons for sputum collection and a clear instruction on collection technique were given to them so that a good quality sputum specimen was collected. On receipt in the laboratory, the specimens were properly labelled and the details of the patient's name, address, age/sex, contact number were entered in the TB laboratory register. Specimens were processed as soon as possible; however when the delay was unavoidable, the specimen was refrigerated or kept in cool place to inhibit the growth of unwanted microorganisms.

Sample examination (ZN staining followed by microscopy)

Yellow, purulent portion of sputum was selected, picked up and transferred onto a new, clean, greaseless, and unscratched slide. Sputum was spread evenly to cover 2/3 of the central portion of the slide. The smeared slide was air dried and heat fixed. Ziehl-Neelsen staining (ZN stain) technique was performed. Stained slides were examined under oil immersion lens to identify acid-fast bacilli (AFB). Acid-Fast Bacilli were stained pink, straight or slightly curved rods, occurring singly or in small groups, may appear beaded. Grading of smear by microscopy was done as per RNTCP guidelines.

Statistical analysis

Statistical analysis was done using SPSS software, version 20. Chi-square test was used to study association of factors. $p<0.05$ was considered statistically significant.

RESULTS

This study was an attempt to estimate the sputum positivity for acid-fast bacilli (AFB) among chest symptomatics and to study their socio-demographic profile. Out of 779 patients, having cough for 2 weeks or more, 139 (17.8%) patients were found to have their smear positive for AFB by ZN staining method.

Out of the total enrolled patients, males (68.03 %) outnumbered the females (31.96 %). 105 (19.81%) males out of 530 and 34 (13.65 %) females out of 249 were smear positive for acid-fast bacilli respectively. Gender-wise association of AFB was statistically not significant. Sputum positivity was maximum in the age group of 31-40 years (19%) and >40 years (19 %) followed by <20 years age group (17.47 %) and 21-30 (14.17 %) years age group. Positivity with relation to the various age groups was found to be statistically insignificant. Although among chest symptomatics, majority of the AFB positive patients were from rural background (18.01 %) but no significant association was found between sputum positivity and residential area. Socio-economic status of the enrolled patients was also studied. Modified BG Prasad's Socio-economic Classification, was used to determine the socioeconomic status of the study subjects. Majority (17.99 %) of the positive population belonged to low socio economics status. With respect to occupation, unemployed patients were more affected with tuberculosis (25 %) followed by farmers (24.41%), unskilled workers (21.95%), semi-skilled workers (17.85%), students (15.92%), skilled worker (11.29%) and then housewives (11.22%). Both socio-economic status and employment status was not significantly associated with sputum positivity (Table 1).

Table 1: Socio-demographic characteristics of the study respondents

Characteristics	Total (n=779)	Smear-positive	Percentage %	p value
Gender				
Male	530	105	19.81%	0.089
Female	249	34	13.65%	
Age (years)				
<20	103	18	17.47%	
21-30	127	18	14.17%	0.88
31-40	121	23	19.00%	
>40	428	80	18.69%	
Residence				
Rural	716	129	18.01%	
Urban	63	10	15.87%	0.865
SE status				
Lower class	717	129	17.99%	
Middle class	60	10	16.66%	
Upper class	2	0	0%	0.09
Occupation				
Student	113	18	15.92 %	
Housewives	196	22	11.22 %	
Skilled worker	62	7	11.29 %	
Semi-skilled worker	56	10	17.85 %	0.277
Unskilled worker	164	36	21.95 %	
Farmer	172	42	24.41 %	
Unemployed	16	4	25 %	

As mentioned in table 2, out of total 139 AFB positive patients, 20.2 % of them had past history of tuberculosis. Association between sputum positivity and past history of TB was considered statistically not significant. In contrast to this finding, strong association was found between positivity and history of contact with a case of tuberculosis. Our study also reveals that patients who were addicted to smoking/alcohol were more affected than non-smokers and teetotallers. Association between sputum positivity and smoking/alcoholism habit was considered to be statistically significant.

Table 2: Association between smear positivity with past history of TB, history of contact with a case of tuberculosis and smoking/alcoholism habit

Past history of TB	Total (n=779)	Smear-positive (n=139)	Percentage %	p value
Yes	8918	1889	20.2%	0.568
No	690121	121690	17.5 %	
History of contact				
Yes	87	31	35.60%	0.0005
No	692	108	15.60%	
Smoking/Alcoholism habit				
Yes	138	39	28.30%	0.006
No	641	100	15.60%	

In our study, grading of smears was done in accordance with RNTCP guidelines. Out of 139 AFB positive patients, we found that most of the patient's smear (24%) fell in the grade of 3+ whereas 13%, 9% and 4% patients were having lower grades i.e. 2+, 1+ and scanty respectively.

The association between sputum AFB positivity and duration of cough in patients was considered to be extremely statistically significant. Details are given in table 3.

Table 3: Correlation between sputum positivity and duration of chest symptoms

Duration of cough	Smear-positivity				Total	p value
	Scanty	1+	2+	3+		
2 weeks	8(22.8%)	18(51.4 %)	3(8.57 %)	6(17.14 %)	35	0.0001
4 weeks	2(5.26%)	14(36.8 %)	8(21.05 %)	14(36.8%)	38	0.0001
8 weeks	0	4(6.06 %)	14(21.2 %)	48(72.7 %)	66	0.0005
Total	10	36	25	68	139	

DISCUSSION

It was estimated that TB bacteria has infected about 40% of the Indian population, the overwhelming majority of whom have latent instead of active TB. So we need to know the impact of national programmes like RNTCP. In 2015, the RNTCP reached to a population of around 1.28 billion. A total of 9,132,306 cases of suspected tuberculosis were examined by sputum smear microscopy and 1,423,181 people were diagnosed and registered for TB treatment.[17] For assessing impact of RNTCP, many methods are available however sputum positivity for AFB among chest symptomatics in our study population also indirectly tells about the impact of the programme. This study was a

hospital-based study. In our study, sputum positivity for AFB among chest symptomatics was high as compared to other similar studies. This high prevalence in our study area could be due to change in the definition of "chest symptomatics". As we knew that the revised operational definition for chest symptomatics according to RNTCP guidelines is that any person who is having a cough for two or more than two weeks should be screened for tuberculosis, which was earlier three weeks. Hence in our study population, we followed the criteria of cough for two or more than two weeks. Out of total 779 patients, who had cough for 2 weeks or more, 139 (17.8%) patients were smear-positive for acid-fast bacilli by Zeihl-Neelsen staining. Similarly, sputum positivity of 14.2 % and 10.6% among chest symptomatics with cough > 2 weeks was observed in studies conducted in Punjab[18] and Sewagram, Central India respectively.[19]

The findings of the present study also reveal that smear-positive cases were maximum in the age group of 31-40 years and >40 years (19%) followed by <20 years age group (17.47 %) and 21-30 years age group (14.17%). Different reasons could account for this vulnerability. First, the disease can take years to become active. Second, elderly people who live in nursing homes and similar facilities are often in close contact with each other, a situation that makes the disease more apt to spread. Third, the body's immune system becomes weaker as a person grows older which makes the elderly more susceptible to the tubercle bacillus.

In our study we found that 19.81% of smear-positive pulmonary TB patients were males and 13.65% were females and ratio of female to male was 1:3.08. In another similar study, affected males and females constituted 58.1% and 41.9% respectively and female to male ratio was 1:1.4.[20] Similarly, study conducted by Batra et. al., in the year 2015 in Punjab, also shows that male population was more affected than females.[18] Similar findings were observed in a study conducted in Thiruvananthapuram by Muthukutty et. al.,[21] in which the prevalence was considerably higher in males than in females. Sumit et. al.,[22] in his study revealed that maximum study subjects were males i.e.74.9% as compared to 25.1% females. Similar male dominance for pulmonary tuberculosis was found in studies conducted by Aarti Kaulagekar and Anjali Radkar (57.8% males v/s 42.2% females).[23] The reason why prevalence of TB is higher in males is not clear but may be due to a combination of biological, immunological, behavioural, and social factors. Some basic studies also indicated that estrogen is immune-protective, and testosterone is immunosuppressive, and these biological factors may have a role in chronic diseases like TB, in which the immunological mechanisms have a very crucial role to play. Behavioural risk factors among men like tobacco usage and alcohol consumption may have also contributed to this difference.

In the present study, out of 139 AFB positive patients, we found that most of the patient's smear (24%) fell in the grade of 3+, whereas 13%, 9% and 4% patients were having lower grades i.e. 2+, 1+ and scanty respectively. Area wise distribution of sputum positive patients revealed that sputum positivity was more common in the patients residing in the rural area (18.01 %) as compared to those residing in the urban area (15.87 %). This finding is in agreement with similar studies conducted in Himachal Pradesh[24] and Punjab[18], India where majority of the affected patients belonged to rural area. This may be attributed to the fact of lack of knowledge of TB with its transmission and inaccessible health care services in rural areas.

Our study further revealed that majority (17.99 %) of the study population belonged to low socioeconomic status and who were unemployed (25%). Similar finding has been reported by Batra et. al.,[18], in which they reported that 32.8% belonged to low socioeconomic status. In another similar study conducted in Jharkhand, India, 26.74% of the sputum positive patients belonged to low socioeconomic status.[25] These people were more affected due to overcrowding, poor ventilation and unhygienic living conditions. Along with overcrowding, poor nutrition may contribute to the strong link observed between tuberculosis and poverty.

In our study, married (18.04%) were found to be more affected with tuberculosis in comparison to unmarried ones (16.80 %), which is comparable to a study conducted in Jharkhand, India in which married (27.42%) were more affected than

unmarried (12.0%).[25] A similar finding was alsoobserved by Bhatt et. al.,[26] where maximum i.e. 55 % sputum positivity was found amongst married subjects.

Sputum positivity was not influenced by past history of TB as this factor was present in only 20.2% of the patients. It was statistically not significant (p=0.568). As far as history of recent contact with a case of TB in the family was concerned, it was strongly associated with the sputum positivity (p=0.0005). 35.6 % of patients gave history of contact with a case of TB. Similar findings were found in a study conducted in Jharkhand, India[25], in which 20.83% with past history and 40.00 % with history of contact with a case of TB were affected and this was also observed in a study conducted in Punjab.[18] They found 41.6 % of patients with past history of TB and 57.4 % ($p < 0.05$) of patients with history of contact with TB. Similar significant findings were also reported from Thiruvanathapuram.[17]

From the present study, it was also found that smoking/alcoholism habits were strongly associated with sputum positive result (p=0.006). Some shreds of evidences have shown a link between tuberculosis and smoking/alcoholism habits. A possible explanation is that nicotine stops the production of TNF-alpha by the macrophages within the lungs, making the patient more vulnerable to the development of progressive illness from latent *Mycobacterium tuberculosis* infection. Similar findings have been reported from elsewhere.[25, 27]

In our study, we also found that the sputum positivity in patients was directly proportional to the duration of cough. The association between sputum positivity and duration of cough was considered to be extremely statistically significant.

In the present study, strong association was found between positivity and history of contact with a case of tuberculosis. Similarly, higher prevalence of active tuberculosis among household contacts than in the contact outside the household has been reported in previous studies.[28, 29]

Attendants of patients suffering from infectious tuberculosis are at high risk because they spend more time and are in close contact with TB patients to provide necessary care. They take care of some part of activities when the patients are unable to meet their basic need of daily living during the sick periods. Sabir et. al.,[30] found that 43% of TB patient's attendants spent 1- 6 hours period with the patient for necessary care. It has been reported that the risk of TB infection among household contact of index TB patients is high.[31] Households of persons with active TB serve as breeding places for TB, and household contact investigation has proved very efficient in finding TB cases. The smear-positivity of the index patient supports its role as the potential source of infection for other household members and there is a higher frequency of TB in households of index TB patients.[32, 33]

CONCLUSION

All health care providers should pay high attention towards cough symptomatics for earlier diagnosis of TB. As evident from the findings of the present study, 17.8 % of cough symptomatics were found to be smear-positive on sputum microscopy. Thus, cough symptomatics are an important group to be traced for early diagnosis of TB. Sputum positivity was higher among elderly age group and males were more affected than females. Sputum positive results were maximum among married, lower socioeconomic status and who belonged to rural area. Various risk factors such as family history of tuberculosis, smoking and alcohol were found to be strongly associated with sputum positivity results. Employment status was also significantly associated with sputum positivity results. Information, education and communication (IEC) materials should be widely disseminated in general public regarding socio-demographic determinants and risk factors responsible for TB.

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ASSESSMENT OF CYTOKINE, OXIDATIVE STRESS AND BLOOD GLUCOSE IN OBESE AND TYPE 2 DIABETIC OBESE SUBJECTS

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ABSTRACT

Introduction: Obesity has become a matter of quality to health care administrators. The busy lifestyle of people made them prefer fast food instead of taking healthy food. But the people are not aware that fast food habit converts to the disease like obesity, type 2 diabetes mellitus (T2DM), dyslipoproteinemia etc.
Material & Methods: This case control study had been carried out in department of Physiology in collaboration of Department of Biochemistry and Medicine, Era's Lucknow Medical College & Hospital, Lucknow to explore status blood sugar fasting (BSF), tumor necrosis factor-α (TNF- α), Insulin by standard spectrophotometric kit methods, blood pressure (BP) as well as anthropometric measurements with the help of suitable instruments and equipments in Control group, Obese group and Obese with type 2 diabetic group.
Results: Values of all above parameters were found increased in obese group with respect to control group and values of all these parameters were found increase in obese with type 2 Diabetes mellitus group with respect to obese group.
Conclusion: Obesity is risk factor for T2DM, Dyslipoproteinemia and coronary artery disease (CAD).

Key words: Obesity, anthropometric measurements, type 2 diabetes mellitus, triacylglycerol, adipose tissue

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INTRODUCTION

Obesity is defined as excess body weight (>20% of ideal weight) due to accumulation of fat. (1) Putative evidence suggests that obesity is almost invariably associated with chronic low grade inflammation and oxidative stress and is calamitous for health and scourge on mankind. (2) The disproportionate rapid rise in prevalence of overweight and obesity in both developed and developing countries distinctly indicate that environmental changes are major determinants of this epidemic. (3) Of course genetic disposition may act independently or may abet the environmental factors. (4) A closely related parallel relationship between excess adiposity and poor health outcome is clearly visible adverse effects of obesity have explicitly been linked with serious diseases like diabetes mellitus, cardiovascular disease and cancer. Further there is gathering evidence that obesity also induces and/ or promotes a number of other diseases and that it increases the chances of premature death unless managed properly. (5) In the recent years, however, two more parameters have found in frequent use waist/hip ratio and waist circumference. (6) In many populations all these three parameters have been found to be related where as in some population's waist/hip ratio and waist circumference have been found a better expression of obesity as central obesity is better predictor of risk. It has been stressed by WHO and other workers that these parameters should be assessed in different populations because categorization may differ from population to population due to differing standards of nutrition, environmental variants, genetic disposition and finally unavoidable abdominal adiposity. (7) She stated that these Indian standards were prepared with the help of 200 experts. As per revised guidelines every second person in Delhi fulfills criterion for obesity or has excess of abdominal fat.

The etiology of simple obesity is multifunctional and multimechanistic. (8) The fundamental defect in this condition is lopsided energy management by body: more calories

consumed than spent. Besides genetic inclination, the putative social, behavioral and environmental courses are increased consumptions of high energy foods particularly fast foods, increased frequency of food intake, indiscriminate selection of foods, especially refined foods excess of trans fat and higher glycemic load carbohydrates. The social aspects influencing the caloric intake are overzealous advertising of sweetened beverages and foods. Sedentary life is another determing factor. For example T.V., movies and computers and more confinement at home encourages less walking and physical exercise. (4) All these factors in concert tend to alter metabolism and appetite. (9) The production of TNF-α, a pro-inflammatory adipocytokine is noticeably enhanced in obesity. (10) TNF-α is a pleotropic cytokine with diverse functions and occurs in many pathological diseases like cancer, cardiovascular disease, type 2 diabetes mellitus etc. (11) It is produced by macrophages in response to inflammation, endotoxemia and cancer and plays a key role in the pathogenesis of peripheral insulin resistance in obesity. TNF-α inhibits tyrosine kinase activity at the insulin receptor level and cause obesity induced insulin resistance. (12,13) Many studies have shown increased serum levels of TNF-α in obese patients in comparison with lean subjects. (14) Emerging clinical data shows that, inflammation precedes the development of clinically overt diabetes and also predicts the subsequent cardiovascular events. (15) TNF-α may serve as an inflammatory biomarker and as an important risk indicator for the future development of type 2 diabetes mellitus and provide a novel target for therapeutic intervention. (16) This study was undertaken to estimate the TNF-α levels in type 2 diabetes mellitus and to analyse the association with the anthropometric (Body Mass Index; BMI and Waist Hip Ratio; WHR) and clinical variables (fasting glucose and insulin) related to insulin resistance (IR), in obese and obese with diabetes.

Due to aforesaid reasons resulting in the tilted and excess energy intake, the body starts gaining weight. This gain is practically confined to accumulation of fat in adipocytes which are centre of adiposity from where aberrant signals originate to initiate various abnormal biochemical outcomes resulting in insulin resistance, metabolic syndrome, diabetes, CVD and others. (17) The struggle begins between physiological and unphysiological forces and diseases set in when physiological processes are overwhelmed. The single most important process regulating "Energy Homeostasis" is "Glucose Homeostasis" in blood and tissues. The major consumers of glucose are peripheral tissue cells. Insulin is undisputedly a key regulator of this process. However, there are an array of hormones and cytokines to counter check its regulatory function. Unfortunately in obesity these counter switches get disturbed. Among these TNF-α is one of the major switches. (18) It gradually diminishes insulin potency in the peripheral tissues with the result cells do not obediently respond to commands of insulin for flow of glucose from exracellular milieu inside the cell. This refusal of the cells to listen to the commands of insulin is known as "Insulin Resistance". Initially beta-cells send more insulin to combat this situation causing "Hyper insulinemia". However, the capacity of beta-cells is limited. Gradually they start getting exhausted and beta-cell dysfunction develops. While these three processes are in progress numerous other unfavorable factors such as proinflammatory cytokines, mitochondrial stress through altered redox status intervene along with TNF-α. In chronic and persistent obesity, insulin alone fails to combat the opposite forces culminating in multiple abnormalities.

The above proposed hypothesis of text position among TNF-α, insulin resistance is quite sound and appealing but its veracity is not proven in all populations or in all patients.

Study Design

This case control study had designed to evaluate the interconnectivity among TNFα , insulin and insulin resistance by examining these parameters in different group of subjects: a) normal subjects, b) normal obese subjects (simple obesity) and c) Type 2 Diabetes Mellitus with Obese (T2DM Obese) Patients.

MATERIAL AND METHODS

The study had carried out on total 120 subjects, who were attending, outpatient department (OPD) of general medicine, Era's Lucknow Medical College & Hospital, Sarfaraz Ganj, Hardoi Road, Lucknow. 40 obese subjects (M = 20, F = 20), 40 T2DM Obese patients (M = 20, F = 20) and 40 normal healthy control (M = 20, F = 20) who attended for their periodic health checkups. All individuals were subjected to a complete medical evaluation by a physician including a full medical history and physical examination. Both males and females between 35-65 years of age were included in the study. Patients with evidence of acute or chronic inflammatory or infectious disease, cancer, persons on insulin, or other medications that could affect

glucose metabolism and pregnant or lactating women were excluded from the study. (19)

Collection of blood sample

Blood sample had collected from median antecubital vein followed by overnight fasting, for biochemical estimations in fluoride (sodium fluoride and potassium oxalate, 5.4 mg NaF and 3.0 mg K-oxalate in each vial) and plain vials respectively.

Anthropometric measurement

Height (cm), Weight (kg), Waist and hip circumferences (cm) were noted using a measuring tape to the 0.1 cm. Waist circumference was measured at the midpoint between the lower border of rib cage and the iliac crest. Hip circumference was measured at the level of trochanter, the widest part of the hip region. Weight (kg) was measured to the nearest 0.1 kg using a weighing machine simultaneously. Waist hip ratio (WHR) was calculated as waist circumference divided by hip circumference. BMI was calculated as weight (kg) divided by height (m^2).

Indian Criteria of BMI cut offs were classified in accordance with the revised Indian guidelines for BMI by Union Health Ministry of India (2005) : Less than 18.4 Kg/m2 (underweight), 18.5-22.9 Kg/m2 (normal), 23-24.9 Kg/m2 (overweight) and >25 Kg/m2 (obese). (26, 27)

W.H.O. Criteria (28) of BMI to Detect Obesity were classified as:

Normal	18 – 24.99 kg / m2
Per-obese (Overweight)	25 – 29.99 kg / m2
Obese class 1 (Moderate)	30 – 34.99 kg / m2
Obese class 2 (Severe)	35 – 39.99 kg / m2
Obese class 3 (Morbid)	≥ 40.00 kg / m2

Cut off waist circumference (26-28)

Male: 90 cm

Female: 80 cm

Biochemical estimations:

Glucose: Blood glucose was estimated by the standard enzymatic kit method. (28)

TNFα and Insulin was estimated by the standard ELISA kit method.

Insulin resistance was calculated by formula given below

HOMA INDEX = Fasting Insulin concentration (µUnit/ml) x Fasting Glucose concentration (mili mol/l)/ 22.5

Normal young subjects have an Insulin resistance of 1. (29)

All samples were processed and examined according to principles of good laboratory practice at clinical biochemistry

Statistical analysis

One-way-analysis of variance (ANOVA-Newman's student test) was performed by comparison of values. All hypothesis testing were two-tailed. P <0.05 was considered statistically significant and the results were expressed as mean ± SD. The Graph pad INSTAT 3.0 software was used to carried out the statistical analysis. (30)

RESULTS

The data in table-1 shows that in type 2 diabetic patients there was change in the values of BMI, BSA, WHR, BSF, TNF α, HOMA IR AND INSULIN with respect to control by +48%, +19%, +5% and +4%, +53%,, +97% and +99% respectively, while change in values of all above parameters in T2DM obese with respect to obese were by +2.0%, +1.8%, +11% and +9%, +21%,, +1% and +23% respectively with respect to Obese subjects.

Table 1: Status of BMI, BSA, WHR, BSF, TNF α, HOMA IR and Insulin in Type 2 Diabetics and Type 2 Diabetics with Obese Patients

Groups	BMI (Kg/ m^2)	BSA (m^2)	WHR	BSF (mg/ dl)	TNF-α (pg/ml)	HOMA-IR	Insulin (µUnit/ ml)
Control n=40	21.79 ±2.36	1.66 ±0.16	0.85 ±0.04	100.17 ±7.86	21.31 ±10.46	30.01 ±11.20	7.57 ±3.05
Obese n=40	31.69 * ±4.07 (+48 %)	1.98* ±0.16 (+19 %)	0.89NS ±0.03 (+5%)	104.10 NS ±7.25 (+4%)	47.47* ±14.26 (+53%)	55.20* ±16.06 (+97%)	13.35* ±3.69 (+99%)
Diabetic Obese n=40	33.45 NS ±3.84 (+2%)	2.05 NS ±0.14 (+1.8 %)	0.99 NS ±0.03 (+11 %)	115.50 NS ±36.31 (+9%)	58.03* ±32.63 (+21%)	56.08 NS ±85.33 (+1%)	16.82* ±6.85 (+23%)

Values expressed as mean ± SD. *p<0.001, NS = Not Significant

The data in table-2 shows that in obese subjects there was decrease in the levels of GSH, SOD, CAT, GPX and GR by -49 %, -24 %, -11 %, -24% and -41% respectively and increase in level of plasma LPO by 252 % with respect to healthy control. While table 1 also show that in type 2 diabetic with obese patients there was decrease in the levels of GSH, SOD, CAT, GPX and GR by -

45%, -50 %, -10%, -29% and 33% respectively and increase in level of plasma LPO by +70 % with respect to obese subjects.

TABLE 2: Levels of GSH, Serum Lipid Peroxide; SOD, CATALASE, GPX AND GR in Different Groups

Experiment schedule	GSH (mg/ dl)	Lipid peroxide (nmol MDA/ml)	SOD (Unit/minute/mg protein)	Catalase (Unit/minute/mg protein)	GPX (nmoleNADPH Oxidase/min/mg protein)	GR (µmole/mg protein)
Control (n=40) BMI 18-22.9 (Kg/m^2)	37.55 ± 3.76	2.18 ± 0.39	2.78 ± 0.19	3851 ± 251.36	366.38±161.00	248.00±34.89
Obese (n=40) BMI 23-24.9 (Kg/m^2)	19.79±1.62* (- 49%)	7.65 ± 1.36* (+253 %)	2.12 ± 0.18* (-24%)	3430 ± 267.08NS (-11%)	280.00±87.56* (-24%)	149.00±38.18* (-41%)
Type 2 Diabetic Obese (n=40) BMI 23-24.9 (Kg/m^2)	10.79±1.62* (- 45%)	12.75 ± 1.36* (+70%)	1.18 ± 0.18* (-50%)	3000 ± 267.08* (-15%)	200.00±87.56* (-29%)	100.00±38.18* (-33%)

Values are expressed as mean ± SD, *p<0.001, NS= Non significant.

DISCUSSION

TNF-α is hypothesized to link obesity to insulin resistance. Studies in human and animal models have indicated that, TNF-α expression in the adipose tissues is significantly elevated in obesity. (19, 20, 31) In our study TNF-α concentration was significantly high in obese T2DM than in non obese subjects. Our results demonstrated that, increased level of TNF-α were associated with increased level of glucose in T2DM and was related to the degree of obesity. Nilksson et al reported that, the plasma TNF-α levels were increased by 23% in lean T2DM compared to 51% in obese T2DM subjects with more severe insulin resistance. (21–25, 32) Katsuki et al reported that, TNF-α is elevated in obese T2DM but not in lean T2DM.14, 31 According to Hotamisligil et al body weight reduction in obese individuals is also associated with a reduction in TNF-α level and in improved insulin sensitivity. Our present results clearly demonstrated that circulating TNF-α level were significantly elevated in T2DM compared to normal healthy subjects particularly in obese subjects, and is strongly correlated with BMI. Our observation is consistent with numerous previous studies which have documented a strong correlation between TNF-α and BMI. (22-24, 33) Elevated levels of TNF-α were also found to predict cardiovascular events with diabetes from the nurses' health study. (25) All these data provide strong associative evidence supporting subclinical inflammation as a unifying factor accelerating the progression of Insulin resistance and T2DM. Our data suggest a possible role of TNF-α in the pathophysiology of Insulin Resistance particularly in obese individuals. 29-33

CONCLUSION

The definition of the cutoff value for "normal" BMI in a population would depend on identifying the risk association with a disorder strongly associated with BMI. Further, such type of studies will specially help health workers and clinicians to suggest health and therapeutic regimen in a particular population. Needless to say, this study in due course of time is expected to be of great practical relevance to the students and staff of Era University.

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CLINICO – ENDOSCOPIC PROFILE OF PATIENTS WITH H. PYLORI INFECTION- UNFOLDING THE IMPLICATIONS

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ABSTRACT

Introduction: Helicobacter Pylori (H. Pylori) plays an important role in study and management of symptoms of Dyspepsia. It is considered to be a carcinogen as well. However, given the fact that it is ubiquitously present in community to the extent of 50-80% in different studies depending upon the sampling from an urban area or a rural area, as well as socio-economic factors, it is worthwhile investigating its correlation to the endoscopy findings as well as clinical profile of patients. Hence this study was aimed at studying clinical profile in terms of the indications for which endoscopy was carried out and ascertaining if it correlates with findings on Upper Gastrointestinal Endoscopy (UGIE) as well as presence or absence of H.Pylori.

Material & Methods: This is a retrospective descriptive study based on the upper GI endoscopies carried out in the institution. The period covered was from 01 Jan 2018 to 31 Dec 2018. The data was classified based on the age group, gender, types of diseases and the diagnosis and analyzed to study the pattern using SPSS Version 16.0.

Results: 237 cases of endoscopy were studied. Male to female ratio was 53:47. 67% of population undergoing endoscopy was in the age group of 11-60 years. The conditions for which endoscopy was indicated included Dyspepsia, Epigastric pain, Chronic Liver Disease, Portal Hypertension, Dysphagia, Gastritis, and 3 cases of Stent removal. Some of the common findings observed on UGIE were Antral and Pan gastritis, Hiatus Hernia, H. Pylori, Oesophageal stricture, Varices, Reflux diseases including Reflux Oesophagitis, Reflux Gastritis and Bile reflux. Correlation of endoscopic findings to presence of H.Pylori, showed significant correlation in cases of Oesopahgeal stricture, Antral gastritis, and Pan gastritis (p-value > 0.05).

Conclusion: The study describes the findings of UGIE in different symptoms setting and reveals significant findings and correlations which have a bearing on management of chronic and sometimes recalcitrant symptoms.

Keywords: H.Pylori, endoscopy, dyspepsia, epigastric pain, varices, chronic liver disease

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INTRODUCTION

Year 1983 AD has been a watershed in our knowledge of patients presenting with dyspepsia, Pain epigastrium and various allied symptoms, when Marshall and Warren isolated the bacteria presently named as Helicobacter Pylori from gastric biopsies in duodenal ulcer patients, heralding a new era in understanding and treatment of gastroduodenal diseases.[1] Helicobacter pylori has been classified as a class I carcinogen by the International Agency for Research on Cancer. It is directly linked to Gastric Cancer.[2,3] The pathogenesis and disease outcomes are dependent upon a complex relationship between bacterial virulence factors, Host response and environmental factors. Among the host factors, the factors that are important are the state of gastroduodenal mucosa, the immunological response as manifested by alterations in serum IgG and Serum IgE amongst others. The bacterial virulence depends on a number of other factors. The cytotoxin-associated gene A protein (CagA), encoded by the cytotoxin-

associated gene A (cagA) is the main virulence factor associated with more severe clinical outcomes. It is further divided into Western-type CagA and East Asian-type CagA. The East Asian-type CagA induces more cytoskeleton changes and is more likely to be associated with gastric cancer.[4]

It has been suggested from a number of studies that presence of H. Pylori is associated with a spectrum of gastrointestinal conditions like gastritis, dyspepsia, epigastric pain, and Cancer.[5,6,7,8]

Different studies have suggested a prevalence rate of H. Pylori as around 50%. [9,10,11]

Considering these facts, it is imperative to understand how the presence or absence of H. Pylori can be confirmed and ruled out, and if the infection is present, initiate early treatment for eradication of infection so that patient may have a symptom free period, post treatment.

This study was carried out in patients suspected to be suffering from gastroduodenal symptoms and signs to identify the endoscopic findings in such cases and to understand whether the signs and symptoms, or the endoscopic findings bear a relation with presence or absence of H. pylori.

MATERIAL & METHODS

This study was conducted by Department of Surgery, at Integral Institute of Medical sciences & Research, Lucknow

This is a retrospective descriptive study based on the upper GI endoscopies carried out in the institution. The period covered was from 01 Jan 2018 to 31 Dec 2018.

The study brought about the spectrum of medical conditions diagnosed with the investigative modality of Upper GI Endoscopy. Biopsy and detection of H. Pylori using RUT was carried out to detect presence or absence of H. Pylori Infection.

This study would help us to know if there is a correlation between the symptoms and signs the patient presents with and the findings on Endoscopy with presence or absence of H. pylori

This study is based on medical record of the cases in which endoscopy was performed. The data is annonymised and does not affect confidentiality of any patient. Being a retrospective study, with no study specific intervention carried out.

INCLUSION CRITERIA:

Patients with symptoms of dyspepsia, difficulty in swallowing, blood in vomiting, unexplained weight loss, loss of appetite, upper abdominal discomfort who underwent endoscopy during the study period covered were included in the study.

EXCLUSION CRITERIA:

The cases where the data was missing or incomplete were excluded from the study.

The data was classified based on the age group, gender, types of diseases the diagnosis, and presence or absence of H. Pylori.

The findings were classified under following heads:

1. Descriptive statistics of study variables

Association of study variable with indication:

Association of study variable with findings

Statistical Analysis was carried out using Microsoft Excel program and SPSS Version 16.0

PRIMARY OUTCOME:

The study included the spectrum of medical conditions diagnosed with the investigative modality of Upper GI Endoscopy. Biopsy and detection of H. Pylori using RUT was carried out to detect presence or absence of H. Pylori Infection.

RESULTS

It was observed that in this study the gender wise distribution was in the ratio of Male: Female: 53:47 or 1.13:1. Maximum number of cases was within the group 31-40 years.

Table 1: Indications for Upper GI Endoscopy

Indications	Frequency	Percent
Dysphagia	20	8.7
Chronic Liver disease	10	4.3
Dyspepsia	15	6.5
Stent removal	3	1.3
Epigastric pain	93	40.4
Gastritis	45	19.6
Portal Hypertension	3	1.3
Pain Upper abdomen	33	14.3
Cholecystitis	5	2.2
Gastric Ulcer	3	1.3
Total	230	100.0

Table 1 shows that the commonest indication for which Endoscopy was done was Epigastric pain followed by Gastritis and upper abdominal pain.

Table 2: Findings on Upper GI Endoscopy

Finding	Frequency	Percent
Oesophageal stricture	6	2.6
Varices	17	7.4
Hiatus Hernia	8	3.5
CBD Stent Removal	2	.9
Normal	49	21.3
Antral gastritis	34	14.8
Gastroduodenitis	18	7.8
Prolapse Gastric Mucosa	5	2.2
Pan gastritis	73	31.7
Reflux Oesophagitis	10	4.3
Bile Reflux	3	1.3
Portal Hypertension Gastropathy	1	.4
Reflux Gastritis	3	1.3
Duodenitis	1	.4
Total	230	100.0

Table 3: Gender wise Distribution of Indications in Cases Undergoing UGIE

Variables	Gender		Total
Indication	Male	Female	
Dysphagia	13	7	20
	10.7%	6.4%	8.7%
Chronic Liver disease	7	3	10
	5.8%	2.8%	4.3%
Dyspepsia	7	8	15
	5.8%	7.3%	6.5%
Stent removal	1	2	3
	.8%	1.8%	1.3%
Epigastric pain	44	49	93
	36.4%	45.0%	40.4%
Gastritis	23	22	45
	19.0%	20.2%	19.6%
Portal Hypertension	1	2	3
	.8%	1.8%	1.3%
Pain Upper abdomen	20	13	33
	16.5%	11.9%	14.3%
Chloecystitis	4	1	5
	3.3%	.9%	2.2%
Gastric Ulcer	1	2	3
	.8%	1.8%	1.3%
Total	121	109	230
	100.0%	100.0%	100.0%

Pearson Chi-Square= 7.437, p value = 0.592

Table 4: Correlations of Symptoms with H Pylori Infection

Symptom	Status	H. Pylori Biopsy			χ^2 value, P value
		Positive	Negative	Not Taken	
Dysphagia	Present	5(4.7%)	13(11.9%)	2(14.3%)	4.1651 , 0.124
	Absent	102(95.3%)	96(88.1%)	12(85.7%)	
Chronic Liver Disease	Present	4(3.7%)	5(4.6%)	1(7.1%)	0.3736 , 0.829
	Absent	103(96.3%)	104(95.4%)	13(92.9%)	
Dyspepsia	Present	5(4.7%)	9(8.3%)	1(7.1%)	1.1471 , 0.563
	Absent	102(95.3%)	100(91.7%)	13(92.9%)	
Stent Removal	Present	1(0.9%)	2(1.8%)	0(0.0%)	0.537, 0.765
	Absent	108(99.1%)	107(98.2%)	14(100.0%)	
Epigastric pain	Present	47(43.9%)	42(38.5%)	4(28.6%)	1.52 , 0.467
	Absent	60(56.1%)	67(61.5%)	10(71.4%)	
Gastritis	Present	22(20.6%)	17(15.6%)	6(42.9%)	5.98 , 0.050
	Absent	85(79.4%)	92(84.4%)	8(57.1%)	
Portal Hypertension	Present	1(0.9%)	2(1.8%)	0(0.0%)	0.537, 0.765
	Absent	108(99.1%)	107(98.2%)	14(100.0%)	
Pain Upper Abdomen	Present	18(16.8%)	15(13.8%)	0(0.0%)	3.02 , 0.221
	Absent	89(83.2%)	94(86.2%)	14(100.0%)	
Chloecystitis	Present	2(1.9%)	3(2.8%)	0(0.0%)	0.529 , 0.767
	Absent	105(98.1%)	106(97.2%)	14(100.0%)	
Gastric Ulcer	Present	2(1.9%)	1(0.9%)	0(0.0%)	0.577, 0.749
	Absent	105(98.1%)	108(99.1%)	14(100.0%)	
Total		107(100.0 %)	109(100.0 %)	14(100.0%)	

UGIE findings reveal that as many as 49 cases (21.3%) had a normal endoscopic findings, Pan Gastritis was found in 73 cases (31.7 %) of all endoscopic findings whereas Antral gastritis was found in 34 cases (14.8%) of total endoscopies done. Reflux disease was found as a cause of symptoms in 10 (4.3%) cases, affecting Oesophagus as Reflux Oesophagitis, in 3 (1.3%) cases affecting stomach being identified as Reflux gastritis, and as Bile Reflux in another 3 (1.3%) cases. Gastroduodenitis was noted in 18 cases forming 7.8% of all the endoscopies. The other findings included Duodenitis in 1 case, Prolapse gastric mucosa in 05 cases, and Oesophageal stricture in 06 cases. (Table 2)

Table 3 reveals that the commonest symptom for which endoscopy was carried out was Epigastric pain in 93 (40.4%) cases, the gender distribution being 44 males to 49 females. Another 33 (14.3%) patients were subjected to endoscopy on account of upper abdominal pain. The male to female ratio for this indication was 20:13.

Epigastric pain, gastritis and upper abdominal pain had significant correlation to presence of H. Pylori (p value < 0.05). (Table 4)

Table 5: Gender Distribution of Endoscopic Findings

Finding	Gender		Total
	Male	Female	
Oesophageal stricture	3	3	6
	2.5%	2.8%	2.6%
Varices	13	4	17
	10.7%	3.7%	7.4%
Hiatus Hernia	6	2	8
	5.0%	1.8%	3.5%
Stent Removal	1	1	2
	.8%	.9%	.9%
Normal	24	25	49
	19.8%	22.9%	21.3%
Antral gastritis	19	15	34
	15.7%	13.8%	14.8%
Gastroduodenitis	8	10	18
	6.6%	9.2%	7.8%
Prolapse Gastric Mucosa	2	3	5
	1.7%	2.8%	2.2%
Pan gastritis	37	36	73
	30.6%	33.0%	31.7%
Reflux Oesophagitis	3	7	10
	2.5%	6.4%	4.3%
Bile Reflux	2	1	3
	1.7%	.9%	1.3%
Portal Hypertension Gastropathy	1	0	1
	.8%	.0%	.4%
Reflux Gastritis	1	2	3
	.8%	1.8%	1.3%
Duodenitis	1	0	1
	.8%	.0%	.4%
Total	121	109	230
	100.0%	100.0%	100.0%

Table 6: Gender Differences in Endoscopic Findings

Gender	Varices		Hiatus Hernia		Reflux oesophagitis		Antral gastritis	
	Incidence	Per cent	Incidence	Per cent	Incidence	Per cent	Incidence	Per cent
Male	13	76.47	6	75	3	30	19	63.33
Female	4	23.53	2	25	7	70	15	36.37
Total	17		8		10		34	

Table 7: Esophagogastroduodenoscopy findings in Relation to H Pylori

Diagnosis Code	Finding	H.Pylori			χ^2 value, P value
		Positive	Negative	Not Taken	
Oesophageal stricture	Present	0(.0%)	6(5.5%)	0(0.0%)	6.84 , **0.033**
	Absent	107(100.0%)	103(94.5%)	14(100.0%)	
Varices	Present	8(7.5%)	8(7.3%)	1(7.1%)	0.0028, 0.998
	Absent	99(92.5%)	101(92.7%)	13(92.9%)	
Hiatus Hernia	Present	3(2.8%)	5(4.6%)	0(0.0%)	1.05 , 0.592
	Absent	104(97.2%)	104(95.4%)	14(100.0%)	
Stent Removal	Present	1(0.9%)	1(0.9%)	0(0.0%)	0.131, 0.937
	Absent	106(99.1%)	108(99.1%)	14(100.0%)	
Normal	Present	17(15.9%)	30(27.5%)	2(14.3%)	4.80 , 0.091
	Absent	90(84.1%)	79(72.5%)	12(85.7%)	
Antral gastritis	Present	13(12.1%)	15(13.8%)	6(42.9%)	9.44 , **0.009**
	Absent	94(87.9%)	94(86.2%)	8(57.1%)	
Gastroduodenitis	Present	9(8.4%)	8(7.3%)	1(7.1%)	0.0833, 0.959
	Absent	98(91.6%)	101(92.7%)	13(92.9%)	
Prolapse Gastric Mucosa	Present	4(3.7%)	1(0.9%)	0(0.0%)	2.35 , 0.309
	Absent	103(96.3%)	108(99.1%)	14(100.0%)	
Pan gastritis	Present	44(41.1%)	27(24.8%)	2(14.3%)	8.76, **0.013**
	Absent	63(58.9%)	82(75.2%)	12(85.7%)	
Reflux Oesophagitis	Present	5(4.7%)	4(3.7%)	1(7.1%)	0.411, 0.814
	Absent	102(95.3%)	105(96.3%)	13(92.9%)	
Bile Reflux	Present	1(0.9%)	2(1.8%)	0(0.0%)	0.537, 0.765
	Absent	106(99.1%)	107(98.2%)	14(100.0%)	
Portal Hypertension Gastropathy	Present	0(0.0%)	1(0.9%)	0(0.0%)	1.11 , 0.573
	Absent	107(100.0%)	108(99.1%)	14(100.0%)	
Reflux Gastritis	Present	1(0.9%)	1(0.9%)	1(7.1%)	3.95 , 0.139
	Absent	106(99.1%)	108(99.1%)	13(92.9%)	
Duodenitis	Present	1(0.9%)	0(0.0%)	0(0.0%)	1.15 , 0.561
	Absent	106(99.1%)	109(100.0%)	14(100.0%)	
Total		107(100.0%)	109(100.0%)	14(100.0%)	

The endoscopic findings did reveal significant gender specific results. It was found that in cases of Varices, the incidence was found to be more in males as compared to females in ratio of 3.25:1,. Similarly in cases of Hiatus hernia, the male to female ratio was found to be 3:1, and in case of Antral gastritis, the male to female ratio was 1.74:1. However, in cases of reflux Oesophagitis, the ratio was reversed and Female to Male ratio was 1.74:1. (Table 6)

Correlation of endoscopic findings to presence of H.Pylori, showed significant correlation in cases of Oesopahgeal stricture, Antral gastritis, and Pan gastritis on Chi square test with p-value > 0.05. (Table 7)

DISCUSSION

One of the biggest challenges in practice of medicine is the understanding of chronic pain abdomen and the distressing symptoms related to Dyspepsia. While, endoscopy as a diagnostic and therapeutic modality has shown great promise and results, this is also a fact that in a developing country like India, such resources are few, and concentrated in urban setup.

At the same time, discovery of H.Pylori has come up with fresh challenges in terms of community health. There is evidence to suggest that it is a precursor to development of malignancy. The malignancy detection rate in Asian dyspeptics has been reported to be 1.4%. [12]

The prevalence of H.Pylori has been found to be high in community as reported in various studies where it has been reported to be between 50% -80% in developing countries.[13,14,15] The common indications for endoscopy, in our experience have been epigastric pain, Gastritis, Upper abdominal pain, and sometimes patients with cholecystitis and cholelithiasis, who remain symptomatic even after cholecystectomy.

In our study, we found normal gastric mucosa in 21.3% of endoscopies. Rajeswari et al have also reported the incidence of normal findings on endoscopy to be similar. [16]

In our study we found 36.17% of patients with normal endoscopy to be positive for H. Pylori. Functional dyspepsia may have normal findings, but relationship with H.Pylori may be controversial.[17]

In our study we found statistically significant correlation between Oesophageal stricture (Malignancy), Antral gastritis and Pan gastritis. In case of Oesophageal strictures though they have been classified as mild , moderate or severe stricture depending on the ease of passing endoscope, in most of cases it is rather subjective. [18]

H. pylori organisms reside in the superficial mucous layer, over the mucosal surface, and in gastric pits, and hence can explain the significant correlation with Gastritis- Antral as well as Pan gastritis.

CONCLUSION

In a Resource constrained and developing country like India where most of the resources are concentrated in urban areas, and there is an issue of affordability, there may be a need for creating guidelines for endoscopy, as well as use of H. pylori eradication kit in cases of epigastric pain, recalcitrant dyspepsia, and post cholecystectomy upper abdominal pain. However, when malignancy is expected, UGIE must be mandatory.

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A STUDY OF CORRELATION BETWEEN LIPOPROTEIN PROFILE AND BMI IN TYPE-2 DIABETIC PATIENTS

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ABSTRACT

Introduction: This case control study had been conducted to explore the relation between body mass index (BMI) and diabetes mellitus. Diabetes mellitus is a group of metabolic disorder characterized by hyperglycemia with glycosuria and it is well documented that increased level of blood glucose is a marker of disorder of carbohydrate metabolism and is associated with the initiation of diabetic dyslipoproteinemia and other complications. Prolonged free radical mediated lipotoxicity and abnormal glucose tolerance are involved in the pathogenesis of diabetes mellitus. Diabetic dyslipoproteinemia is characterized by the increased level of cholesterol, reduced HDL and high triglyceride (TG) levels. The present study was carried out to explore the status of oxidative stress, antioxidant enzymes, lipids and lipoprotein profile in type-2 diabetic patients.

Material & Methods: This study was conducted on type 2 diabetic patients attending the diabetes OPD, Era's Lucknow Medical & Hospital, Sarfaraz Ganj, Hardoi Road, Lucknow. All biochemical assays were carried out by the standard kit methods.

Results: A marked increase in plasma levels of fasting blood sugar, lipid peroxide, lipid profile accompanied with increase in the lipids and apo-protein levels of serum β lipoproteins following decrease in lipid and protein constituents of α lipoprotein, antioxidant enzymes and reduced glutathione were noted in type 2 diabetic patients with BMI 23-24.9 Kg/m^2 in comparison to healthy control with BMI 18-22.9 Kg/m^2.

Conclusion: This study shows a significant boost in oxidative stress, β lipoproteins, blood glucose, glycosylated hemoglobin following with decrease in α lipoproteins, antioxidant enzymes, reduced glutathione and lecithin cholesterol acyl transferase activities were observed in T2DM patients with respect to healthy control

Key words: Lipoprotein profile - Oxidative stress – Antioxidant Enzymes – LCAT - Body Mass Index

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INTRODUCTION

An enhance in body fat is generally associated with an increase in risk of metabolic diseases such as type 2 diabetes mellitus, hypertension and dyslipidaemia (1). Body mass index (BMI) criteria are currently the primary focus in obesity treatment recommendations, with different treatment cutoff points based upon the presence or absence of obesity-related co morbid disease. Type 2 Diabetes Mellitus (T2DM) is a cluster of abnormal metabolic paradigms with the essential feature of hyperglycemia and is dubbed as the disease of "premature ageing". Incidence of T2DM is rising all over the world at worrying rate, despite, comprehensive and coordinated effects of World Health Organization (WHO), International Diabetes Federation and Several Social Science Agencies (1). All efforts have failed till date to arrest this rising incidence. 6.6 % of the world population was affected by this disease in 2010 with an estimated 285 million carriers and the number may become almost double (552 million) by 2030. India is facing an even more grim scenario. In 2000, the number of diabetic carriers was 31.7 million which rose to 58.7 million in 2010 and 12 million more patients are expected to get added in another

20 years. On the basis of affected population, both in terms of percentage and numbers India has significantly more patients than China and other neighboring countries and is often referred to as the diabetic capital of the world. The reasons for this lopsided proclivity are still poorly understood (2).

Metabolically, T2DM is a hetrogenous multifactorial syndrome with environmental and pleotropic involvement in which the former are overwhelmingly significant factors. Indeed, hyperglycemia is an essential expression due to relative or absolute lack of insulin action or secretion. Pathway selective insulin resistance is a cardinal, if not essential feature. It is almost inevitably accompanied with hyperglycemic complexities such as altered lipid metabolism and raised oxidative status due to unfavorable "Cellular Redox Homeostatic Box". Several researchers have corroborated this condition by animal cell culture and *in vitro* studies and our recent animal studies also support them (3). The objectives of this study were to explore the relation between body mass index (BMI) and diabetes mellitus. Therefore, present study was design to assess the level of altered lipid profile, lipoprotein profile, oxidative stress and antioxidants in type -2 diabetic patients with BMI 23-24.9 Kg/m^2.

MATERIAL AND METHODS

The present study was carried out in the department of Biochemistry, Physiology and Department of Medicine, Era's Lucknow Medical & Hospital, Sarfaraz Ganj, Hardoi Road, Lucknow. In collaboration with Biochemistry Division, Central Drug Research Institute Lucknow.

Selection of Healthy Human Volunteers:

100 healthy control (Male-50, Female-50), age 25 to 30 years, BMI 18-22.9 were served as Control. These individuals attended the outpatient department for their periodical health checkup.

Selection of T2DM Patients:

100 T2DM Patients (Male-35, Female-65), Age 40 To 50 Years, BMI 23-24.9 Were Selected From Diabetes Outpatient Department Of Medicine, Era's Lucknow Medical & Hospital, Sarfaraz Ganj, Hardoi Road, Lucknow.

Exclusion Criteria For T2DM Patients:

Patients With Evidence Of Acute Or Chronic Inflammatory Conditions, Infectious Disease, Hypertension, Cancer, Persons On Insulin Or Other Medications That Could Affect Glucose Metabolism Were Excluded. Pregnant And Lactating Women Were Also Not Included In The Study.

Inclusion Criteria For T2DM Patients:

All T2 DM Patients Were Subjected To A Complete Medical evaluation by a physician including recording a full medical history and physical examination. Both males and females with fasting blood glucose ≥145 mg/dl and BMI 23-24.9 Kg/m^2 were included in the study.

Study Design

Subjects were divided in to two groups of 100 subject each: Group 1: Healthy Control (n=100), Group 2: Type 2 Diabetes Mellitus (n=100). The study proposal was approved by the Institutional Ethics Committee of Era's Lucknow Medical & Hospital, Sarfaraz Ganj, Hardoi Road, Lucknow.

Blood samples were collected after over night (12 hours) fasting, from the ante median cubital vein, using disposable plastic syringes with all aseptic precautions. Blood was transferred immediately in to a dry clean plastic test tube with a gentle push to avoid hemolysis. Blood was collected from both groups (Control & Diabetic), for biochemical estimations in fluoride (sodium fluoride and potassium oxalate, 5.4 mg NaF and 3.0 mg K-oxalate in each vial), EDTA (3 mg/ vial) and plain vials.

Separation of Serum and Plasma:

Plasma was separated by centrifuging anticoagulant mixed whole blood at 1500 rpm for 15 minutes at 4 °C in Eppendorf centrifuge machine. On the other hand, for separating serum, the whole blood was kept in plain vacuutainer at 37 °C for 30 minutes after which this coagulated blood was centrifuged at 1500 rpm for 15 minute at 4°C in Eppendorf centrifuge machine. The supernatant was pipette out in a new tube and kept at - 20 °C till analysis.

Preparation of RBC Lysate:

3 ml whole blood of EDTA vacuutainer was taken and centrifuged at 1500 rpm for 15 minutes at 4 °C in Eppendorf centrifuge machine. The whole supernatant from the tubes was pipette out, then to this supernatant was added 1 ml of normal saline

(0.9% Nacl, isotonic solution). It was then again Eppendorf centrifuge machine. This step was repeated for three times for proper washing of RBC. Then 1.0 ml of washed RBC was taken in a new test tube, to which 3 ml of chilled Tripled Distilled Water (TDW) was added to lyses RBC. It was mixed/shaked well for 1 minute. This step followed by centrifugation at 10,000 rpm for 15 minutes at 4°C in Eppendorf centrifuge machine to settle down cell ghost of RBC. The supernatant was pipette out in a new tube and stored it at -20°C till analyzed.

Biochemical Analysis of Blood and Plasma:

The blood was centrifuged and plasma was separated. The fasting blood sugar (FBS) (4) was analyzed in plasma while glycosylated hemoglobin (HbA1C) (5), Super oxide dismutase (SOD) (6), Catalase (CAT)(7), Glutathione peroxidase (GPx) (8) and Glutathione reductase (GR) (9) were estimated in RBC lysate, serum totalcholesterol (TC) (10), triglyceride (TG) (11), high density lipoprotein total cholesterol (HDL-TC) (12) were assayed by standard spectrophotometric methods. Low density lipoprotein total cholesterol (LDL-TC) and very low density lipoprotein total cholesterol (VLDL-TC) were calculated by Friedewald's equation (13). Serum was also used for the assay of lecithin cholesterol acyl transferase activity (LCAT) (14), lipid peroxide (LPO) (15), and reduced glutathione (GSH) (16). A portion of serum was fractionated into very low density lipoprotein (VLDL), low density lipoprotein (LDL) and high density lipoprotein (HDL) by polyanionic precipitation methods (17). Lipoproteins were measured for their total cholesterol (TC) (10), phospholipids (PL) (18), triglyceride (TG) (11) and apoprotein (19) by standard spectrophotometric methods.

Statistical Analysis:

One-way-analysis of variance (ANOVA-Newman's student test) was performed by comparison of values for diabetic group with control. All hypothesis testing were two-tailed. P <0.05 was considered statistically significant and the results were expressed as mean ± SD. The Graph pad INSTAT 3.0 software was used to carried out the statistical analysis (20).

centrifuged at 1500 rpm for 15 minutes at 4°C in

RESULTS

The data in Table-1 shows that, in type 2 diabetic patients showed markedly increased levels of in fasting blood sugar 57 %, HbA1c 40 %, serum; TC, TG, LDL- Cholesterol and VLDL- Cholesterol levels 34%, 59%, 58 %, 60 % respectively. On the other hand type 2 diabetic patients showed decreased levels of HDL- Cholesterol by 39% and LCAT levels17%. With respected to healthy control.

TABLE 1:

Analysis of hyperglycemic serum showed marked increase in the levels of lipids and apoprotein constituting b-lipoproteins (VLDL and LDL) and these effects were pronounced for VLDL-TC 60 %, PL 133 %, TG 59 % and apoproteins 7 %. There was increase in LDL-TC, PL, TG 62 %, 139 %, 23 % respectively and apoprotein 13 %. There was a decrease in HDL-TC, PL, TG and apoprotein (34 %, 24 %, 10 % and 25 %) respectively with respected to healthy control. (Table 2)

The data in table-3 shows that in type 2 diabetic patients there was decrease in the levels of GSH, SOD, CAT by 49 %, 24 %, 11 % respectively and increase in level of plasma LPO by 252 % with respect to healthy control.

Table 1: Levels of Fasting Blood Glucose, Glycosylated Hemoglobin, Serum Lecithin Cholesterol Acyl Transferase And Serum Lipid Profile In Type-2 Diabetic Patients

Experimental schedule	BMI (Kg/m^2)	Fasting Blood sugar	Glycosylated Hemoglobin *(g%)*	Serum LCAT (mmol/L/hr)	Serum lipid profile				
					TC (mg/dl)	TG (mg/dl)	LDL-TC (mg/dl)	VLDL-TC (mg/dl)	HDL-TC (mg/dl)
Healthy Control (n= 100)	18-22.9	90.26 ± 9.05	4.98 ± 0.53	79.84 ± 14.97	200.86 ± 21.67	110.06 ± 20.18	127.24 ± 24.57	21.89 ± 7.56	49.60 ± 9.17
Type 2 Diabetic (n=100)	23-24.9	149.40 ± 10.86* (+ 57%)	6.97 ± 0.78* (+ 40%)	65.78 ± 13.18* (- 17%)	268.53 ± 11.36* (+34 %)	175.00 ± 28.01* (+59 %)	201.17 ± 14.42* (+58 %)	35.00 ± 5.60* (+60%)	30.53 ± 4.40* (-39%)

Values expressed as mg/dl are mean ± SD of 100 subjects. Values in the parenthesis are percent change. Type 2 Diabetic Patients group *with BMI 23-24.9 Kg/m²* was compared with Healthy Control*p<0.001.

Table 2: Levels of Serum Lipoprotein Profile In Type-2 Diabetic Patients

Experimental schedule	VLDL				LDL				HDL			
	TC (mg/dl)	PL (mg/dl)	TG (mg/dl)	Apo-protein (mg/dl)	TC (mg/dl)	PL (mg/dl)	TG (mg/dl)	Apo-protein (mg/dl)	TC (mg/dl)	PL (mg/dl)	TG (mg/dl)	Apo-protein (mg/dl)
Healthy Control (n=100) BMI 18-22.9 (Kg/m^2)	20.98 ± 7.56	37.60 ± 3.99	39.16 ± 3.95	16.85 ± 1.04	124.16 ± 14.42	29.55 ± 2.11	27.18 ± 1.11	27.13 ± 1.61	46.81 ± 9.17	82.55 ± 9.35	18.47 ± 1.79	183.89 ± 11.34
Type 2 Diabetic BMI 23-24.9 (Kg/m^2) (n=100)	36.00 ± 5.60** (+ 60 %)	87.60 ± 7.48** (+ 133 %)	58.79 ± 5.70** (+ 59 %)	18.00NS ± 0.57 (6.8 %)	201.17 ± 14.42** (+ 62 %)	70.59 ± 7.43** (+ 139 %)	33.21 ± 6.29** (+ 23 %)	30.55 ± 1.46* (12.6 %)	30.54± 4.44** (- 34%)	62.52 ± 6.27** (- 24.26 %)	16.55 NS ± 1.28 (-10.39 %)	137.42± 12.33** (-25.31%)

Values are expressed as mean ± SD of 100 subjects, Type 2 Diabetic group with BMI 23-24.9 Kg/m^2 was compared with Healthy control. **p<0.001, *p<0.05, NS= Non significant.

Table 3: Levels of GSH, Serum Lipid Peroxide; SOD, Catalase, GPx and GR in Type-2 Diabetic Patients

Experimental schedule	Status of markers used for oxidative stress in Serum		Status of Antioxidant Enzymes in RBC Lysate			
	GSH (mg/ dl)	Lipid peroxide (nmol MDA/ml)	SOD (Unit/minute/mg protein)	Catalase (Unit/minute/mg protein)	GPx (nmoleNADPH Oxidase/min/mg protein)	GR (µmole/mg protein)
Healthy Control (n=100) BMI 18-22.9 (Kg/m^2)	38.55 ± 3.76	2.18 ± 0.39	2.78 ± 0.19	3851 ± 251.36	366.38±161.00	248.00±34.89
Type 2 Diabetic (n=100) BMI 23-24.9 (Kg/m^2)	19.79±1.62* (- 50%)	7.65 ± 1.36* (+253%)	2.12 ± 0.18* (-24%)	3430 ± 267.08NS (-10%)	280.00±87.56* (-24%)	149.00±38.18* (-42%)

Values are expressed as mean ± SD of 100 subjects, Type 2 Diabetic group with BMI 23-24.9 Kg/m^2 was compared with control *p<0.001, NS= Non significant.

DISCUSSION

In the present study the average glycosylated hemoglobin (HbA1c), lipoprotein profile and antioxidants enzymes significantly impaired in type 2 patients with BMI 23-24.9 Kg/m^2 when compare with healthy control with BMI 18-22.9 Kg/m^2. Subtractions (total cholesterol, phospholipids, triglycerides and apoprotein fractions) of VLDL, LDL and HDL were examined. While lipid fractions were adversely affected in patients and required correction, the three most important features needing focus are low HDL cholesterol, low LCAT levels (Table- 1), low HDL apoprotein fraction (Table-2) and low GSH, SOD, CAT, GPx and GR (Table-3). There is consistent evidence that HDL choledterol is a potent predictor of cardiovascular events independently and also in T2DM patients (21). The cardio protective effect of HDL is attributed to its role in reverse cholesterol transport. It removes excess cholesterol from peripheral tissues towards the liver for excretion in to bile or else for steroid hormone synthesis in steroidogenic organs. Further effects of HDL are proteotropic as it also exerts most importantly as antioxidant and anti-inflammatory agent (22).

Lecithin cholesterol aceyl transferase is an vitally important enzyme helping in reverse cholesterol transport. It transfers 2 acyl groups of lecithin to cholesterol resulting in generation of cholesterol esters which are retained in core of HDL particle for final scavenging. Incidentally glycosylated Hb negatively correlates with LCAT activity in T2DM. Apoprotein-1 is quantitatively a major component of HDL. Glycation of apoprotein A-1 in HDL alters and reduces LCAT activity in proportion to the extent of apoprotein A-1 glycation. Indeed there is convincing evidence that hyperglycemia induces several pathways generating more ROS. These ROS increase glycation potential (22). In our study, apoprotein-1 significantly decreased and concomitantly OS also increased ($p<0.01$). Further more in both VLDL and LDL fractions total cholesterol and triglycerides level were consistently and considerably higher in diabetic patients indicating dyslipidemia. It is now widely accepted that dyslipidemia is a cardinal feature in dibetes**.** American Diabetes Association, 2003, had stated that T2DM is associated with a cluster of interrelated plasma lipid and lipoprotein fractions. Low HDL and elevated triglycerides also increase the risk of cardiovascular disease 2 -4 times in T2DM (23).

Our study indicates the pivotal role of oxidative stress in pathogenesis and progression of T2DM. Although the role of OS in origin of T2DM is still controversial issue but it definitely abets T2DM and plays a central role in development of diabetic complications. One of the major oxidant is super oxide anion, that too with predominance in endothelial cells of both large and small arteries and myocardium and in convenience with dyslipidemia it increases the risk of cardiovascular events several folds. It is also postulated that O2 inactivates 2 critical artiatherosclerotic enzymes endothelial nitric oxide synthase and prostacyclin Synthase (24). In the present study, LPO, an accepted marker of OS in T2DM was significantly raised in diabetic patients. The average increase was more than threefold to that of controls. This clearly alluded and signified to provoke OS in diabetes. Consequently this must be disturbing the redox box . The raised OS was accompanied with reduction in GSH level, and lower SOD, Cat , GPx and GR activities. On the contrary endogenous antioxidants are reducible and try to balance cellular antioxidants, thereby maintaining cellular redox homeostasis. In light of these report, the observation stated in Table 3 purport perturbed redox box in T2DM 24.

CONCLUSION

Our study indicates the pivotal role of oxidative stress, impaired carbohydrate and lipid metabolism in pathogenesis and progression in type 2 diabetic patients with BMI 23-24.9 Kg/m^2 when compare with healthy control with BMI 18-22.9 Kg/m^2 . This study shows a significant boost in oxidative stress, β lipoproteins, blood glucose, glycosylated hemoglobin following with decrease in α lipoproteins, antioxidant enzymes, reduced glutathione and lecithin cholesterol acyl trans ferase activities were observed in T2DM patients with respect to healthy control. This is clearly suggested that increased oxidative stress, hyperglycemia,

impaired lipid profile, abnormal lipoprotein constituents and decreased activity of antioxidant enzymes, reduced glutathione, lecithin cholesterol acyl transferase and high BMI are risk factors in the patho-mechanism of atherosclerosis in patients suffering from T2DM.

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CLINICAL CORRELATES OF DISEASE PATTERN ON UPPER GASTROINTESTINAL ENDOSCOPY WITH CLINICAL INDICATIONS: EXPERIENCE AT A TEACHING HOSPITAL

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Abstract

Introduction: Upper gastrointestinal Endoscopy (UGIE) has been recognised as a single cost-effective investigation which can be used to detect a number of medical and surgical conditions. From diagnostic perspective as well as from the perspective of evidence-based medicine, this study was undertaken with the broad aim to find spectrum of conditions for which endoscopy was carried out in the institution.

Materials and Methods: This is a retrospective study, based on medical data of endoscopies carried out between 01 Jan 2018 – 31 Dec 2018. Exclusion criteria being the cases where the data was incomplete. The data was classified based on the age group, gender, types of diseases and the diagnosis and analyzed to study the pattern using Microsoft Excel program.

Results: 237 cases of endoscopy were studied. Male to female ratio was 53:47. 67% of population undergoing endoscopy was in the age group of 11-60 years. The conditions for which endoscopy was indicated included dyspepsia, epigastric pain, chronic liver disease, portal hypertension, dysphagia, gastritis, and 3 cases of stent removal. Some of the common findings observed on UGIE were Antral and Pan gastritis, Hiatus Hernia, H. Pylori, Oesophageal stricture, Varices, Reflux diseases including Reflux Oesophagitis, Reflux Gastritis and Bile reflux.

Conclusion: The study describes the findings of UGIE in different symptoms setting and reveals significant findings which have a bearing on management of chronic and sometimes recalcitrant symptoms

Keywords: Endoscopy, dyspepsia, epigastric pain, varices, chronic liver disease

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INTRODUCTION

Pain abdomen is commonest symptom amongst patients reporting to OPD. While some of them present as acute abdomen, and are expeditiously diagnosed and managed in Casualty department itself, majority of instances report as chronic symptoms. To add to the diagnostic conundrum, is the fact that some of these symptoms may not have an organic basis. The spectrum of such complaints includes Dyspepsia. It may be defined as upper abdominal or retrosternal pain or discomfort, heartburn, nausea, vomiting or other symptoms considered to be referable to the proximal alimentary tract.[1] In terms of incidence of dyspepsia, it is reported to be 4-5% of General Practitioners consultation, and 20-40% of Gastroenterologists' consultation.[2] Dyspepsia was found to be more prevalent in middle aged individuals, compared to other age groups. in a study conducted in Mumbai.[3] Another class of patients who report with dyspeptic symptoms may not have any organic cause, but are symptomatic anyhow. Such patients are classified as Functional dyspepsia. As per Roman III Classification, these are the patients who meet following criteria Postprandial fullness, early satiety, epigastric pain or burning and no evidence of structural disease that is likely to explain the symptoms. Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis.[4] Upper GI Endoscopy has been a preferred diagnostic modality to investigate such patients and come to a diagnosis. Some of the other indications include dysphagia or odynophagia, persistent gastroesophageal reflux symptoms, occult gastrointestinal bleeding, and surveillance for malignancy.[5] This study was carried out to analyse the clinical correlates of disease pattern of Upper GI Endoscopy at a teaching Hospital in North India.

The objectives of this study were:

1. To understand the spectrum of conditions for which endoscopy was carried out
2. To study the endoscopic results in a variety of medical indications for Endoscopy
3. To study the endoscopic findings with a view to determine the spectrum of medical conditions in the patients reporting for endoscopy

MATERIAL AND METHODS

This study was conducted by Department of Surgery, at Integral Institute of Medical sciences & Research, Lucknow. This was a retrospective descriptive study based on the upper GI endoscopies carried out in the institution. The period covered was from 01 Jan 2017 to 31 Dec 2018. Patients with symptoms of dyspepsia, difficulty in swallowing, blood in vomiting, unexplained weight loss, loss of appetite, upper abdominal discomfort were included in the study. Patients who attended the gastroenterology outpatients section and also patients referred from other wards, screened by Gastroenterologist for upper GI endoscopy, were the subjects of this study. The study was approved by the Institutional Review Committee (IRC) and the Ethical Review Committee (ERC). The data was classified based on the age group, gender, types of diseases and the diagnosis and analyzed to study the pattern using Microsoft Excel program.

Inclusion criteria:

All the patients who underwent endoscopy during the period covered were included in the study.

Exclusion criteria:

The cases where the data was missing or incomplete were excluded from the study.

Primary outcome:

The study brought about the spectrum of medical conditions diagnosed with the investigative modality of Upper GI Endoscopy. This study would help us to know the disease pattern in this particular area, and would perhaps provide the basis for an epidemiological study at a later stage to identify risk factors causing the particular upper GI tract disease.

RESULTS

The maximum number of patients that underwent UGIE was in the age group 31-40 constituting 19.43% of the sample. The other major age grouped was 21-30 and 41-50. It is interesting to note that 67% of population undergoing endoscopy is in the age group of 11-60 years. (Figure1)

The male is to female ratio in this study, in terms of percentage, was found to be 53:47. (Figure 2)

Figure 1: Age group wise distribution of subjects

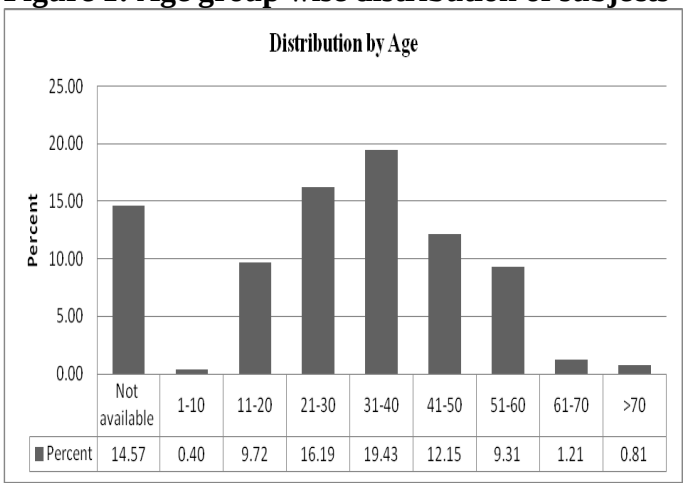


Figure 2: Gender wise distribution of subjects

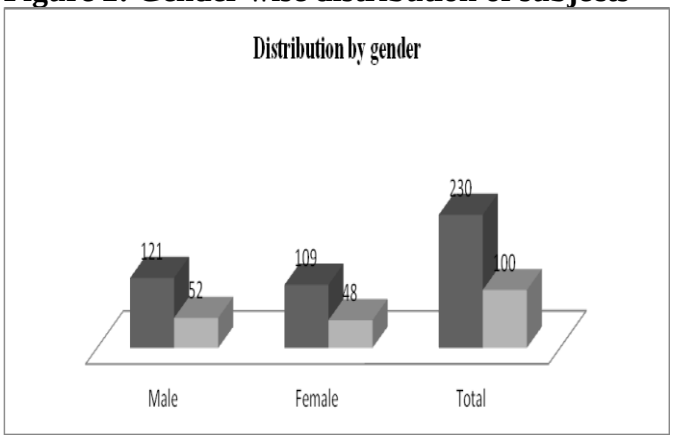
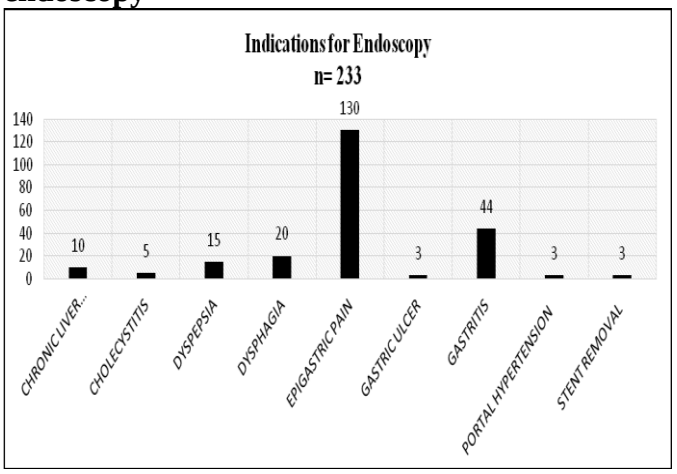


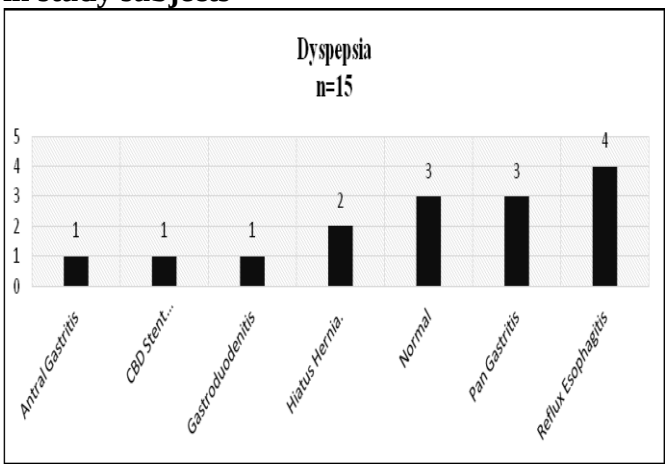
Figure 3: Distribution of indications for endoscopy



Out of 233 cases studied, majority of the cases that were subjected to UGIE 130 had reported with complaints of epigastric pain, being the primary complaint in addition to dyspeptic symptoms. As many as 15 cases reported with primary complaints of dyspepsia. Chronic liver disease cases reporting for review were also subjected to endoscopy in view of upper abdominal discomfort and 10 such cases were evaluated. Amongst other indications- we had 5 cases of known Cholelithiasis, 3 cases admitted for CBD stent removal and 3 known cases of Gastric ulcer reporting for review. 20 cases of

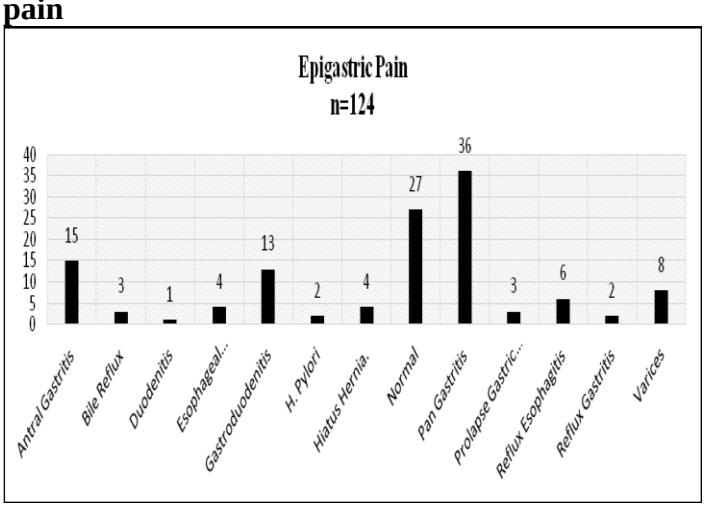
Dysphagia, and 44 instances of patients reporting with clinical impression of Gastritis were also investigated using UGIE (Upper Gastrointestinal Endoscopy) as primary modality of investigation. (Figure 3)

Figure 4: Distribution of symptoms of dyspepsia in study subjects



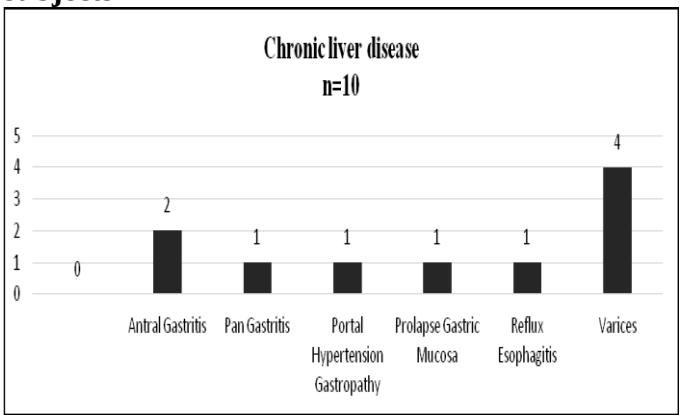
There were 15 cases in this series who reported with symptoms of dyspepsia, not responding to usual medical treatment. Of these, 3 cases had normal endoscopic findings, 4 cases were found to have Reflux Oesophagitis, 3 had Pan gastritis, and 2 cases had Hiatus Hernia. (Figure 4)

Figure 5: Distribution of subjects with epigastric pain



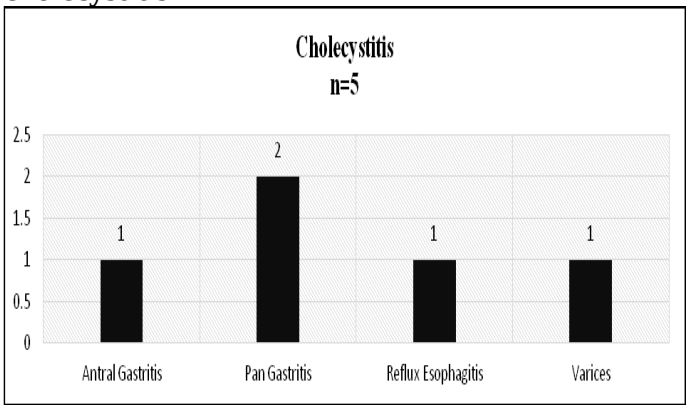
Majority of patients in our study reported with epigastric pain. The incidence of patients with epigastric pain was 124, forming 53.21% of sample size. 27 cases had normal study, on endoscopy. In terms of endoscopic findings Pan gastritis and Antral gastritis were most common, being 36 and 15 respectively. Reflux disease accounted for 11 cases, with 6 cases showing features of reflux Oesophagitis, 3 cases revealing bile reflux and 2 cases having features of Reflux gastritis. Gastroduodenitis and Duodenitis were noted in 13 and 1 case respectively. (Figure 5)

Figure 6: Distribution of chronic liver disease in subjects



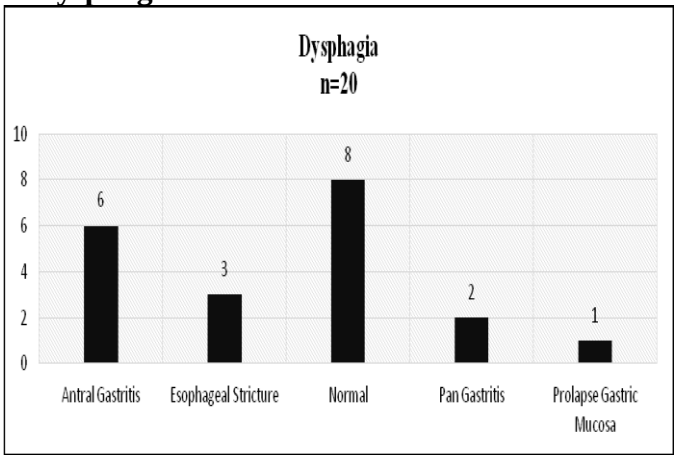
In this study 10 cases of patients with known liver diseases were studied. Endoscopic findings revealed 4 cases having Oesopahgeal varices, while 2 cases revealed Antral Gastritis. Findings of Portal Gastropathy, Pan-gastritis, Prolapse Gastric mucosa, and Reflux Oesophagitis were noted in one case each. (Figure 6)

Figure 7: Distribution of subjects with cholecystitis



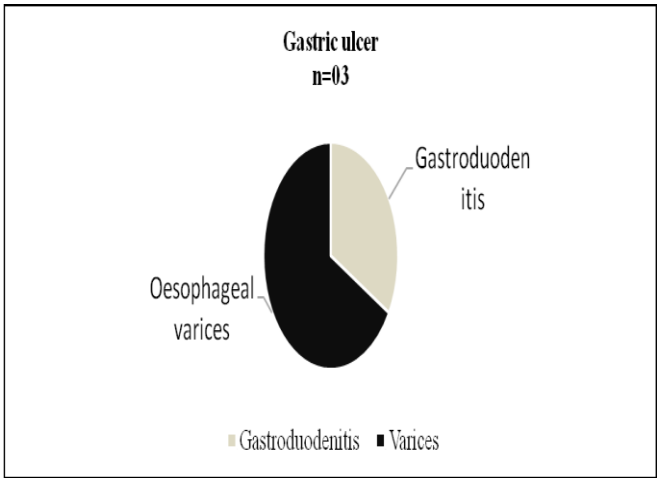
Out of the cases of Pain abdomen, who underwent multi-modality investigation, 5 were diagnosed as cases of Cholecystitis. In these cases, it was found that the endoscopic findings revealed, Pan -gastritis in 2 cases and Antral Gastritis, Reflux Oesophagitis, and varices in one case each. (Figure 7)

Figure 8: Distribution of subjects with symptoms of dysphagia



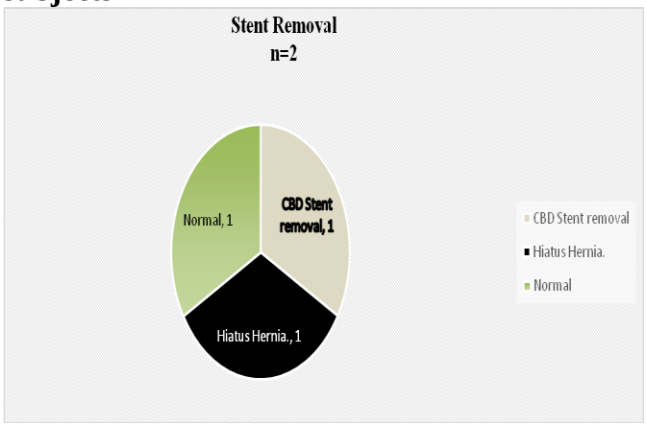
We had 20 cases of patients presenting with symptoms of dysphagia of varying degrees. On endoscopy, 8 of such cases were found to have no abnormality, while in 3 cases Oesophageal stricture accounted for the symptoms. In 9 cases gastritis was seen, involving whole stomach as Pan gastritis in 2 cases and limited to Antrum in 6 cases. In a solitary case Prolapse of gastric mucosa was seen. (Figure 8)

Figure 9: Distribution of known cases of Gastric ulcer



We had 3 cases where UGIE was indicated for review of known cases of Gastric ulcer. Out of these 2 cases had evidence of Oesophageal varices, while one case had Gastroduodenitis. (Figure 9)

Figure 10: Distribution of stent removal in subjects



We had 2 cases who underwent endoscopy on review after removal of CBD stent and were symptomatic. Out of these 1 had a normal endoscopic finding, I was found to have Hiatus hernia. In one case endoscopy was carried out to remove the stent. (Figure 10)

DISCUSSION

Upper GI Endoscopy as a diagnostic and Therapeutic modality has evolved greatly over last few decades. It has helped in understanding of a number of gastric and gastroduodenal conditions in patients who were symptomatic for long but did not reveal much by way of existing diagnostic support. Some of the conditions where it played a significant role include conditions like Dyspepsia, epigastric pain, Upper GI Bleeding, Malignancies, and Reflux diseases. However, India is a vast country and it is important to understand the regional differences as well as effect of socio-economic status leading to insights which may contribute to formulation of national health policies. Dyspepsia is a group of symptoms that includes upper abdominal discomfort or pain which may be intermittent or persistent, may or may not be associated with belching, bloating, heart burn, nausea, or vomiting. [6] The causes for dyspepsia are numerous which include gastritis, Peptic ulcer disease, Oesophageal reflux disease, gastric carcinoma etc. In the present study we have looked into endoscopic findings of patients reporting with different clinical findings. In this study Male: Female ratio was 53%:47%. Gado et al reported a ratio of 51%: 49%. Thomson A. B.R et al reported a male to female ratio of 1:1. In India Sumathi Breported a male to female ratio of 1.5:1 and Sunil Kumar et al. reported a ratio of 1.05:1. Chronic Liver disease is described in literature to have correlation with Peptic Ulcer disease. Both duodenal and gastric ulcers are more common in cirrhosis: the reported prevalence is 24.1% [15] It is recognized that the prevalence of gastric ulceration increases with the severity of liver disease and is related to changes in the hepatic venous pressure gradient. [15,16.] However, in present study we could not see this correlation. This could be attributed to the decreased incidence of peptic ulcer compared to 1995-96, when it was more common. The other events in evolving liver disease is development of Portal hypertension and formation of portosystemic shunts is a major event in the natural history of liver disease. Gastroesophageal varices are present in > 50% of patients with portal hypertension and are more likely as liver disease progresses.[17]In our study the incidence of Varices was found to be 40%. This could be attribute to the fact that in our study the number of cases with chronic liver disease was less (10), and since the presence of varices also depends on the severity and progress of chronic liver disease. Portal hypertensive gastropathy (PHG), with its typical “snake skin” appearance, is present in approximately 80% of patients with cirrhosis.[18] In this study the incidence of PHG was noted to be 10%, and again it could be due to a smaller number of cases with Chronic liver disease who were subjected to UGIE. In another study no substantial difference in the topographic distribution of

superficial gastritis emerged.[19] In the present study 20% of cases were found to have Gastritis, with equal incidence of Antral Gastritis and Pan-gastritis. We found one case each (10%) of Prolapse Gastric Mucosa, and Reflux Oesophagitis each. Faintuch et al [20] reported a predominance of functional dyspepsia, on endoscopy, whereas cancer was an uncommon finding, despite the high prevalence of *H. pylori*. In our series we observed 20% of cases to have normal findings, 20% had Pan gastritis, while 25% had Reflux Oesophagitis. We also had findings of Hiatus Hernia, Gastroduodenitis, and antral gastritis in 3 cases. In the study by Ray et al, 9398 cases were studied, and most of the patients presented with the similar complaints of pain abdomen.[21] Common causes of upper abdominal pain are peptic ulcer and gallstones. However, the role of upper GI endoscopy before cholecystectomy is controversial,[22]Patients with symptomatic gallstones and negative oesophago-gastro-duodenoscopy (OGD) remain asymptomatic after cholecystectomy, while patients with positive OGD findings remain symptomatic [23] Schwenk et al reported Upper GI endoscopy in 1064 out of 1143 (93.1%) patients with cholelithiasis before elective cholecystectomy. Upper GI pathological findings were detected in 345 patients (30.2%)[24] In our study, we found 100% lesions on endoscopy. The number of patients of cholecystitis who underwent UGIE was 5 and the endoscopic findings were Gastritis in 3 cases, 2 cases of Pan-gastritis and one case of Antral gastritis. The other 2 cases were found to reveal Reflux Oesophagitis in 1 and Varices in another. Thje reason could be the fact that in our study UGIE was done for symptomatic patients, while in other series it was done on all cases being posted for Cholecystectomy. However, it does give an idea that at least in some cases where patients may still be symptomatic after cholecystectomy, the cause may be in the upper GI tract. The prevalence of dysphagia in the otherwise healthy general population is difficult to determine but in arecent population‐based study focused on dysphagia, it was found that among an adult population, the prevalence ofdysphagia was up to 17%, with a peak in the 40–49 years ofage group for both males and females, indicating that dysphagia is a remarkably common condition in the general population.[25] Sahu et al reported endoscopic findings in cases of dysphagia and had interesting findings as they compared UGIE findings with biopsy report. They found that out of 150 cases that underwent UGIE 73 were reported as carcinoma oesophagus on UGIE whereas in terms of biopsy only 62 were confirmed (41%), and 11 turned out to have no carcinoma. In terms of UGIE findings of no carcinoma in 77 cases all cases were confirmed as negative for carcinoma on biopsy. 43 cases were diagnosed as Oesophagitis on endoscopy out of which 10 were confirmed to be carcinoma on biopsy. [26] In our study number of cases of dysphagia was very small. Endoscopy was done in 20 cases of dysphagia, out of which only 3 had Oesophageal stricture confirmed to be due to carcinoma on biopsy (15%). 8 cases showed up normal findings. 8 cases had gastritis with 6 having Antral and 2 having Pan -gastritis. 1 case had prolapse of gastric mucosa. It is possible that the difference could be the large number of cases in the series of Sahu et al as compared to our study.

CONCLUSION

Upper Gastrointestinal Endoscopy, is an effective modality for investigating cases referable to GI system. Most of the times, there are significant findings of endoscopy, which has a bearing on treatment and outcome. However, it is to be noted that in a significant percentage of cases , the study may be normal.

In rural setting, there is a question of availability, and affordability of UGIE. In terms of findings, most of the cases revealed anral gastritis or Pan gastritis.

It is reecommended that upper GI endoscopy may be considered as a first line of investigation in cases of dyspepsia and pain referable to upper abdomen and especially epigastric pain.

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PREVALENCE OF GIARDIASIS AMONG CHILDREN ADMITTED WITH DIARRHOEA IN A TERTIARY HOSPITAL OF LUCKNOW

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ABSTRACT

Introduction: *Giardia lamblia* is highly infectious protozoan parasite capable of causing gastrointestinal illness in humans. This study was undertaken to find the prevalence of *Giardia lamblia* infection in children admitted with diarrhoea in a tertiary hospital of Lucknow.

Material and Methods: This cross-sectional study was conducted among 184 children admitted with diarrhoea over a period of six months from January 2018 to June 2018 in the Department of Paediatrics, Integral Institute of Medical Sciences & Research, Lucknow. These cases were further screened for giardiasis in the Department of Microbiology of the institute. This research was approved by the Institutional Research Committee & the Ethical Review Committee. Before enrolment in this research, written consent was taken from the parents and/ or legal guardian of the children. Chi square and Fisher exact test was used to see the determination among categorical variables. P<0.05 was taken as significant.

Results: A total of 184 samples were examined, out of which 14.13% samples were positive for *Giardia lamblia* infection. *Giardia lamblia* was more prevalent in male patients (14.28%) than in female patients (13.92%). Giardiasis was least common in children aged 6 to10 years (6.97%). Most of the patients belonged to the rural area (13.13%). Most subjects belonged to the lower socio-economic class (19.8%) that was more than middle socio-economic class (7.22%). Most of the cases were found to have poor hygiene (15.5%). Out of total positive subjects, mixed infections were found in four children. Two of them had *G.lamblia+E.histolytica* and other two had *G.lamblia+B.hominis* co-infection.

Conclusion: Large scale study is needed in order to get accurate estimation of prevalence and implementing effective control measures to prevent transmission of *Giardia lamblia* in future.

Keywords: Prevalence, *Giardia lamblia*, diarrhoea

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INTRODUCTION

Giardia lamblia, also known as *G. duodenalis* and *G. intestinalis*, is the most common protozoal parasite of the human intestine worldwide with rates of detection between 2-5% in the developed nations and 20-30% in the developing nations.[1] Giardiasis is associated with poor sanitary conditions, insufficient water treatment, day-care centers and with institutional facilities such as nursing homes. Infection occurs when infective cysts of *G. lamblia* are ingested by a susceptible host through contaminated water, food, by direct person-to-person or animal-to-person transmission. The World Health Organization reported that 200 million people in Asia, Africa and Latin America have symptoms of giardiasis with some 500,000 new cases a year, especially among children.[2] The infection may produce severe acute diarrhoea in children less than five years of age with chronic infections resulting in weight loss and growth retardation.[3-5] Several studies have associated these infections with socio-demographic, hygiene, nutritional and immune condition of the host and strain of the parasite.[6] In developing countries, common risk factors associated with *G. lamblia* infection are socio-demography, improper sanitation, bad personal hygiene, eating of unwashed fruits and vegetables, and drinking of contaminated water.[7] *Giardia* assemblage has been combined with asymptomatic diarrhea [8] and as the

predominant genotype in diarrhea cases.[9] According to the World Health Organization (WHO), more than one million (almost 15-20%) of the world's population is chronically infected with parasites.[10] In India total prevalence rate of intestinal parasitic infection ranges from 12.5% to 66% with varying prevalence rate for individual parasite.[11] Globally, the intestinal parasitic infections such as soil-transmitted helminth (STH) and protozoa infections have been identified as one of the most significant causes of illnesses and diseases especially among disadvantaged communities.[12] The infection may cause severe diarrhoea, malabsorption syndrome resulting in growth retardation and poor psychomotor development of child.[13] With this background, this study was undertaken to find the prevalence of *Giardia lamblia* infection in children admitted with diarrhoea in a tertiary hospital of District Lucknow.

MATERIALS AND METHODS

This cross-sectional study was conducted among 184 children admitted with diarrhoea over a period of six months from January 2018 to June 2018 in the Department of Paediatrics, Integral Institute of Medical Sciences & Research, Lucknow, Uttar Pradesh. These cases were further referred for screening for giardiasis in the Department of Microbiology of the institute. This research was approved by the Institutional Research Committee (IRC) & the Ethical Review Committee (ERC). Before enrolment in this research, written consent was taken from the parents and/ or legal guardian of the children. The risk and benefit had been interpreted in the consent form. Socio-demographic and clinical data was obtained using a structured questionnaire. Information concerning their personal hygiene was also collected.

Inclusion Criteria:

Children ≤14 years of age, admitted in inpatient units of the Paediatrics department with diarrhoea were included.

Exclusion Criteria:

I. Children who had received anthelminthic drugs within 3 months of study were excluded.

II. Accompanying guardian not willing to give consent for their children participation in the study

Collection of Sample:

Faecal specimens were collected from each study participants and placed into a wide mouthed clean plastic container. The stool samples were examined within 1-2 hrs of collection to detect and identify cyst/trophozotes of *Giardia lamblia*, in the Microbiology laboratory of Integral Institute of Medical Sciences & Research Hospital, Dasauli, Kursi Road, Lucknow.

Laboratory examination:

Faecal specimen was inspected with naked eye for any accompanying blood, pus, mucus, intestinal worms or proglottids etc. which could have determined severe dysentery and the presence of helminths. The stool specimens were examined microscopically using normal saline & lugol's iodine mounts on grease free slides.[14]

Statistical analysis:

The categorical data was investigated by calculating proportion. Chi square test was used to see the determination among categorical variables. However, Fisher exact test used in case of small prevalence in different cell. $P<0.05$ was taken as significant.

RESULTS

Total 184 subjects were divided in to age groups. The first age group was 1- 5 years, second age group was 6-10 years, and the third age group was 11-14 years. In the first age group total patients were 112 in which 19 patients (16.96%) were positive. In the second age group total subjects were 43 in which 3 patients (6.97%) were positive. In third age group total patients were 29 in which 4 patients (13.79%) showed positive result. The prevalence was higher in 1-5 years of age group as compared to second and third age groups. Age wise different of positivity was not found to be significant. Out of 105 males and 79 females, 15 males (14.28%) and 11 females (13.92%) were positive for *Giardia lamblia*. Males were found to be more infected with *Giardia lamblia* as compared to females, the difference being statistically significant.(table 1)

Table 1: Demographic distribution of *Giardia lamblia* cases in paediatric age groups

Variable	No of Cases	Positive	%	Chi-square	p-value
Age group					
1 to 5yrs	112	19	16.96	0.294	2.447
6 to 10 yrs	43	3	6.97		
11to 14yrs	29	4	13.79		
Gender					
Male	105	15	14.28	0.944	0.005
Female	79	11	13.92		

Table 2: Distribution pattern of Giardiasis among children according to place of residence

Area	No of Cases	Positive	%	Chi, sq	p-value
Rural	99	13	13.13	0.589	0.293
Urban	85	13	7.06		
Total	184	26	14.13		

Table 2 illustrates the area wise distribution, in which 99 subjects belonged to rural area and 85 from urban area. In the rural area 13 subjects (13.13%) were positive and in the urban area 13 subjects (7.06%) positive. Though area wise difference of positivity was not significant, the maximum number of positive subjects were belonging to rural area than urban area. (table 2)

Table 3: Association of Giardiasis with Socioeconimic status among children

Socioeconimic status	No of cases	Positive	%	Chi-sq	p-value
Lower	101	20	19.8	0.589	0.293
Middle	83	6	7.22		
Total	184	26	14.13		

Table 3 shows the socio-economic status among paediatric patients. 83 subjects belonged to the middle class , in which 6 patients (7.22%) were positive. Out of 101 patients belonging to lower class, 20 patients (19.8%) were positive. The higher prevalence rate was found in lower class patients than middle class. (table 3)

Table 4: Association of Giardiasis with personal hygiene among children

Personal hygeine	No of Cases	Positive	%	Chi-sq	p-value
Poor	103	16	15.5	0.569	0.524
Good	81	10	12.34		
Total	184	26	14.13		

Most of the patients suffering from giardiasis had poor hygiene (15.5%). ((table 4**)**

Table 5: Coinfection of *Giardia lamblia* with other intestinal parasites

Name of parasites	No. of positive case	%	Chi-square	P-value
G.lamblia+E.histolytica	2	1.086	0.814	0.367
G.lamblia+B.hominis	2	1.086	0.01	0.919

Table 5 depicts the distribution pattern of *Giardia lamblia* infection with other intestinal parasites. Out of total positive subjects, mixed infections were found in four children. Two of them had *G.lamblia+E.histolytica* and other two had *G.lamblia+B.hominis* co-infection. (table 5)

DISCUSSION

According to Kumar et.,al.[15] the prevalence of *Giardia lamblia* infection in the study was 13.67%. This study was similar to our study, out of 184 samples, 26 cases were positive for *Giardia lamblia*. So the overall prevalence of *Giardia lamblia* was 14.13%. According to Abdullah et.,al.[16], *Giardia lamblia* infection investigated in 268 children who provided the samples, 8.2% were found to be positive for giardiasis. According to Jethwa et, al [17], out of 300 children with diarrhoea, 15 (5%) had infection with *Giardia lamblia*. In our study, out of 105 males and 79 females, 15 males (14.28%) and 11 females (13.92%) were positive for *Giardia lamblia*. In comparison to another study, prevalence of parasitic infection was more common in females (15.68%) as compared to that in males (12.87%), in age ≤15 years.[15] According to Abdullah et.,al.16 (125 males and 143 females), males (10.4%) were found to be most infected with *Giardia lamblia* as compared to females (6.29%). In the present study, the first age group distribution was 1- 5 years (16.96%), followed by 6-10 years (6.987%), and 11-14 years (13.79%). The prevalence was higher in age group I as compared

to II and III age groups. In comparison to another study, predominance in different age groups on the basis of their age, children were divided into three groups. Group I included the children between 5-8 years of age, group II and group III included the children between 9-12 and 13-15 years of age groups. The infection rate was highest in case of group I (13.7%), then showed a devolution with increase in age and was least in case of group 3 (3.88%).[16] In another similar study, distribution of children declared with diarrhoea were categorized according to their age groups. In this study, preschool children were mostly affected with Giardia infection 6.4% (9/141). [17] In the present study according to the area distribution, 99 subjects belonged to rural area and 85 from urban area. In the present study, 13 patients belonging to rural area (13.13%) and the same number of patients belonging to rural area (7.06%) were found to be suffering from giardiasis. Prevalence was higher in patients belonging to rural area than urban area. In a similar research work, prevalence in rural and urban children comparison showed that the infection rate was higher in children belonging to rural areas (9.87%) than belonging to urban areas (6.03%). [16] In our study there was association of *Giardia lamblia* with personal hygiene. A total 184 children were included, in which 103 and 81 children were following poor and good hygiene practices. Most of the positive patients were following poor hygiene 16 (15.5%), as compared to patients with good hygiene 10 (12.34%). According to Abdullah et.,al.[16], infection rate was greater in children with poor personal hygiene. In this study subjects were divided into different socio-economic class according to kuppu swamy socio-economic status 2018.[18] In our study, 83 patients belonged to the middle class, in which 6 patients (7.22%) were positive. Out of 101 patients belonging to lower socio-economic class, 20 patients (19.8%) were positive. The higher prevalence rate was found in lower class patients than middle class.

CONCLUSION

A large scale study is needed in order to get accurate estimation of prevalence and implementing effective control measures to prevent transmission of *Giardia lamblia* in future.

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EFFECT OF TOBACCO USAGE ON CARDIO-RESPIRATORY SYSTEM IN PRE AND POSTOPERATIVE PERIOD

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ABSTRACT

Introduction: Smoking is becoming very important for anesthetic morbidity. In spite of its widespread noxious effects on health, developing countries have increasing statistics on smoking population. Aim of the present study is to estimate the effect of tobacco usage on cardio-respiratory system in pre and postoperative period

Material and Methods: Study was conducted at Nehru Hospital, B.R.D. Medical College, Gorakhpur after the permission of ethical committee. Both genders between 18-60 years were included. After the permission of ethical committee, detailed history, pulmonary function test, matchstick blowing test and partial pressure of oxygen was recorded preoperatively and on postoperative day 1,2 and3. Patients were divided into three groups according to smoking and tobacco chewing habits. Statistical analysis was done using SPSS version 16.0 software. t-test, and Mann–Whitney test were applied according to the requirement. The level of significance was fixed at 95%. $P < 0.05$ was considered statistically significant.

Results: The study included 50 patients go through elective surgery. Respiratory complications included productive cough, bilateral rhonchi, mild hypoxemia, and prolonged intubation and were observed more commonly in group of smokers and tobacco chewers followed by group of smokers. Reduction in partial pressure of oxygen in all groups on first three postoperative days but the maximum reduction were observed in group of smokers and tobacco chewers on first postoperative day and were given oxygen inhalation to prevent hypoxia.

Conclusion: Patients should quit smoking as soon as they are scheduled for surgery. Chest physiotherapy, breathing exercises should be suggested preoperatively.

Keywords: Complications, smoking, respiratory

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INTRODUCTION

Smoking is becoming very significant for anesthetic morbidity. In spite of its prevalent noxious effects on health, developing countries have increasing figures on smoking population. Postoperative pulmonary complexities are 2 to 6 times more common in smokers as compared to nonsmokers. Smokers have a 70% elevated risk for cancer, cardiovascular or pulmonary disease, as distinguished to nonsmokers. [1] In industrialized countries, approximately one third of the adult population smoke and approximately 20% of natural deaths are pointed to tobacco utilization. [2,3] In the world, approximately 3.7 million people die, and being one third in developing countries. Smoking is the major risk factor for arterial thromboembolism and coronary vasospasm from side to side multiple ways, including straight endothelial and haematological dent and metabolic and biochemical irregularities. [3,4] Confirmed smokers have Carboxyhemoglobin levels of 5% to 15%, which may mean oxygen saturation below 15% pointed to by pulse oximetry. In execution, accessible oxygen would be even lower since Carboxyhemoglobin shifts Hb dissociation curve to the left. Inbuilt dent could be measured through increased sympathetic movement and airway hyper-reflex [3,4,5,6] Approximately one fourth of smokers have chronic bronchitis, which is five times lower in nonsmokers.[2] Additional events with anesthetic

implications are cell-mediated humoral immunity impairment, in addition to microsomal enzymes induction with the increase in numerous drugs metabolism.[6] There are confirmations that smokers are more susceptible to upper airway problems, including laryngospasm during anesthetic emergence and sedation. Circuitous evidences show that the same difficulties are reflected in lower airways. Nevertheless, a clearer demonstration of enhanced morbidity has been recounted to preoperative lung complications, such as pneumonia and atelectasy, which are two to six times more common in smokers. [1,4,5,6] Smoker shave extra post operative hypoxemia than non smokers after alike anesthesia and surgery.[7] Aim of the present study is to estimate the effect of tobacco usage on cardio-respiratory system in pre and postoperative period

MATERIAL AND METHODS

Study was conducted at Nehru Hospital, B.R.D. Medical College, Gorakhpur after the permission of ethical committee. Both gender between 18-60 years of ASA (American Society of Anaesthesiology) grade I and grade II scheduled for elective surgical procedures were included. A day before operation thorough general and systemic examination was done.

Arterial blood gas analysis was done and partial pressure of oxygen was recorded preoperatively and on postoperative day 1, 2 and 3. Bed side pulmonary function tests including breath holding time, forced expiratory time and matchstick blowing test were done by using following criteria.

Table 1: Grading of pulmonary function tests was done by using following criteria

Test	Normal	Mild	Moderate	Severe
Breath	25	20	15	<15
Forced	<4	04	05	>05

Matchstick blowing test was done by asking the patient to blow a matchstick with open mouth from a distance of 15 centimetres and divide into two groups whether able to perform matchstick blow test or not.

Patients were divided into three groups according to smoking and tobacco chewing habits. Group-I: Non-smokers (20 patients).

Group-II: Smokers-Patients who smoked more than 10 cigarettes or bidi per day were classified as smokers (20 patients) and

Group-III: Smokers and tobacco chewers (10 patients).

All the patients were pre-medicated with injection pentazocine 30 mg and injection glycopyrrolate 0.2mg given intramuscularly 30 minutes before general anaesthesia. Patients were then shifted to operation theatre. The routine monitoring like pulse rate, blood pressure, electrocardiography, SpO2 recording were done throughout the surgery. All the patients were pre-oxygenated with 100% oxygen by face mask and were induced with thiopentone sodium 4-5mg/kg (2.5% solution) and succinylcholine 1 -2mg/kg intravenous was given to facilitate intubation. Heart rate, systolic blood pressure, diastolic blood pressure, mean arterial blood pressure, mean oxygen saturation were recorded just after intubation, 5 minutes after intubation, 30 minutes after intubation, before extubation and just after extubation. All the patients were kept for 8 hours in recovery room. Vital parameters like pulse rate, blood pressure, oxygen saturation were recorded. All the patients were watched for postoperative complications like bronchospasm, coughing, hypoxia, nausea, vomiting etc.

Data entry and statistical analysis were performed using the Microsoft Excel and SPSS windows version 16.0 software. Tests of significance like t-test and Mann–Whitney test are applied to find out the results. Statistical significance taken as p value < 0.05.

RESULTS

The study included 50 patients go through elective surgery. The patients were divided into three groups. Group-I non-smokers, Group-II smokers and Group-III smoker and tobacco chewers. The following observation has been made.

Table 2: Gender wise Distribution of subjects

Groups	Male		Female		Total	
	No.	%	No.	%	No	%
Group-I (Non-smokers)	15	75.0	05	25,0	20	40.0
Group-II (Smokers)	15	75.0	05	25.0	20	40.0
Group-III (Smokers and tobacco chewers chewer)	07	70.0	03	30.0	10	20.0
Total	37	74.0	13	26.0	50	100. 0

Table 2 shows that most of the patients in the study were mule which constitutes 37 out of 50 patient i.e74%. Male Female ratio was 2.84:1.(table 2)

Table 3: Grading of preoperative bedside pulmonary function tests in various groups

Test	Group-I				Group-II				Group-III			
	Normal	Mild	Moderate	Severe	Normal	Mild	Moderate	Severe	Normal	Mild	Moderate	Severe
Breath holding	18	02	-	-	08	09	03	-	03	03	03	01
Forced expiratory	18	02	-	-	09	08	03	-	04	03	02	01

N = Normal; Mod. = Moderate: Sev. = Severe

Table 3 shows grading of preoperative bed side pulmonary function test in various groups. In Group-III, 4 patients had moderate and severe reduction in breath holding time and 3 patients had significant reduction in forced expiratory time. In Group-II, only 3 patients had significant reduction in breath holding time and forced expiratory time. In Group-I, none of the patient had significant reduction in breath holding time and forced expiratory time. Table also shows that preoperative bedside pulmonary function test was significantly reduced in Group-III.(table 3)

Table 4: Showing the number of patients able to perform matchstick blowing test m various groups

Test	Group-I		Group-II		Group-III	
	Yes	No	Yes	No	Yes	No
Match stick blowing test	19	01	16	04	06	04

Table 4 shows the number of patients able to perform matchstick blowing test in various groups. Four patients in Group-II and Group-III were unable to perform the test while only one patient in Group-I was unable to perform the test. Thus, it was observed that mostly smokers and tobacco chewers as compared to non-smokers had significant reduction of preoperative bedside pulmonary function tests. Table also shows that 40% of patients of Group-III were unable to perform matchstick blowing test.(table 4)

Table 5: Complications during first three postoperative days in various groups

Complications	Group-I		Group-II		Group-III	
	No.	%	No.	%	No.	%
Fever	02	10.0	08	40.0	05	50. 0
Respiratory						
Productive cough	1	5	6	30	4	40
Bilateral Rhonchi	1	5	9	45	4	40
Bilateral	1	5	7	35	4	40
Hypoxemia	-	-	1	5	2	20
Prolonged intubation	-	-	-	-	-	-
Cardiovascular complications						
Tachycardia	1	5	6	30	4	40
Hypertension	1	5	2	10	1	10
Hypotension	1	5	1	5	1	10
Septicaemia	-	-	-	-	1	10
Pain	2	10	4	20	4	40
Nausea& Vomiting	1	5	1	5	1	10

Table 5 shows complications during first 3 postoperative days in various groups. Respiratory complications included productive cough, bilateral rhonchi, mild hypoxemia, prolonged intubation and were observed more commonly in Group-III followed by Group-II. Fever may be due to the retention of secretions in chest which was found in 50% of patients of Group-Ill who had most of the

respiratory complications. Pain was observed in 4 patients (40%) of Group-Ill and 2 patients (20%) of Group-II. This may be due to the increased requirement of analgesics in smokers and tobacco chewers postoperatively.(table 5)

Table 6: Mean partial pressure of oxygen with standard deviation at different intervals in different groups

Groups	Pre operative	Postoperative day 1		Postoperative day 2		Postoperative day 3	
	Mean± S.D.	Mean± S.D.	'p' value	Mean± S.D.	'p' value	Mean± S.D.	'p' value
Group-I	85.74±4.43	82.43±5.43	>0.05 INS	83.24±3.62	>0.05 INS	83.32^-4.93	>0.05 INS
Group-II	80.32±5.83	75.63±5.43	<0.01 HS	78.54±4.93	>0.05 INS	77.45±3.42	>0.05 INS
Group-III	78.54±4.27	73.42±3.42	<0.01 MHS	75.640±5.53 (with oxygen therapy)	>0.05 INS	77.45±3.42 (with oxygen therapy)	>0.05 INS

Table 6 shows the mean partial pressure of oxygen with standard deviation and different intervals in different groups. There was reduction in partial pressure of oxygen in all groups on first three postoperative days but the maximum reduction was observed in Group-III on first postoperative day and was given oxygen inhalation to prevent hypoxia. Statistical comparison of partial pressure of oxygen in mmHg with preoperative value at different intervals in different groups.(table 6)

DISCUSSION

Smoking is an addiction which causes the death of 40-50% of those people who continue to smoke. [8] Long-term smokers (more than 30 years) often have more signs and symptoms of pulmonary function deterioration and prominent signs, such as sputum production. However, in shorter-term smokers and without major symptoms, the possibility of reactive airways should also be considered.[9] This advocates that cigarette smoking causes many physiological changes in body thus putting the patient at an increased risk when undergoing general anaesthesia and further increased risk of postoperative complications. Smokers have been shown to exhibit heightened upper airway reflex responses to chemical stimuli. The haemodynamic changes associated with laryngoscopy and intubation have been studied extensively and many pharmacological methods have been used to obtund them, but to our knowledge, the effect of smoking per se has not been considered. Although, in the majority of patients undergoing general anaesthesia these responses are probably of little consequence, they may be relevant in patients with cardiovascular and cerebrovascular disease. Thus, the aim of this study was to effect of tobacco usage on cardio-respiratory system in pre and postoperative period in smokers, tobacco chewers and non-smokers. In group of smoker and tobacco chewers, 4 patients had moderate and severe reduction in breath holding time and 3 patients had significant reduction in forced expiratory time. In group of smoker, only 3 patients had significant reduction in breath holding time and forced expiratory time. In Group of non smoker, none of the patient had significant reduction in breath holding time and forced expiratory time. Nel et al (1996)[8] studied the effects of postoperative pulmonary complications and found that postoperative pulmonary complications as atelectasis, pneumonia, fever more in smokers than non-smokers. Furthermore, prolonged abstinence from smoking significantly decreases the risk of postoperative respiratory complications.[10, 11] Six months of abstinence restores antimicrobial and inflammatory alveolar macrophage function.[12] Smoking cessation for 6–8 weeks improves pulmonary function.[13] Present study showed complications during first 3 postoperative days in various groups. Respiratory complications included productive cough, bilateral rhonchi, mild hypoxemia, prolonged intubation and were observed more commonly in group of smoker and tobacco chewers followed by group of smoker. Fever may be due to the retention of secretions in chest which was found in 50% of patients of smoker and tobacco chewers who had most of the respiratory complications. Tachycardia was observed in 40% of patients who belongs to smoker and tobacco chewers group and 6 patients (30%) of smoker group. Nausea, vomiting, hypotension was observed in each group which may not be related to smoking. Septicaemia was observed in only one smoker and tobacco chewers which may be due to associated severe crepitations, fever, tachycardia, productive cough in the patient. In addition, Morton (1944)[14] concluded that patients who smoked more than 10 cigarettes per day had a six fold increase in postoperative chest complications. Also

postoperative respiratory morbidity rate of 14.8% in smokers and 6.3% in non-smokers following abdominal operations.[15] Postoperative pulmonary complications are use upto five times more common in smokers even in absence of abnormal pulmonary function tests.[16] Present study showed that there was reduction in partial pressure of oxygen in all groups on first three postoperative days but the maximum reduction was observed in smoker and tobacco chewers group on first postoperative day and were given oxygen inhalation to prevent hypoxia. As most of the patients in group of smoker and tobacco chewers suffered pulmonary complications and needed oxygen therapy so there was reduction in partial pressure of oxygen on postoperative day 2 and 3. Thus, we have seen that haemodynamic changes and perioperative and postoperative complications were more common in smokers and tobacco chewers followed by smokers.

CONCLUSION

Fever, respiratory complications tachycardia and pain were commonest complication during first three postoperative days observed most commonly in smokers and tobacco chewers. Patients should quit smoking as soon as they are scheduled for surgery. Chest physiotherapy, breathing exercises should be advised preoperatively.

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PATTERNS OF GLYCEMIC CONTROL USING GLYCOSYLATED HEMOGLOBIN IN DIABETIC PATIENTS

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ABSTRACT

Introduction: The main role of Glycosylated haemoglobin is in getting information about degree of control in a diabetic patient. The aim of this study was to assess patterns of glycaemic control using glycosylated haemoglobin in diabetic patients and to find out correlation between levels of plasma glucose and glycosylated haemoglobin in diabetics.

Material and Methods: The present study has been conducted on 107 patients of diabetes mellitus selected from outpatients department. Patient's general information and clinical examinations, blood glucose level and previous investigations were recorded on a proforma after taking permission from institutional ethical committee. Correlation between the levels of glycosylated haemoglobin and plasma glucose fasting was also observed. Data was analyzed using SPSS 16.0.

Results: A total of 107 patients aged more than 20 years were included in the study. Fifty study subjects having HbA1c greater than 6.5%, had mild diabetes (less than 200 mg/dl plasma glucose fasting value). 38 (40.9%) subjects had Moderate (200-350 mg/dl) diabetes. Approximately 5% study subjects having greater than 6.5% HbA1c level were in severe category of diabetes (more than 350 mg/dl plasma glucose fasting). Linear regression analysis for correlation of HbA1c level and plasma glucose fasting was found statistically significant and correlation coefficient was 0.449.

Conclusion: This study concludes that by using glycosylated haemoglobin and plasma glucose fasting, we can diagnose diabetes mellitus early and prevent any unwanted complications. This will also prevent any undue modifications in lifestyle or any mental depression from a misdiagnosis.

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INTRODUCTION

Both science and the practice of medicine revolutionize rapidly. In recent years, new developments have taken place of breath taking speed. The most important of these is the science pertaining to health and disease. One of the new concepts is that careful control of blood glucose helps to prevent or postpone the dread complications of angioplasty and neuropathy in the course of diabetes Mellitus. A deterrent to greater acceptance of this is lack of control of blood sugar. Prospective studies suggest that there is positive relationship between the degree of metabolic control and the frequency and extent of late complications of Diabetes mellitus.[1]. Investigation of the structure and biosynthesis of glycosylated Haemoglobin (HbA1c) in the past decade have provided a means to objectively access the average level of glycaemia in diabetic patients. The use of Glycosylated haemoglobin level as integrated index of long term blood glucose level, represents a significant tool in our research and therapeutic armamentarium.[2] From the structural and biosynthesis information available it is clear that HbA1c is formed slowly and almost irreversibly by the condensation of glucose and haemoglobin in red blood cell. At any given point of time glycosylated haemoglobin level is better indicator of blood glucose. The process of glycosylation is continuous through whole 120 day life span of red blood cells, so it correlates with glucose levels of previous 6 to 8 weeks.[3] On the other hand, HbA1c is a marker of

long term glucose homeostasis and is routinely used to assess the adequacy of glycaemic control in diabetic patients. Many researchers have been noted that HbA1c is associated with type2 diabetes patients. As well as, HbA1c is a marker of long term glucose homeostasis and is routinely used to assess the adequacy of glycaemic control in diabetic patients.[4-6] HbA1c level increases with age, chronic subclinical inflammation and possibly oxidative stress and also in conditions that can adversely affect red blood cell survival. For example, haemolytic anaemia, blood transfusion.[4,7,8] The present study was undertaken to find out correlation between levels of plasma glucose and glycosylated haemoglobin in diabetics.

MATERIAL AND METHODS

The present cross-sectional one year study was conducted in Departments of Pathology and Medicine, Government Medical College, Azamgarh among the patients attending out patients department of "Diabetes" as specialty clinic after taking permission from institutional ethical committee. Patient's general information, history and clinical examinations and previous investigations (if any) were recorded on a proforma. History and examination included mainly the duration of disease, presenting complaints such as polyuria, polydipsia, polyphagia, and change in weight and other related complications. Patients were then investigated for blood glucose level and along with them normal healthy individuals who were considered as controls were also investigated for the same. Estimation of blood glucose was done by glucose oxidase method (Bauer, 1990), [9]
Grading of Diabetes was done as follows:
Fasting plasma glucose (as per American Diabetes Association):
Normal-<5.6 mmol/l (100 mg/dl)
Impaired glucose tolerance: 5.6-6.9 mmol/l (100-125 mg/dl)
Diabetes mellitus - ≥7 mmol/l (126 mg/dl)[10]
Glycated Hb:
Normal level of HbA1c: <6.5[11-13]

Statistical Analysis

Data was analyzed using SPSS 16.0. Patterns of glycaemic control were presented by percentages. Chi square test and one way analysis of variance were applied for significance. Linear regression analysis and Pearson's correlation was used to determine the relationship between plasma glucose fasting and HbA1c. Plasma glucose fasting was included as explanatory variables of HbA1c in linear regression analysis.

RESULTS

A total of 107 patients who were more than 20 years of age and diagnosed to be suffering from diabetes were included in the study.

Table 1 : Distribution of Plasma Glucose Fasting values according to age and gender

Age Group	Plasma Glucose Fasting			P value
	Mild (up to 200 mg/dl)	Moderate (200-350 mg/dl)	Severe (> 350 mg/dl)	
≤ 40	15(23.8)	12(30.8)	0(0.0)	0.303
>40	48(76.2)	27(69.2)	5(100.0)	
Gender				
Male	37(58.7)	21(53.8)	4(80.0)	0.527
Female	26(41.3)	18(46.2)	1(20.0)	
Total	63(100)	39(100)	5(100)	

Table 1 reveals that most of the subjects belonged to the age group greater than forty years. In which majority (76.2%) showed mild plasma glucose levels, followed by moderate levels (69.2%). No subject had severe Plasma Glucose Fasting (> 350 mg/dl) in less than equal to 40 years age group. Sixty two subjects (57.9%) were males and 45 subjects (42.1%) were females. In severe plasma glucose fasting level category, majority (80%) of subjects were males. (Table 1)

Table 2: Distribution of HbA1c according to age and gender

Age Group	HbA1c Level			P value
	Normal (<5.6 %)	Pre diabetes (5.7%-6.4%)	Diabetes (>6.5%)	
≤ 40	0(0.0)	3(25.0)	24(25.8)	0.708
> 40	2(100.0)	9(75.0)	69(74.2)	
Gender				
Male	2(100.0)	5(41.7)	55(59.1)	0.245
Female	0(0.0)	7(58.3)	38(40.9)	
Total	2(100)	12(100)	93(100)	

Table 2 illustrates that 74.2 % diabetes patients were above the age group of forty years. While only

25.8% diabetes patients belonged to less than equal to 40 years age group according to HbA1c level. No significant difference between age group and HbA1c level was found. On the other hand, most of the diabetes patients were males (59.1%). Only four patients showed normal HbA1c Level (<5.6 %) and twelve patients showed pre diabetes stage (5.7%-6.4%) according to HbA1c level. There were no significance differences between HbA1c Level and gender. (table 2)

Table 3: Patterns of glycaemic control among study subjects

Plasma Glucose Fasting	HbA1c Level			P value
	Normal (<5.6 %)	Pre diabetes (5.7%-6.4%)	Diabetes (>6.5%)	
Mild (up to 200 mg/dl)	2(100.0)	11(91.7)	50(53.7)	0.101
Moderate(200-350 mg/dl)	0(0.0)	1(8.3)	38(40.9)	
Severe (> 350 mg/dl)	0(0.0)	0(0.0)	5(5.4)	
Total	2(100.0)	12(100.0)	93(100.0)	

Out of total subjects, fifty study subjects had HbA1c greater than 6.5%, and had mild diabetes (less than 200mg/dl plasma glucose fasting value). Approximately five percent study subjects had greater than 6.5% HbA1c level and who were in severe category of diabetes more than 350 mg/dl) according to plasma glucose fasting. Out of total 93 diabetes patients (>6.5%), 38 study subjects had moderate (200-350 mg/dl) level of Plasma Glucose Fasting. There were no significance differences between HbA1c Level and Plasma Glucose Fasting. (table 3)

Table 4: Variation of Plasma Glucose Fasting and HbA1c Levels between the groups

Parameter	Mean ± SD	F statistic	P value
Plasma Glucose Fasting			
Mild (up to 200 mg/dl)	149.3±26.4	188.46	**<0.001**
Moderate(200-350 mg/dl)	246.1 ±34.8		
Severe (more than 350 mg/dl)	434.7 ±116.2		
HbA1c Level			
Normal (<5.6 %)	5.4 ±0.1	22.92	**<0.001**
Pre diabetes (5.7%-6.4%)	6.1 ±0.3		
Diabetes (>6.5%)	10.1 ±2.3		

The one way analysis of variance (ANOVA) was used to compare the plasma glucose fasting value and HbA1c level of patients from all groups i.e., Mild (up to 200 mg/dl) , Moderate(200-350 mg/dl) and severe (more than 350 mg/dl) & Normal (<5.6 %) , Pre diabetes(5.7%-6.4%) and Diabetes (>6.5%) respectively. Significance difference between groups was found in both parameters (P<0.001). Severe plasma glucose fasting value showed highest variation as compared to other two. However in HbA1c levels there were minimal variations in between the groups .(table 4)

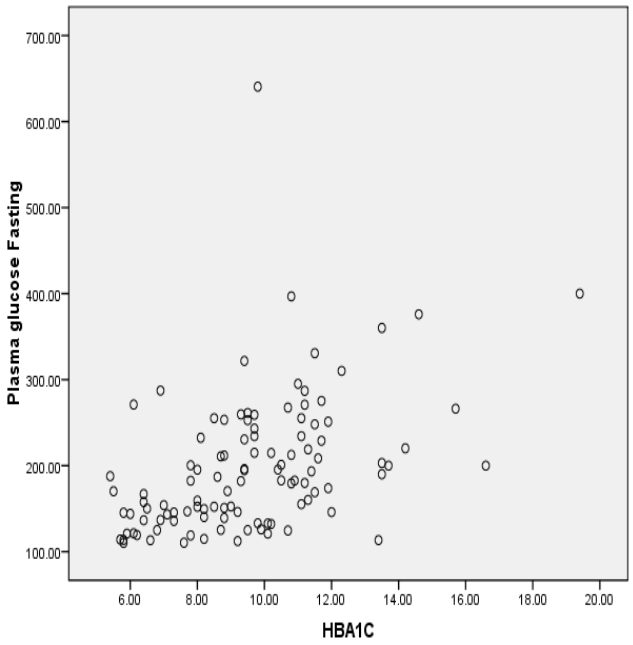

Figure 1 Plasma Glucose Fasting *vs* HbA1c

On linear regression analysis taking HbA1c as independent variable and FPG as other variable, it was observed that HbA1c and FPG had significant linear relationship. (r= 0.449, p<0.001)

DISCUSSION

Observation of glycaemic control in diabetes has enhanced to a great extent after the introduction of measurement of HbA1c level. The significant investigations reflect short-term and long-term glycaemic status of the diabetics and are certainly superior to quantization of blood glucose alone. Measurement of glycosylated haemoglobin may be employed safely as diagnostic tool and can be a great help in therapeutic management of the diabetic patients. In present study, no significance differences were found between plasma glucose fasting and HbA1c with age and gender. In addition,

this study reported that among total cases 67.5% were males and 32.5% were females. The cases in respect to age, sex and type of diabetes are well correlated with studies given by previous workers such as Genuth [14] and Ganong [15] who have reported that NIDDM usually develops after age of 40 years and IDDM usually appears in the patients under 30 years of age. In present study most of the patients with severe diabetes (more than 350 mg/dl) were males, There were no significance differences between HbA1c Level and sex. Furthermore, Mean value of Glycated Hb was high in female patients (12.57%) than mean values of male patients (12.10%). These type of results were also obtained by Goldstein et al.[16] Stickland [17] et al stated that because of chronic blood loss (menstruation) and sex difference in Red blood cell life span (109 days) female hemoglobin can undergo greater degree of glycosylation compared to that of male,. That's why female diabetic patients have higher value higher of HbA1c. [16,17] A study conducted in Malaysia proposed that an HbA1c value of 6.5% is an adequate and useful supportive marker to diagnose diabetes because of its high specificity. A borderline (5.6-6.4%) or high (>=6.5%) level of HBA1c was found to powerfully predict future drug treatment for diabetes.[18] The diagnostic standing of HbA1c was also suggested by another author. They found that glycosylated hemoglobin not only acts as an important tool for diagnosis but also as an effective marker indicating the need for acute intervention.[19] In present study, approximately five percent study subjects had greater than 6.5% HbA1c level and who were in severe category of diabetes according to plasma glucose fasting. Out of total 93 diabetes patients (>6.5%), 38 study subjects had moderate(200-350 mg/dl) Plasma Glucose Fasting level. There were no significance differences between HbA1c Level and Plasma Glucose Fasting. Similar finding by Kahlon et al [20] was reported with formation of a cross tabulation between glycosylated hemoglobin and FPG while studying the patterns of glycemic control of patients. It was seen that even though there were some patients who had their plasma glucose fasting levels below the levels of diagnostic criteria (125 mg/dl) their HbA1c levels were found to be well above the normal range. This tells us that plasma glucose fasting alone is not a sufficient test to diagnose a patient as diabetic as there is a possibility of giving false results. The explanation to this can be that a patient may alter his activities or diet a night before taking the test, or may get anxious or nervous before the test, which may lead to an abnormal rise in the blood glucose levels.[20] The relationship between HbA1c and plasma glucose is complex. Many studies have shown that HbA1c is an index of mean plasma glucose over the preceding weeks to months as erythrocyte life span averages 120 days. Present study showed that HbA1c and plasma glucose fasting had linear relation.

CONCLUSION

The present study emphasises that by using glycosylated haemoglobin and plasma glucose fasting, we be able to diagnose diabetes mellitus early and prevent any unwanted complications. This confirms the role of these tests in assessment of the degree of control and management in diabetic patients. Also prevent any undue modifications in lifestyle or any mental depression from a misdiagnosis.

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UNDERNUTRITION DELAYS SEXUAL MATURITY IN MID ADOLESCENT INDIAN BOYS:A CROSS SECTIONAL HOSPITAL BASED STUDY

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ABSTRACT

Introduction: Undernutrition is highly prevalent among adolescent boys in India. Research on the interrelationship of undernutrition, sexual maturation and future reproductive health in adolescent boys has not been given due attention in the Indian subcontinent.

Material & Methods: This cross-sectional study involved 10-15 year old apparently healthy adolescent boys. Anthropometric assessment of weight, height, BMI; Pubertal stage assessment with the help of Tanner's SMR staging photographs and the testicular size assessment by using Prader's orchidometer was done. Pubertal onset was defined as attaining a Testicular Volume of Four ml or greater (≥4ml).

Results: A total of 346 boys were studied. 272 were in early adolescence (10-13 years) and rest 74 were in mid adolescence (14-15 years). 90% of the boys belonged to lower /lower middle socioeconomic status. 192 boys were in Tanner's stage G1Ph1, 100 boys were in stage G2Ph2, 49 were in G3Ph3 and 5 were in Tanner's stage G4Ph4.. Mean age of pubertal onset in boys with normal weight was found to be12.07 ± 1.28 years, in boys having Thinness<5th percentile was found to be 12.32±1.64 years (p value 0.3565), in boys having Stunting <3rd centile was found to be12.7±1.79 years (p value 0.0293) and in boys who were either overweight /obese was found to be 12.82±1.31 years (p value 0.0798). Boys, who had either Thinness <5th percentile or Stunting<3rd centile had lesser testicular volumes as compared to boys with normal BMI and height. This variation in testicular volume was not found to be significant in early adolescence (normal vs thin BMI p value of 0.2599; normal vs stunted height p value of 0.2605). In mid adolescent boys (14-15 years), the variation in testicular volume was found to be highly significant (normal vs thin BMI p value of <0.0001; normal vs stunted height p value of <0.0024).

Conclusion: Undernutrition significantly affects sexual maturation in mid adolescent boys.

Key words: Under Nutrition, Sexual Maturity, SMR, BMI, Adolescent, Boys

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INTRODUCTION

Puberty is a period during which children attain adult secondary sexual characteristics and reproductive capability.[1]The age of onset of puberty and the rate of sexual maturation show a lot of variability. Puberty entails a progressive nonlinear process starting from prepubescent to full sexual maturity through the interaction and cooperation of biological, physical, and psychological changes.[2] Pubertal growth and biological maturation are dynamic processes regulated by a variety of factors. Genetic, endocrine, nutritional factors and ethnicity contribute variably to the amount of growth gained during this important period of rapid changes.[3] Nutrition is one of the most important factors affecting pubertal development. Nutritional status during childhood is known to have a significant effect on the timing of puberty with chronic undernutrition being associated with delayed puberty and compromised pubertal spurt. On the other hand, the growing menace of another kind of malnutrition i.e. obesity has been associated with a trigger in pubertal onset in girls.[2] The nutritional status and reproductive health of adolescent boys (10-15 YEARS) is highly understudied in India and their interrelationship has been still less researched upon. Against the global prevalence of 12·4% of Thinness <5th percentile in adolescent boys,[4] the prevalence ranges between 30-50% in various studies among the Indian boys;[5,6] against the global prevalence of 12·9% obesity and overweight among the same population, India has a prevalence of 5·3% overweight and 2·3% obesity among Indian adolescents.[7] This data points towards the persisting scourge of under nutrition among Indian boys. Some recent studies have pointed towards association of delayed puberty in adolescence with reproductive health of young adults. There is

scarcity of data regarding the effect of undernutrition on puberty and growth in adolescent boys of the Indian subcontinent, therefore this work was planned.

MATERIAL AND METHODS

This study was conducted over a period of 1 year (November 2016 to October 2017) in the Adolescent clinics of the Department of Pediatrics of Shri Ram Murti Smarak Institute of Medical Sciences(Tertiary Care Hospital and Teaching Institute).This study was done after permission from Institutional Ethical Committee. All the male children aged 10-15 years attending the Adolescent Clinics who were apparently healthy and who did not have a documented chronic systemic illness/ a documented endocrine condition/ any drug therapy for more than 1 month in the last 3 months (steroid, hormonal therapy, diuretic therapy, anti congestive medication, AED), and whose guardians gave consent, were included in the study. Written informed consent from the parent/guardian and verbal consent from the boys was taken. The boys underwent a detailed history and clinical examination including anthropometry. The exact age of the participants (in years and months) was calculated by his date of birth. All measurements were made with participants dressed in light clothing without footwear. Height was measured with digital stadiometer. Weight was measured with digital weighing machine. BMI was calculated and status of stunting, thinness, overweight and obesity was determined as per WHO reference data for adolescents.[8] Since the first external sign of puberty in boys, is change from Tanner's genital stage G1 to G2 including enlargement of the testis therefore Pubertal stage assessment was done by using Tanner's SMR staging photographs[9] and the testicular size was assessed by using Prader'sorchidometer. Testes <1 ml were recorded as 1 ml. Based on volume, testicular assessment was divided into four stages.[10] Stage I (prepubertal stage) included subjects with volume <4 ml, Stage II (early pubertal stage) – volume >4 ml but ≤8 ml, Stage III (mid-pubertal stage) – volume >10 ml but ≤15 ml, and Stage IV (fully matured stage) – volume >15 ml. Pubertal onset was defined as TV of 4 ml or greater, consistent to an earlier publication which reported strong correlation between the onset of puberty assessed as per Tanner's method and TV.[10]If there was a discrepancy in two TVs, the larger one was taken into consideration. Clinical examination and pubertal assessment was done by a single observer. The socioeconomic status of the study participants was assessed by Modified B.G. Prasad socioeconomic scale.[11] For analysis, the study subjects were also divided into 2 groups: 1. Early adolescents (10-13 years), 2. Mid adolescents (14-15 years).[12]

Statistical analysis: The comparison of 2 means was done with help of Student's T test. P value of <0.05 was considered to be significant.

RESULTS

500 boys were seen in the Adolescent Clinics over a period of one year. Out of them, 154 subjects did not fulfil the study criteria and therefore were not included in the study. So the final analysis was conducted upon 346 adolescents who fulfilled the study criteria and were enrolled in the study.

Table 1: Sociodemographic characteristics of the study subjects (n=346)

Parameters	N (%)
1.1- Age (years. months)	
10 ·1-10·11	110
11·1-11·11	37
12·1-12·11	83
13·1-13·11	42
14·1-14·11	34
≥15	40
TOTAL	346
1.2- Socio-economic status	
Upper middle	1 (0·3%)
Middle	29 (8·4%)
Lower middle	81 (23·4%)
Lower	235 (67·9%)
1.3- Clinical Findings	
Thinness<5th percentile	96 (27·74%)
Overweight BMI >+1SD	19 (5·49%)
Obese BMI >+2SD	14 (4·05%)
Stunting<3rd centile	73(21·09%)

346 adolescent boys in the age group 10-15 years were enrolled in the study. Nearly 90% of the study subjects belonged to the lower and lower middle class according to Modified BG Prasad Scale for the assessment of socioeconomic status. And nearly 61% boys had clinically detected mild to moderate pallor, one out of every 3 boy was undernourished, 1 out of every 5 boys was stunted and 1 out of every 10 boys was either overweight or obese.

Table 2: Weight, Height, BMI, and Testicular volume in different age groups

Age (In Yrs)	N	Weight (Kgs) Mean±Sd	Height (Cms) Mean±Sd	BMI(kg/m^2) Mean±SD	Testicular Vol(ml) Mean±SD
10.1-10.11	110	27·2±5·8	130·7±8·3	15·8±2·9	3·07±1·02
11.1-11.11	37	30·4±6·8	137·9±7·4	15·9±2·6	4·02±1·36
12.1-12.11	83	35·5±7·7	144·4±7·4	16·9±3·0	5·03±1·44
13.1-13.11	42	37·7±7·9	146·1±8·9	17·6±3·2	6·28±2·40
14.1-14.11	34	39·9±8·4	153·4±9·6	16·7±2·6	7·44±2·75
≥15	40	48·4±7·9	158·1±9·3	19·4±2·7	10·75±3·40
Total	346				

The mean weight, BMI and the testicular volume of the adolescent boys in the study population steadily increased with the increasing age but a sudden spurt was found in between 14-15 years. TV was found to increase at the rate of 1cm/yr between 10-14 years after which a sudden spurt of nearly 3·5 cm was recorded. As regards the height of the boys, it steadily increased at the rate of nearly 7 cm/yr in the study population between 10-12 years after which it showed a slight decline.

Table 3: Sexual maturity staging in different age groups using the Tanner's SMR staging photographs

Age (yrs. months)	N	Tanner Staging			
		G1Ph1	G2Ph2	G3Ph3	G4Ph4
10-10·11	110	108 (98·2%)	2(1·8%)		
11-11·11	37	33 (89·2%)	4(10·8%)		
12-12·11	83	32 (38·6%)	51 (61·4%)		
13-13·11	42	11 (26·2%)	28 (66·7%)	3(7·1%)	
14-14·11	34	5 (14·7%)	13(38·3%)	15(44·1%)	1(2·9%)
≥15	40	3(7·5%)	2(5%)	31(77·5%)	4(10%)
TOTAL	346	192	100	49	5

Between 10-11 years, boys were predominantly in SMR stage 1, between 12-13 years, 2/3rd boys had entered SMR 2.At 14 years, 50% of the boys had entered SMR ¾, but 50% of the boys were still in SMR ½. By 15 years, nearly 90% of the boys had entered SMR 3/4 although remaining 10 % were still in SMR 1/2.

Table 4: Weight, height, BMI, and Testicular volume in different SMR stages:

SMR Stage	Mean Age (Yrs)	Weight (Kgs) Mean±Sd	Height(Cms) Mean±Sd	BMI(kg/m^2) Mean±SD	Testicular Vol(ml) Mean±SD
I	10·9±1·35	29·50±6·98	135·44±10·10	15·98±2·88	3·56±1·55
II	12·6±0·86	37·92±7·89	146·35±8·27	17·64±3·03	6·07±1·58
III	14·8±0·69	46·46±8·73	158·05±8·70	18·52±2·92	10·35±2·83
IV	15·0±0·70	50·02±10·43	162·22±8·02	18·81±2·29	14·0±2·83

The mean age of the boys in SMR Stage 1 was 10·9±1·35 years and the mean testicular volume was 3·56±1·55 cc. The mean age attained at SMR stage 2 was 12.6 ±0.86 years and the mean testicular volume was 6·07±1·58 cc. The mean age attained at SMR stage 3 was 14·8±0·69 years and the mean testicular volume was 10·35±2·83 cc. The mean age attained at SMR stage 4 was 15·0±0·70 years and the mean testicular volume was 14±2·83 cc.

Table 5: Comparison of the mean testicular volumes in across different BMI in early and mid-adolescence

EARLY ADOLESCENCE (10-13 YEARS)	N	MEAN BMI Kg/m2	MEAN TESTICULAR VOLUME(ml)	SD	P value (Student T test)
THINNESS<5TH PERCENTILE	74	13·31±2·59	4·12	±1·88	0·2599
NORMAL	167	16·49±2·43	4·42	±1·89	-
OVERWEIGHT/OBESITY	31	21·25±6·31	3·97	±2·02	0·2285
total	**272**				
MID ADOLESCENCE (14-15 YEARS)					
THINNESS<5TH PERCENTILE	20	14·8±3·36	6·70	±2·92	<0·0001
NORMAL	51	18·39±4·01	10·35	±3·29	
OVERWEIGHT/OBESITY	3	26·04±2·31	-	-	
total	**74**				

Table 6: Comparison of the mean testicular volumes in across different Heights in early and mid-adolescence

Early Adolescence (10-13 Yrs)	N	Mean Height (cms)	Mean Testicular Volume	SD	P Value Student T test
Normal	220	142·44±6·4	4·350	±1·89	
Stunting	52	129·5±3·6	4·019	±1·94	0·2605
Total	272				
Mid Adolescence (14-15 Yrs)					
Normal	52	160·7±6·02	9·849	±3·75	
Stunting	22	144·3±5·56	7·043	±3·13	0·0024
Total	74				

The influence of BMI and height on the testicular volume was assessed across the age groups. In early adolescence i.e. 10-13 years group, the testicular volume of boys who either Thin, obese or stunted was less as compared to the boys with normal weight and height but the difference was not statistically significant. With increasing age, in mid adolescence, the testicular volume of boys who were either Thin or Stunted became significantly lower as compared to the normal population.

The median age of the onset of SMR STAGE 2 in normal boys was 12years in the present study; mean age was 12·07 years with SD of ± 1·28 years. The median age of the onset of SMR STAGE 2 in obese boys was 12·8 years in the present study; mean age was 12·82±1·31 years. The median age of the onset of SMR STAGE 2 in thin boys was 12·3years in the present study; mean age was 12·32±1·64 years .

DISCUSSION

The study consists of apparently healthy subjects with no known major diseases belonging to the early (10-13 years) and mid (14-15 years) adolescence SMR group. The study population predominantly belonged to the lower and lower-middle class according to Modified B J Prasad scale for socioeconomic status.

The mean age of onset of puberty i.e. SMR stage 2 with testicular volume of >4 ml in the present study was found to be 12·6years. Studies from the Indian subcontinent have shown the mean age of onset of puberty to be ranging from 10·41 years in urban boys of Delhi(8) to 12·69 years in urban school boys of Chennai.[13] This suggests a variable pattern in the onset of puberty among adolescent boys belonging to different geographical areas and socioeconomic status in India. This difference in the urban and rural adolescent boys has also been reported worldwide.[14,15,16,17,18]

When compared across different BMI, the median age of the onset of SMR STAGE 2 in normal boys was 12years in the present study with a mean age of 12·07 ± 1·28 years as compared to a median age of 12·3 years in boys with thinness <5th percentile. The mean age of onset of puberty in the thin boys(mean BMI 13·83±1·06 kg/m2) was found to be 12·32±1·64 years and the difference from the normal BMI boys(mean BMI 17·12±1·63 kg/m2) was not found to be significant(p value 0·3565).The mean age of onset of puberty in the stunted boys(mean height 134·7±8·88 cms) was found to be 12·7±1·79 years and the difference from the normal height boys(mean height 145·2±10·1cms) was found to be significant(p value 0·0293).In rural Hyderabad (India) longitudinal data on height measurements were studied in pre-school children available during an 18 year period. Boys with severe height deficit at age 5+ (severe under-nutrition) entered late into puberty, about 1-year later, as compared to the normal Indian boys.[19]A similar study done in Kenya demonstrated a delay of the magnitude of 3 years in pubertal onset in rural malnourished adolescent boys.[20]This showed that acute undernutrition , apparently, seemed not to influence the age of onset of puberty in adolescent boys. But stunting, as a marker of chronic malnutrition, delays the onset of puberty in adolescent boys.

As regards the boys with overweight /obesity in the present study, the median age of the onset of puberty i.e. SMR STAGE 2 was found to be 12·8 years .The mean age of onset of puberty in the overweight/obese boys(mean BMI 23·69±2·45 kg/m2) was found to be 12·82±1·31 years and the difference from the normal BMI boys(mean BMI 17·12±1·63 kg/m^2) was not found to be significant(p value 0·0798).Although it showed a delay of about 8 months but the difference was not found to be statistically significant. Similar studies [8] done on Indian boys have found no significant difference in the age of attainment of gonadarche i.e testicular volume >4 ml in boys with normal BMI vs raised BMI, though pubarche occurred 8 months earlier in the latter group.[8] Studies done in other countries have shown contradictory results.[14,21,22,23,24,25]

In the present study, the testicular volume showed variation with different levels of nutritional status, across a particular age group. Boys who had either

Thinness <5th percentile or Stunting had lesser testicular volumes as compared to boys with normal BMI and height. This variation in testicular volume was not found to be significant in early adolescence(normal vs thin BMI p value of 0·2599;normal vs stunted height p value of 0·2605). In mid adolescent boys(14-15 years), the variation in testicular volume was found to be highly significant (normal vs thin BMI p value of <0·0001; normal vs stunted height p value of <0·0024).Thus a very significant statistical variation was noted with increasing age in the study population that had entered mid adolescence. This shows that undernutrition significantly affects sexual maturation in mid adolescent boys. Literature is again very sparse in reporting the influence of undernutriton in boys on their sexual maturity throughout the adolescent years. Among very few studies available, one of the Brazilian study on 1107 males in 8-14 years age group reported decreased height for age was associated with late sexual maturation.[21] Another Korean study done on 20 year old young male adults demonstrated that low body weight had an increased likelihood of a low testicular volume (OR 2·54;95% CI 1·57–4·12;*P*<0·001).[22]Although Indian studies have reported increase in testicular volume with increasing height, there is dearth of data on the status of testicular volume in undernourished adolescent boys. The testicular volume was also found to be decreased in boys who were either obese/overweight as compared to the normal boys but this difference was not found to be statistically significant (p value 0·2285).

In the present study, 50% of the boys who had chronologically entered mid adolescence were still in SMR Stage 1&2.A spurt in weight, BMI and testicular volume was found after the age of 14 years. The previous studies showed a spurt in weight and testicular volume between 13-14 years i.e. at the end of early adolescence,[10,13] whereas in the present study, the spurt was delayed occurring after the age of 14 years. This is again a pointer towards a possibility of lag in sexual maturation in undernourished adolescent boys, probably constitutional in nature. Prospective studies are required to confirm whether this is really suggesting the pattern of constitutional delay in the studied population. This is significant in view of studies suggesting that in adolescent boys having delayed onset and progression of puberty, the testosterone peaks later and it may never reach the same levels as the boys with earlier and timed pubertal onset.[27,28] We might speculate that in future, this may affect the reproductive health of these boys.

To the best of the available knowledge, undernutrition in adolescent boys and its influence on sexual maturation and reproductive health has been very less researched upon. Some recent studies are indicating an association between older ages at pubertal development and altered reproductive hormones concentrations as well as similar tendencies in several of the other reproductive parameters. This does suggest an association between the timing and progression of pubertal development and reproductive health later in life. Studies have also suggested that delayed puberty and sexual maturation may have harmful effects in future on various adult health outcomes like Height, bone mineral density, adult psychosexual functioning and educational achievement.[29]

Although the study was hospital based , cross sectional and done on a small sample size, but the findings strongly indicate the influence of under nutrition in delaying sexual maturation in boys during their mid adolescence. Large population based Indian data is required to substantiate the findings of the present study in Indian adolescent boys. Also the adolescents need to be followed prospectively till they enter adulthood to see whether this lag persists in future.

From a Pediatrician's perspective, this study also highlights the importance of doing a routine clinical evaluation of sexual maturity status and testicular volume assessment in adolescent clinics in order to detect the future reproductive health problems in adolescent years itself.

CONCLUSION

Chronic undernutrition delays the onset of puberty in adolescent boys. Undernutriton, prevailing throughout adolescence, plays a very significant role in delaying the further sexual maturation by the time the boy enters mid adolescence.

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ASSESSMENT OF IMPROVEMENT IN CHILDREN WITH SEVERE ACUTE MALNUTRITION AT NUTRITION REHABILITATION CENTRE OF SHRI RAM MURTI SMARAK INSTITUTE OF MEDICAL SCIENCES BAREILLY, UTTAR PRADESH

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ABSTRACT

Introduction: Nutrition rehabilitation centre (NRC) is a unit in a district health facility, where children with severe acute malnutrition are admitted and provided with nutritional and therapeutic care. This study was undertaken to evaluate the feeding pattern and weight improvement among SAM cases.

Material & Methods: This hospital based prospective study was carried out at NRC, Shri Ram Murti Smarak Institute of Medical Sciences Bareilly Uttar Pradesh, India. Analysis of nutritional data of all the children aged between 6-59 months admitted from 1st January 2016 to 30th November 2016 was done using SPSS version 21.0.

Results: This was a hospital based prospective observational one year study. 96 cases of Severe Acute Malnutrition (SAM) were admitted, 82 cases were enrolled in the study group while 14 cases were excluded. These cases were evaluated for Weight improvement, Pedal Edema, Mid-Upper Arm Circumference (MUAC) and Co-morbidities at successive time intervals. The data was analyzed using SPSS version 21 and expressed in frequency, percentages and proportions.

Conclusions: This study reflects that NRCs have been playing a key role to cope up with the problem of severe acute malnutrition as demonstrated by a high rate of weight gain, increase in MUAC and absence of pedal oedema at discharge as well as during follow ups.

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INTRODUCTION

Childhood undernutrition is an important public health and development challenge in India. Undernourished children have significantly higher risk of mortality and morbidity. Besides increasing the risk of death and disease, undernutrition also leads to growth retardation and impaired psychosocial and cognitive development. Severe Acute Malnutrition (SAM) is defined as the presence of severe wasting (weight for height <-3 SD) or Mid-Upper Arm Circumference (MUAC) less than or equal to 115mm or bilateral oedema as an indicator of SAM.[1] Every year some 10.6 million children die before they reach their fifth birthday. Seven out of every ten of these deaths are due to diarrhoea, pneumonia, measles, malaria or malnutrition.[2] In India, the prevalence of SAM in children remains high despite overall economic growth.[3] Out of 19 million SAM child in all developing countries, 8 million (42%) are in India. National family health survey-3 show that 42.5% of Indian children <5 years were underweight, 48% were stunted, 17% were wasted and 6.4% suffer from SAM and these SAM children have high mortality ranging from 20%-30%.[4] The prevalence of malnutrition varies across states like Madhya Pradesh recording the highest rate (55%) and Kerala among the lowest (27%).[5] Despite economic growth and development in India, the prevalence of severe wasting among children is increasing.[6] The second

National Family Health Survey (NFHS-2) (1998–99) indicated that 6.7% of children aged 0–35 months were severely wasted, and it increased in 2006 when the NFHS-3 indicated that 7.9% of children below 60 months of age were suffering from severe wasting.[7] According to NFHS-3, 7.9% of under-five children in India suffer from SAM. With the current estimated total population of India has 1260 million, it is expected that about 8–9 million are likely to be suffering from SAM[8] This is more prevalent in socio-economically deprived communities.[9] In the state of Uttar Pradesh, the most densely populated state of India – NHFS-3 indicates that 14.9% of children 0-59 months old are wasted and 5.2% are severely wasted. With this background this study was undertaken to evaluate the feeding pattern and weight improvement among SAM cases.

MATERIAL & METHODS

This observational, descriptive; hospital based prospective study was carried out at NRC, Shri Ram Murti Smarak Institute of Medical Sciences Bareilly Uttar Pradesh, India. This centre caters to the entire Bareilly district. Children were admitted to the NRC through outpatient NRC clinic, or OPD transfers from pediatric wards in the hospital. Children between 6-59 months of age were admitted to the NRC between 1st January 2016 to 30th November 2016 were included in the study. Data was collected from NRC register, anthropometric measurements of children, as well as from parental interview. Institutional ethical clearance was obtained before under taking this study. All the children admitted in NRC and fulfilling the study criteria were assessed on the basis of a pretested Proforma. Data was collected regarding the demographic characteristics and dietary pattern (breastfeeding status, start of complementary feeding etc.). Anthropometric assessment was done (Weight – digital weighing scale, Height/Length- stadiometre/infantometre, MUAC – non-stretchable tape). After that the children underwent a detailed physical examination. Children enrolled were managed according to the WHO Guidelines for the inpatient treatment of severely malnourished children.

Exclusion Criteria:

Children with any chronic systemic disorder known to be associated with failure to thrive and Children clinically screened for following conditions were excluded:

a) Congenital cardiac defects.

b) Defects of GIT associated with malabsorption.

c) Illnesses like Chronic Renal conditions, Chronic Liver disease, Chronic Haemolytic Anaemia, Meningitis, Chronic or Static Encephalopathies like Cerebral Palsy.

The data was analyzed using SPSS version 21 and expressed in frequency, percentages and proportions. The statistical significance was evaluated at 5% level of significance. P value <0.05= statistically significant & P value <0.001= highly statistically significant

RESULTS

96 cases of Severe Acute Malnutrition (SAM) were admitted, 82 cases were enrolled in the study group while 14 cases were excluded because of exclusion criteria. These cases were evaluated for Weight improvement, Pedal Oedema, Mid-Upper Arm Circumference (MUAC).

Out of 82 enrolled patients in the study, 51 (62.2%) were males and 31(37.8%) were females.

Table 1: Distribution of patients according to age & gender

Age (in months)	Gender		Frequency (n=82) (%)	P value
	Male (n=51)	Female (n=31)		
≤12	10 (19.6)	11 (35.5)	21 (25.6)	0.610
13-24	22 (43.1)	10 (32.3)	32 (39.0)	
25-36	10 (19.6)	5 (16.1)	15 (18.3)	
37-48	6 (11.6)	3 (9.7)	9 (11.0)	
49-60	3 (5.9)	2 (6.5)	5 (6.1)	
Total	51 (100.0)	31 (100.0)	81 (100.0)	
Mean ± SD	24.98 ± 14.01	21.87 ± 15.76	23.80 ± 14.68	
Min-Max	7-60	6-60	6-60	

In the study, 62.2% were males whereas 37.8% were females (M:F=51:31), maximum cases of SAM were in the age group of 13-24 months (n=32, 39%) & minimum were in >48 months (n=5,6.1%).

Table 2: Type of feeding observed in children

Type of Feeding		Male (n=51)	Female (n=31)	Total (n=82)	P value
Exclusive Breastfeed		1 (2.0)	9 (29.0)	10 (12.2)	0.001
Mixed feeding	Mixed complementary	45 (88.2)	20 (64.5)	65 (79.3)	
	Mixed top feed	5 (9.8)	2 (6.5)	7 (8.5)	
Total		51 (100.0)	31 (100.0)	81 (100.0)	

Mixed complimentary feeding was significantly dominant in SAM patients (n=65, 79.3%).

Table 3: Comparison of weight gain from day 1 to day 7, day 14 and day 30 among children

Days		Weight(in grams) Mean ± Std. Deviation	P value
1	Day 1	6994.63 ± 1969.450	<0.001
	Day 7	7259.33 ± 1988.555	
2	Day 1	6994.63 ± 1969.450	<0.001
	Day 14	7441.10± 1970.288	
3	Day 1	6994.63 ± 1969.450	<0.001
	Day 30	7651.95 ± 1979.045	

In the study, weight improvement is observed on consecutive follow-up as duration of hospital stay increases and the correlation was found to be statistically highly significant as p value <0.001.

Table 4: Comparison of change in MUAC from day 1 to day 7, day 14 and day 30

Days		MUAC (in cms) Mean ± Std. Deviation (n=82)	P value
1	Day 1	10.74±1.19	<0.001
	Day 7	11.30±1.24	
2	Day 1	10.74±1.19	<0.001
	Day 14	11.47±1.13	
3	Day 1	10.74±1.19	<0.001
	Day 30	11.73±1.09	

In the study, improvement is observed in MUAC on consecutive follow-up as duration of hospital stay increases and the correlation was found to be statistically highly significant.

Table 5: Comparison of pedal oedema from day 1 to day 7, day 14 and day 30

Days	Pedal Oedema		Total	P value
	Present	Absent		
Day 1	7	75	82	<0.001
Day 7	5	77	82	
Day 14	0	82	82	---
Day 30	0	82	82	---

In the study, correlation is found to be statistically highly significant (p value is < 0.001). Pedal edemas was present in 7 patients on day 1 out of 82 patients, which decreased to 5 patients on day 7 and none of the patients had pedal edema at day 14 and day 30.

Table 6: Weight gain of patients on different days in relation to type of feeding

Days	Type of feeding at the time of admission	No. of children	Weight (in grams) Mean ± Std. Deviation	P value
Day 1	Exclusive breastfeed	10	4847.50±1019.83	<0.001
	Mixed complementary	65	7476.85±1850.48	
	Mixed Top feed	7	5584.29 ± 1969.45	
Day 7	Exclusive breastfeed	10	4970.50±1084.68	<0.001
	Mixed complementary	65	7767.85±1836.19	
	Mixed Top feed	7	5807.14 ±1988.55	
Day 14	Exclusive breastfeed	10	5170.0±1175.018	<0.001
	Mixed complementary	65	7949.85±1807.55	
	Mixed Top feed	7	5961.43 ±1237.44	
Day 30	Exclusive breastfeed	10	5406.00 ±1170.05	<0.001
	Mixed complementary	65	8158.46 ±1824.54	
	Mixed Top feed	7	6157.14 ±1979.04	

In the study, weight improvement is observed on consecutive follow-ups and correlation is found to be statistically highly significant.

DISCUSSION

Severe Acute Malnutrition is preventable and treatable cause of childhood morbidity and mortality. Systematic Guidelines is used for the treatment of SAM. Severe Acute Malnutrition (SAM) is defined as the presence of severe wasting (weight for height <-3 SD) or Mid-Upper Arm Circumference (MUAC) less than or equal to 115mm or bilateral oedema as an indicator of SAM.[10] The present study has been conducted in Pediatrics ward of Shri Ram Murti Smarak Institute of Medical Sciences (SRMSIMS). It was a hospital based, prospective observational study. During the study period of 11 months, total 96 cases of SAM were admitted, out of which 82 cases were enrolled in the study group. These cases were evaluated for weight improvement, pedal oedema (PO), mid-upper arm circumference (MUAC) and co-morbidities at successive time intervals. The study showed that, Severe Acute Malnutrition was more common in male children with Male:Female Ratio

of 1.6:1 [Table no.1]. In the similar way Saka AO et al[11] also had a male preponderance. Their sample size was 90, out of which 53 were male and 37 were female and Male: Female Ratio was 1.43:1 which was comparable with the present study. A study by Arya AK et al[12] had a sample size of 200 children, 118 were male and 82 were female and the Ratio was 1.44:1 in their study. The Male preponderance has also been observed by Singh K et al[13] where the sample size was 1229 out of which 671 were male children and 558 were female and the Ratio was 1.4:1 , Similarly male preponderance has also been reported by various other studies like Choudhury M et al[14], Ashraf et al[15], Aneja et al[16] from Maharashtra. In present study as well as other similar studies, male preponderance is due to ritual and social norms, parents give more importance and seek medical advice more often for male child. However, a study by Joshi S et al[17] observed a female preponderance of 78% vs 22% male children. The reason was not given in their study but it may be due to variation in the sample size. In our study, maximum 32 children (39.0%) were in the age group of 13-24 months followed by 15 (18.3%) children in 25-36 months and least 5 (6.1%) children were in 49-60 months of age group and the association between male and female children in different age group was not found statistically significant.

CONCLUSION

The NRCs are effective in improving the condition of admitted SAM children, but the effects are not sustained following discharge due to lack of adequate parental awareness. There is an urgent need to link these centre with community-based models for follow-up and improve health education measures to maintain the gains achieved.

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Anatomical Variations in Optic Nerve andInternal Carotid Artery in Relation To Sphenoid Sinus among Patients Undergoing Computed Tomography of Paranasal Sinus

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ABSTRACT

INTRODUCTION: Sphenoid sinus develops in body of sphenoid bone. Neurovascular structures like Optic nerve and internal carotid artery have an intimate relation with sphenoid sinus and understanding anatomy of these vital neurovascular structure is important as during functional endoscopic sinus surgery (FESS),these structures may be at risk. . This study was undertaken to assess the Anatomical variations in optic nerve and internal carotid artery in relation to sphenoid sinus among patients undergoing computed tomography of paranasal sinus.

MATERIAL & METHODS: A retrospective study was done on 100 patients, using triplanar imaging provided by 64-slice spiral CT. Scans were obtained for patients with head and neck disease, not having sphenoid sinus involvement e.g.- Trauma, polyp, sinusitis, malignancy.Computer workstation with Siemens SYNGO fast View software was used. Both soft tissue and bone windows were observed and relation of optic nerve and internal carotid artery to sphenoid sinus was noted.

RESULTS: On CT scan optic nerve protrusion was noted in Forty two (42%) cases in sphenoid cases, and bony wall around optic nerve was dehiscent in 14% cases. Internal carotid artery protrusion into the sphenoid sinus was noted in 30% cases, and bony wall around internal carotid artery was dehiscent in 12% cases.

CONCLUSION: Anatomical variations in optic nerve and internal carotid artery in relation to sphenoid sinus were seen among patients. These structures are at potential risk during endoscopic sinus surgery. To avoid potential risk of haemorrhage, blindness, and other complications, pre operative review of C.T scan should be done.. The triplanar imaging (1mm thickness) gives a three-dimensional image of the sphenoid sinus, compared to coronal imaging.

KEYWORDS: Anatomical Variations, Optic Nerve, Internal Carotid Artery, Sphenoid Sinus

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INTRODUCTION

Sphenoid sinus develops in sphenoid bone,it is a mucosa lined,aerated cavity.Though it is present at birth but its pneumatisation reaches maximum until adulthood.[1,2] It has an intimate relationship with Optic nerve (ON),Internal carotid artery (ICA),Cavernous sinus and Pituitary gland.[3]

The Pneumatisation may extend into pterygoid process, maxilla ethmoid process, foramen rotundum, anterior clinoid process, vidian canal. Usually optic nerve is superolateral in relation to sphenoid sinus but occasionally optic nerve may pass through the sinus,[4-8] there may only be a thin

bony covering on optic nerve and internal carotid artery and thus may be at risk during endoscopic sinus surgery, transsphenoidal surgical procedures.[9] This varied relationship of optic nerve and internal carotid artery is due to extension of pneumatisation process.

To avoid damage to these vital neurovascular structures, knowledge of anatomy of optic nerve and internal carotid artery in relation to sphenoid sinus is important.

The objective of this study was to assess the variation in the anatomy of the optic nerve and internal carotid artery in relation to sphenoid sinus.

MATERIAL & METHODS

The study was approved by the ethical and research committee of the institution. This Retrospective study was performed on 100 patients (200 normal slides) who were referred for CT scan of the paranasal sinuses (PNS) at the department of radiodiagnostics, CT and MRI centre of Hind institute of medical sciences, Barabanki, U.P between June 2014 and December 2014. Patients whose age was more than 16 years and in whom anatomy was not altered by trauma, sinusitis and neoplastic disease were included. They were advised to go through CT scan of PNS and instructed to clean their nose by blowing out any secretion. The scanning was done using Siemens SOMATOM Sensation 64-slice CT scanner. The images were obtained in the axial plane and then reconstructed in three planes with 1-mm thickness. They were loaded onto a CD with the help of DICOM magicView software and Siemens SYNGO fastView software. The images were examined using triplanar imaging software according to modification of Delano system of classification of Batra et al. [8]

Optic nerve in relation to sphenoid sinus was classified as:
Type 0: Does not border sphenoid sinus
Type 1: Adjacent to sphenoid sinus
Type 2: Indentation on sphenoid sinus
Type 3: Less than 50% exposure of optic nerve in sphenoid sinus
Type 4: Optic nerve traversing sphenoid sinus

Internal carotid artery relation to sphenoid sinus is classified as either protrusion or bony dehiscence.
Protrusion of the ICA into the sphenoid sinus was defined asthe presence of more than half the circumference of the ICA into the sphenoid sinus cavity with or without defects in their bony margins. Bone dehiscence was defined as the absence of visible bone density separating the sinus from the course of the ICA.
Statistical analysis was performed using the statistical package for social sciences (SPSS Inc, Chicago, IL) for Windows. The Results were expressed as mean ± standard deviation. A p-value <0.05 was considered statistically significant.

RESULTS

There were 53 (53%) males and 47 (47%) females with M: F ratio of 6: 5. Their ages ranged from16 to 80 years with a mean age of 48.36 years ± 18.15

Table 1 shows the relationship of ON to sphenoid sinus. Forty two (42%) cases have Optic Nerve protrusion into the sphenoidal sinus [Types 2 - 4] while 22 (22%) cases shows that during a sphenoid surgery or trans-sphenoidal pituitary surgery,optic nerve will be vulnerable as optic nerve is either partially or totally [Types 3 - 4] exposed within the sphenoid sinus. Relationship of optic nerve to solenoid sinus is shown in Figure 1. Type 0, Type 1, Type 2 pneumatisation pattern showed no bone dehiscence. However, dehiscence occurred in 14(14%) patients. 8 of the cases were Type 4.

Table 1:Relationship of Optic Nerve to Sphenoid Sinus

Types	Rightside	Left side	Bilateral	Total (Percentage)
0	2	1	25	28 (28%)
1	5	3	22	30 (30%)
2	7	11	2	20 (20%)
3	4	7	3	14 (14%)
4	4	4	0	8 (8%)
Total	22	26	2	100 (100%)

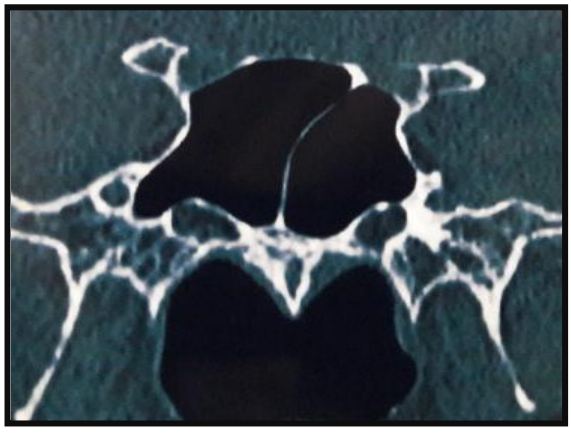

Figure 1: Dehiscence of right optic nerve with protrusion of bilateral internal carotid artery

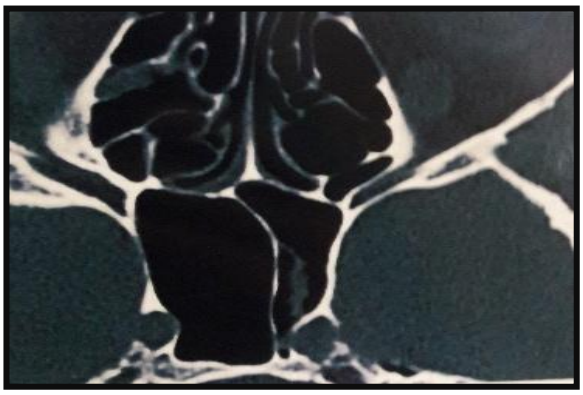

Figure 2: Protrusion of right internal carotid artery with dehiscence of left internal carotid artery

Internal Carotid Artery

Protrusion of ICA into the sphenoid sinus was identified in 30 (30%) patients.

Protrusion was seen on the right side in 9 (9%) patients and on the left side in 10 (10%) patients and bilateral in 11 (11%) patients.

The bony dehiscence of the internal carotid artery was seen in 12% patients; in which right side was involved in 6 (6%) cases, and bony dehiscence on left side in 5 (5%) cases and bilaterally in 2 (2%) case.

The C.T images demonstrating ICA protrusion and dehiscence of bony wall of solenoid sinus is shown in Figure 1,2.

DISCUSSION

Endoscopic trans nasal sphenoid procedures and trans sphenoidal pituitary surgery are less traumatic in comparison to transcranial procedures as they provide better visualization and avoid brain retraction.

Thus to minimize risk during surgery and in order to avoid fatal complications like blindness, haemorrhage, proper understanding of pneumatisation of sphenoid sinus and it's relation to surrounding neurovascular structure is vital.

Optic nerve protrusion into the sphenoid sinus

During sphenoid surgery, knowledge of location of optic nerve in relation to sphenoid surgery is vital. In our study, prevalence of optic nerve protrusion into sphenoid sinus was 42%, Dehiscence of bony wall between sphenoid sinus and optic nerve was 14%. However different studies have shown different prevalence rates, study done by Fuji et al[3] and Heskova et al [4] have shown dehiscence of the bony wall between the ON and sphenoidal sinus as 4% and 11.7% respectively.Prevalence of optic nerve protrusion varies between 8% to 70%. [8,9,10]

Our study shows considerable high rate of optic nerve protrusion into the sphenoid sinus.Protrusion or dehiscence of optic nerve puts it at risk during sinus disease complications or due to surgical trauma.Bony wall dehiscencemay contribute to optic neuritis and predisposes optic nerveto damage during surgery, and If damage risk of blindness is very high. [11]

Internal carotid artery protrusion into the sphenoid sinus

Internal carotid artery bleeding makes neurological sequel inevitable. [12,13]Thus protrusion of internal carotid artery in sphenoid sinus should be carefully assessed preoperatively. In our study, 30% patients had internal carotid artery protrusion into the sphenoid sinus. Bony wall between internal carotid artery and sphenoid sinus showed dehiscence in 12% cases.

Sirikci et al [14] in his study showed similar findings. But in the study done by Fuji et al [3]on 25 cadaveric specimens, Internal Carotid Artery was dehiscent in lateral wall of the sphenoid sinus in 8%[3] cases, which is slightly lower than the prevalence rate from this study. Internal carotid artery protrusion seen by Sethi et al., Elwany et al., and Hewaidi GH et al. in their studywas 93%, 29%, and 41% of cases, respectively[15-17], and study done by Kennedy et al.,showed that in 25% cases there was dehiscence of the bony wall of the internal carotid artery[18].According to Unal B et al., internal carotid artery dehiscence was noted in 5.3% of cases. [6]

So the protrusion of ICA into the sphenoid sinus and its dehiscence makes the patient at risk for uncontrollable haemorrhage during surgery, thuscareful preoperative evaluation should be done before undertaking sphenoidal surgery.

CONCLUSION

Anatomical variations of optic nerve and internal carotid artery are frequently observed in C.T Scan. In our study there was high prevalence of protrusion and dehiscence of optic nerve and internal carotid artery. During sphenoid surgery assessment of optic nerve and internal carotid artery is essential to avoid fatal complications.

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EFFICACY AND SAFETY OF PANCHGAVYA GHRIT ALONG WITH PROPANOLOL IN PROPHYLAXIS OF MIGRAINE PATIENTS: A COMPARATIVE STUDY

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ABSTRACT

Introduction: Propranolol and Flunarizine have proven to be useful tools in migraine prophylaxis. This trial aimed the comparison of the efficacy of Propanolol, Propanolol and Placebo and Propanolol and Panchgavya Ghrit in migraine prophylaxis.

Material & methods: The present study was a prospective, randomized, open-label, blinded-endpoint (probe) trial. Patients with chronic migraine (cm) were randomized (1:1:1) to Flunarizine and Flunarizine and placebo and Flunarizine and PGG in three treatment groups. The study was carried out in outdoor department of psychiatry, T.S. MISHRA medical college and hospital, Lucknow and K.G.M.U, Ayush department, Lucknow after clearance from institutional ethical committee. Participants were enrolled, administered scales and assessed for the clinical outcomes. Side effect monitoring was done.

Results: migraine was more common in age group above 30 females and patients with positive family history. Pain scales namely vas (visual analogue scale), NPRS (numeric pain rating scale), VRS (verbal rating scale) when employed denoted there was decreased migraine frequency, decreased perception of pain, less intake of abortive medication consumed by subjects implying there were reduction in number of migraine days and there was decrease in the abortive medications taken for the same group c scored better on pain scales followed by group b and group a. In relation to the side effects except weight loss difference was found to be significant among the three groups.

Conclusion: this study concludes that combination of standard prophylaxis in allopathic medication along with Panch Gavya Ghrit there was decrease in measures of symptom severity, better tolerability, lesser side effects, better compliance, lesser drop outs, good treatment response and the efficacy of treatments in treatment studies of patients with mental disorders implying that Panch Gavya Ghrit when administered along with Flunarizine was more efficacious and safe when compared with other two groups. However large multicentric RCTS of long duration and involving more number of subjects are required to ascertain these facts.

Keywords: Panchgavya ghrit, propanolol, prophylaxis, migraine

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INTRODUCTION

Migraine being a widespread, chronic and intermittently disabling disorder the prevalence of migraine is about 6-8% in men and 12-15% in women as per conducted studies which is characterized by recurrent headaches with or without aura [1]. Approximately 3000 migraine attacks occur every day for each million of the general population which impress upon the incidence and prevalence of migraine [2]. The rate of migraine varies globally, and recent anecdotal evidence suggests higher rates in certain places like India[3]. Recurrent migraines cause disability : the cost of missed workdays and impaired performance associated with migraines in the United States totals around $13 billion each year[4,5]. Preventive therapy, which can reduce the frequency of migraines by 50 percent or more, is used by less than one half of persons with migraine headache[6]. In Ayuveda *Arddhavabhedaka - same* clinical condition of

migraine is a commonly occurring vascular headache characterized by pain on one half of the head as cardinal feature. Vagbhata included this condition in the classification of *Vataja-Siroroga*. Pain in one half of the head may also appear as a symptom in various conditions viz. *Anyatovata (Netraroga), Vata-Paryayam (Netraroga)* and *Ardditavata (Vataroga).* According to Ayurveda, action of a drug is based on its Guna, Veerya, Vipaaka and Prabhaava. These as themselves or as combinations determine the status of drug action in the body .Fate of the drug always depends on Rasapancaka and it goes in line with modern pharmacodynamics.[7] Besides that the drug action also depends the action of Agni on that particular drug. Most of the Ayurvedic drugs act only after absorption and are said to have systemic or general action. Many a time, the term 'action' and 'effect' of a drug are used as synonyms.

Many a drug has been mentioned in Ayurvedic psychiatry. Panchagavya gritha (PGG) is mentioned in Apasmara Chikitsa. It is one of the commonly used Yogas not only for Apasmara, but also many other psychiatric conditions including OCD, Migraine Depression and types of Schizophrenia in the form of oral route of drug intake and Nasya karma. The combination contains 5 ingredients: Gos'akr't (Cow dung), Godadhi (Curd), Goksheera (Milk), Gomootra (Cow's urine) and Goghr'ta (Ghee)[8]. All the drugs are taken in equal quantities and the Gritha is prepared as per the common preparatory techniques regarding Gritha[9]. Literature revealed that cow ghee, cow milk and cow urine possesses intellect and memory enhancing, rejuvenating and aphrodisiac activities [10,11,12]. Cow dung juice has antibacterial[13] and cow curd has aphrodisiac[14] activity. Similarly various researches are reported on single cow products for their effects on CNS. Thus combination of these products may show cumulative desired effect of PGG on cognition i.e. improvement of learning and memory. Previously PGG has been assessed for anticonvulsant[15], hepatoprotective[16] and antiepileptic activities[17]; however no work has been carried out on assessment of anti migraine activity of PGG. Sometimes, if migraine headaches are recurring twice a month or more, a prophylactic treatment is required. There is a variety of medication usually employed in the migraine prophylaxis, a hint that none is entirely effective. Moreover, usually there are patients who do not respond to one or more prophylactic drugs. Besides, there are individual differences in the responsiveness to different prophylactic agents and even sometimes, an inability to sustain an initial good response to a particular agent[8]. Such facts may be arguments for the concomitant use of two modalities of drugs in migraine prophylaxis. Propranolol and Flunarizine have proven to be useful tools in migraine prophylaxis [18,19,20,21]. This trial aims the comparison of the efficacy of Propanolol, Propanolol and Placebo and Propanolol and Panchgavya Ghrit in migraine prophylaxis.

MATERIAL & METHODS

The present study was a prospective, randomized, open-label, blinded-endpoint (PROBE) trial. Patients with chronic migraine (CM) were randomized (1:1:1) to Flunarizine and Flunarizine and placebo and Flunarizine and PGG in three treatment groups. The study was carried out in outdoor patients in the department of Psychiatry, T.S.Mishra Medical College and Hospital, Lucknow and K.G.M.U, Ayush Department, Lucknow after clearance from Institutional Ethical Committee. A Psychiatrist enrolled the participants, administered scales and assessed the clinical outcomes. Side effect monitoring was done and by a pharmacologist and a psychiatrist using DOTES scale. Nasya karma of Panchgavya Ghrit was done and taught to subjects attendant by competent Ayurvedic practitioner in O.P.D setting. The trial was conducted from September 2016 to January 2017.The patients were included in the study after fulfilling the inclusion/exclusion criteria after obtaining full informed consent as diagnosed in psychiatry OPD of T.S.Mishra medical college and hospital. Systematic Random Sampling was applied and concealment was done by envelop method. Statistician had generated allocation sequence and assigned participants to their respective groups. The sample size was 90.

Inclusion Criteria was ICHD-IIR criteria for CM (as reported by the patient): Experienced ≥7 days of headache lasting ≥30 min during T0 (-2 week to 0 week),On ≥4 of these days, subjects were required to have experienced migraine headache ,Patients

could receive preventive medications(medications for acute attack) other than the medications given during study period ,With and without medication overuse, Subject > 10 years of age, Either gender, Headache history > 2 years, Willing to follow the dietary restriction, Willing to complete daily diary, Willing to take the medication Or comply with procedure during the entire study period.

Exclusion Criteria :Tension-type headache, cluster headache, and other primary headaches ,Secondary headache and other neurological disease ,Relatively severe systemic diseases (cardiovascular disease, acute infectious disease, hematopathy, endocrinopathy, allergy, and methysis), Headache caused by otorhinolaryngology diseases or intracranial pathological changes, Oral contraceptives, pregnancy, or lactation period ,Use of prophylactic migraine medication in the last 3 months, Participation in another clinical trial ,Headache type other than CM, Migraine onset after the age of 60 years, Previous history of migraine prophylaxis before enrollment, History of hepatic or renal disorder, nephrolithiasis or other severe systemic disease, Severe depression. Use of any other alternative medication during study apart from rescue medication Ultracet a combination of Tramadol 37.5mg and Acetaminophen 325mg as and when required

Primary outcome measures were to assess reduction of total number of migraine days and comparison of side effects in three groups Secondary outcome measures were to assess the disability associated with migraine, reduction of number of days of acute abortive medication intake and, reduction of number of acute abortive medication tablets taken .

Patients were followed per 2 weeks at the Headache Clinic. At each visit, diaries were collected, and information within the diary was used for outcome measurement. This study consisted of two periods: a prospective baseline screening period lasting up to 2 weeks (week -2 to week 0, T0 with T signifying 2 weeks), and a treatment period lasting 12 weeks after enrolment (weeks 0-12, T1-T6).The treatment phase consisted of a 2-week titration period (T1) and a 10-week maintenance period (T2-T6). In the first group during the titration period, subjects were given 30 mg/day propranolol once daily in the first week, followed by 60 mg/day Propanolol in divided doses (twice daily) in the second week. When subjects could not tolerate this target dose, the initial dose was continued through T6. In the second group during the titration period, subjects were given 30 mg/day Propanolol along with placebo once daily in the first week, followed by 60 mg/day Propanolol in divided doses (twice daily)along with placebo in the second week. When subjects could not tolerate this target dose, the initial dose of Propanolol was continued through T6 .In the third group subjects were given 30 mg/day Propanolol along with Panchgavya Ghrita 5ml OD before food once daily in the first week, followed by 60 mg/day Propanolol in divided doses (twice daily)along with Panchgavya Ghrita 5ml BD before food in the second week. When subjects could not tolerate this target dose, the initial dose of Propanolol along with panchgavya ghrita was continued through T6. *Nasya karma* with internal administration of *Panchagavya Ghrita* 5ml BD before food with hot water for 3 months. All the patients were advised to follow *Pathyapathya* schedule (avoidance of aetioiogical factor). Regulated diet (three meals and three snacks providing adequate calories and meals devoid of nicotine, caffeine, reheated food, aerated drink), and lifestyle modification included minimum 8 h sleep, moderate exercise such as morning or evening walk for 30-60 min and abstention from smoking / drinking was advocated in third group.

Headache frequency was calculated from the daily headache diary the total number of headache frequency the patient had after the start of therapy till the completion of therapy. The subjects were also instructed to record the presence and intensity of their headaches on a daily basis. Additionally, the subjects were invited to comment on the nature of their headache, the associated symptoms, and the suspected triggers. Headache intensity was determined by using visual analogue scale (VAS) , numeric rating scale (NRS) and the verbal rating scale (VRS) Guide to grading headache intensity was included with each diary.disability associated with migraine was measured using the Migraine Disability Assessment Score (MIDAS). Efficacy was assessed by comparing the 3 treatments groups with regard to migraine index (the sum of daily scores of headache), frequency of attacks, global evaluation (the patients were asked to classify their

response to the treatment as poor, good, very good or excellent). Migraine index and attack frequency were calculated per 14 days. Attack abortive agents were allowed if necessary. The amount of these agents taken by the patients were recorded

A detailed baseline assessment was done as per the semi structured proforma which included psychiatric and medical history, physical examination and detailed mental status assessment. Baseline investigations (Hb, TLC, DLC, ESR, Blood Sugar, Liver Function Tests and Blood Urea) were carried out. Patients were evaluated every second week as per schedule mentioned earlier. . Patients were evaluated every second week as per schedule mentioned earlier. Concomitant rescue medication was allowed for severe migraine episode, records of which were maintained. The addition of abortive medication for migraine, a combination of Tramadol 37.5mg and Acetaminophen 325mg was considered for the final analysis. Instruments used were

- Semistuctured proforma for socio demographic details.
- Details of psychiatric history and examination Migraine Disability Assessment Schedule (MIDAS)
- Clinical global impression (CGI-I)[9]
- Dosage Record Treatment Emergent Symptom Scale (DOTES)[10] visual analogue scale (VAS)
- Numeric rating scale (NRS) verbal rating scale (VRS)

At every visit migraine symptoms were measured by using visual analogue scale (VAS), Numeric rating scale (NRS) verbal rating scale (VRS) and detailed history was asked pertaining to the same. At initial visit severity of symptoms were assessed by CGI-S. At visits space between every two weeks Clinical global impression – improvement (CGI-I) were given to the subjects. Adverse effects were also either recorded by the patient, reported by the patient, observed by the therapist or either elicited by the therapist on each visit. Drug naive patients were taken in the study. If the patients were on any medication, then they were kept drug free for a period of at least 15 days for complete elimination of the drug from the body prior to randomization. Treatment with prior psychotropic medications (e.g., antipsychotic agents, antidepressants and mood stabilizers) were discontinued as tolerated and clinically appropriate at least 15 days prior to randomization. The variables were presented as percentages, and. Chi-square test was used.

RESULTS

The maximum patients those who were enrolled had migraine attack once a week. Most complained of nausea, photo phobia, phono phobia, and vomiting as associated symptoms. A total of 90 patients were screened and relief in headache started to develop after 4 weeks and became conspicuous after 6weeks however patient fared much better, with better compliance less drop outs and minimal side effects in Group C.

Table-1: Sociodemographic variables of the subjects

Variables	Propanolol Group (n=30)		Propanolol and Placebo Group (N=30)		Propanolol and panchgavya ghrit (n=30)		Chi square	p-value
	N	%	N	%	N	%		
AGE (years)								
Upto 30	9	29.97	8	26.4	6	19.8	0.102	0.95
31-45	21	70.03	22	73.6	14	80.2		
Sex								
Male	8	26.4	6	19.8	6	19.8	0.711	0.707
Female	22	73.6	24	80.2	14	80.2		
Duration of Illness								
0-10 Years	15	41.5	17	56.95	18	61.4	0.977	0.913
11-20 Years	8	26.4	8	26.4	6	19.8		
21-30 Years	7	23.1	5	16.65	6	19.8		
Family History of Migraine Illness								
Present	21	70.03	23	76.9	22	73.6	0.341	0.843
Absent	9	29.97	7	23.1	8	26.4		

There were no intergroup significant differences pertaining to age, sex duration of illness and family history of migraine illness however the general finding suggest that migraine was more common in age group above 30 females and patients with positive family history. Maximum patients had duration of illness less than 10 years. (Table 1)

Table 2: Mean change in parameters pertaining to migraine score from baseline in two groups

Parameter	Group	Day							
		0	7	14	28	42	56	70	84
CGI	Gr1	7							
	Gr2	7							
	Gr3	7							
CGI-I	Gr1		4	4	3	3	3	2	1
	Gr2		4	4	3	2	2	1	1
	Gr3		3	3	2	2	1	1	1
MIDAS	Gr1	25							9
	Gr2	26							7
	Gr3	28							4
VAS	Gr1	10	9	8	7	6	4	2	1
	Gr2	10	9	8	6	5	3	2	1
	Gr3	10	7	5	3	2	1	1	1
VRS	Gr1	Severe	Severe	Severe	Severe	Moderate	Moderate	Mild	Mild
	Gr2	Severe	Severe	Severe	Moderate	Moderate	Moderate	Mild	Mild
	Gr3	Severe	Severe	Moderate	Mild	Mild	Mild	Mild	Mild
NPRS	Gr1	9	8	7.33	7	6	5	4	2.33
	Gr2	8.66	8.33	7.66	6	5	4	3.33	1.66
	Gr3	9	7	5	3.66	3	2	1	0.66

Clinical Global Impression rating scale employed revealed that to start with subjects scored 7 which stands for pathology interfering in many life functions which reduced drastically in Group C as compared to Group B and Group A in descending order .the implications were that there were rapid rate of recovery in clinical status of Group C as compared to other two groups. Pain scales namely VAS (visual analogue scale),NPRS(Numeric Pain Rating Scale),VRS(verbal rating scale) when employed denoted there was decreased migraine frequency, decreased perception of pain, less intake of abortive medication consumed by subjects implying there were reduction in number of migraine days and there was decrease in the abortive medications taken for the same .Group C scored better on pain scales followed by Group B and Group A. Decrease in MIDAS score was observed after the therapy. At the start of therapy the number of most patients had Grade IV(severe disability) which came down to Grade II in group A and B and Grade I in group C inferring that little or no disability was observed in third group however mild disability was still present in Group I and II . (Table 2, Figure 1)

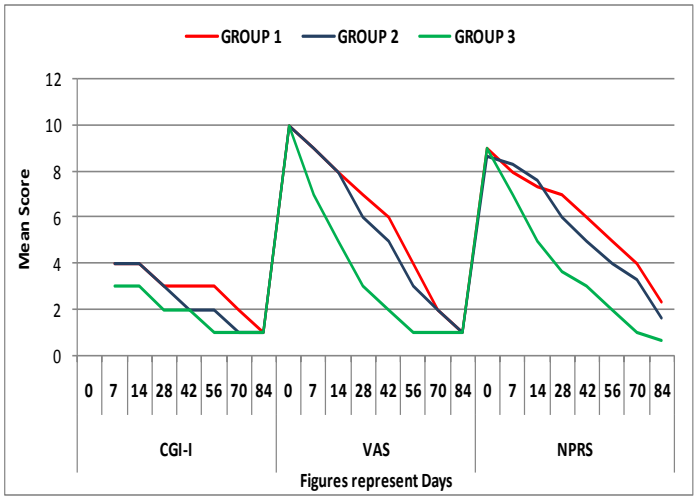

Table 3A: Side Effects Assessed by DOTES

Side Effects	Group 1: Propanolol		Group 2: Propanolol with Placebo		Group 3: Propanolol with Panchgavya		Significance	
	No. of Subjects		No. of Subjects		No. of Subjects			
	No. of Subjects in single visit	Kruskal-Wallis Mean Rank	No of Subjects in single visit	Kruskal-Wallis Mean Rank	No. of Subjects in single visit	Kruskal-Wallis Mean Rank	Kruskal-Wallis Chi Square	p-value
a. BEHAVIOURAL TOXICITY								
Toxic confessional state	2	12.14	1	11.86	0	9.00	2.350	0.309
Decreased Motor activity	4	14.43	2	11.14	2	7.43	4.878	0.087
Drowsiness	4	12.29	4	13.00	4	7.71	3.255	0.196
b. ANS AND GIT SIDE DFFECTS								
Dry mouth	4	12.71	3	11.64	2	8.64	1.911	0.385
Blurred vision	2	12.00	2	12.00	0	9.00	2.327	0.312
Constipation	3	12.64	2	9.86	2	10.50	0.924	0.630
Nausea	6	13.57	6	11.14	5	8.29	2.640	0.267
Diarrhoea	4	13.86	3	10.86	3	8.29	3.135	0.209
c. OTHERS								
Dermatologic	6	13.29	6	13.29	4	6.43	5.875	0.053
Weight loss	3	13.57	3	12.93	1	6.50	6.086	**0.048**
Anorexia/decreased appetite	3	11.79	3	13.86	2	7.36	4.445	0.108

In relation to the side effects weight loss difference was found to be significant among the three groups. Most of the sides effects were have higher ranks in group 1, followed by group 2 and lowest in group 3 but none of the side effect differences were found to be significant except the weight loss. (Table 3 A)

Table 3 B: Side effects and symptoms associated with migraine reported by the patient, observed by the clinician or elicited by the therapist

Side Effect	Group 1: Propanolol		Group 2: Propanolol with Placebo		GROUP3: Propanolol with Panchgavya		Significance	
	No. of Subjects		No. of Subjects		No. of Subjects			
	Maximum no. of Subjects in single visit	Kruskal-Wallis Mean Rank	Maximum no. of Subjects in singlevisit	Kruskal-Wallis Mean Rank	Maximum no. of Subjects in singlevisit	Kruskal-Wallis Mean Rank	Kruskal-Wallis Chi Sq	p-value
Hypersomnolence	5	13.14	5	11.79	5	8.07	2.589	0.274
Depression	5	13.21	5	11.36	5	8.43	2.222	0.329
Insomnia	3	11.71	3	11.36	3	9.93	0.428	0.807
Emotional Lability	2	11.86	2	12.36	1	8.79	1.955	0.376
Fatigue	3	12.14	2	10.29	3	10.57	0.519	0.771
Vertigo	4	12.43	3	10.29	3	10.29	0.655	0.721
Psychosis	3	11.36	3	11.71	3	9.93	0.428	0.807
Metabolic Disorders	3	13.50	3	10.50	3	9.00	2.258	0.323
Bradycardia	3	12.00	3	10.50	3	10.50	0.390	0.823
Oliguria	3	11.14	3	12.29	3	9.57	0.839	0.657
Wheezing	3	11.86	3	10.71	3	10.43	0.297	0.862
Respiratory Distress	2	11.43	2	11.43	2	10.14	0.361	0.835
Menstrual Irregularity	3	14.07	2	11.43	0	7.5	5.701	0.058
Hyperglycemia	3	12	3	10.5	3	10.5	0.39	0.823
Decreased Tear Production	4	12.21	4	11.29	4	9.5	0.761	0.684
Decreased Visual Acquity	3	10.5	3	12	3	10.5	0.323	0.851

Most of the side effects had lower ranks in group 3 as compared to group 1 and 2 but none of the side effect differences were found to be significant. (Table 3 B)

Table 4: Triggers for Getting Migraine Attack

Variable	GROUP A				GROUP B				GROUP C		
Days	14	28	42	56	14	28	42	56	14	28	42
Weather	5	3	2	1	4	2	1	-	3	2	1
Menses	2	1	-	-	2	1	-	-	-	-	-
Oily and Fried Food	2	1	-	-	2	2	1	-	-	-	-
Lack of Sleep	6	4	2	1	5	4	2	1	2	1	-
Hunger	5	4	2	1	3	2	1	-	2	1	-
Travelling	5	4	2	1	5	3	2	1	3	2	1
Exertion	3	2	1	-	2	1	-	-	-	-	-
Alcohol	3	2	1	-	2	1	-	-	-	-	-

Migraine attacks due to weather, menses, oily and fried food, lack of sleep, stress, hunger, travelling, exertion and alcohol were more in group A followed by B and C. (Table 4)

DISCUSSION

Since the pharmaceutical treatment of migraine is complex, with no agreed upon guidelines individuals often need abortive medication during acute attacks and some prophylactic measure to reduce attacks. Some abortive drugs such as Triptans and ergotamine tartrate are not commonly used in resource-poor countries, resulting in a significant amount of pain and disability.[22] Another problem is the actual overuse of such medications which causes 'medication overuse headache' (MOH), further complicating management strategies.[23]

A large percentage of patients do not respond to pharmacological interventions for migraine headache, develop unacceptable side-effects, or are reluctant to take medications[24]. As a result many patients resort to many complementary and alternative therapies like acupuncture,[25] biofeedback therapy,[26] relaxation therapy, herbal remedies and vitamin or mineral supplementation.[24] Recent studies have demonstrated the effectiveness of acupuncture[27] and Yoga[28] in the reduction of migraine headache. The use of complementary and alternative medicine (CAM) in migraine is a growing phenomenon which, though increasingly widespread, is poorly understood.[29] Ayurveda is a traditional medical system used by a majority of India's 1.1 billion population[30].Though Ayurvedic therapy is popular among migraine sufferers, there are very few studies which have compared pharmacotherapy pertaining to combination of two lines of treatment aiming for the holistic view of treatment with aim of increasing compliance ,increasing potency of drugs and reducing side

effects caused by allopathic medicines when administered alone. Migraine was distinguished from common headache by Tissot in 1783 for the first time who ascribed it to a supra-orbital neuralgia provoked by reflexes from the stomach, gall bladder or uterus. Later, migraine was classified as a neurological disorder. Our hypothesis is quite similar to Tissot's idea on the pathogenesis of migraine, viz. that it usually arose from stomach disturbance.[31] Incidentally, there is a close correlation between the symptoms of migraine with those of *Amla-pitta* (state of acid-alkali imbalance in the body) causing symptoms such as: *brahma*(confusion), *moorcha* (fainting), *aruchi* (anorexia), *aalasya* (fatigue), *chardi* (vomiting), *pras ek* (nausea), mukhmadhurya (sweetness in the mouth) and shiroruja (headache). The correlation between the cause and symptoms of *Amla-pitta* match the current diagnosis criteria of migraine.

Complimentary and Alternative Medicine (CAM) is often perceived by the public to be more helpful than conventional care for the treatment of headache.[32] Prior studies also denote that when Propanolol and flunarizne were administer together there was better clinical outcome which has been replicated in this study that is polytheraphy is better than monotherapy.[33] This is also in line with the prior ayurvedic researchers which stress upon effectiveness safety and tolerability of ayurvedic medications in migraine prophylaxis[34] The subjects had migraine without aura was a non-cross-over design, although less powerful than the cross-over design , had the advantage of avoiding the carryover effect, a feature of great importance in migraine prophylaxis trials .

From this comparative study we can make a preliminary assessment that combination of standard prophylaxis in allopathic medication along with panch gavya ghrit there was decrease in measures of symptom severity, better tolerability, lesser side effects, better compliance, lesser drop outs, good treatment response and the efficacy of treatments in treatment studies of patients with mental disorders implying that panch gavya ghrit when administered along with Flunarizine was more efficacious and safe when compared with other two groups. However large multicentric RCTs of long duration and involving more number of subjects are required to ascertain these facts.

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CONGENITAL AURAL ATRESIA WITH CHOLESTEATOMA: AN EXPERIENCE IN TERTIARY CARE HOSPITAL

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ABSTRACT

EAC atresia is a rare paediatric age group anomaly with occurrence of 1 in 10000 to 20000 live births. If not corrected in childhood it is carried upto adulthood with various associated disabilities starting from cosmetic disfigurement to hearing loss and impairment of speech, EAC atresia associated with hypoplastic or distorted middle ear anatomy, absence of ossicles and mal-route of facial nerve. In this retrospective study cases of congenital external ear canal atresia with cholesteatoma were operated in Department of ENT and Head and Neck surgery, All India institute of Medical sciences, Patna. Out of three cases, two of them were reported with facial palsy. All cases were managed surgically with trans-mastoid approach of mastoid exploration with wide conchomeatoplasty. In one case Canalplasty was performed with skin graft. Merocel wick was used in all cases to avoid restenosis.

Key words: Congenital EAC atresia

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INTRODUCTION

Congenital EAC atresia is a rare congenital anomaly commonly found in pediatric age group with incidence of 1 in 10000 to 20000 live births. Severity of anomaly varies from deformed pinna, narrowing or complete absence of EAC to hypoplastic middle ear leading to varying degree of conductive hearing impairment. Sensorineural hearing loss has also been reported[1]. To give a hearing ear and keep EAC patent or free from restenosis is still a challenge for many surgeons. The first operation to correct an atresia of EAC was performed in 1882 by Schwager[2]. In recent years improved radiological and audiological assessment along with improvements in surgical technology such as high magnification operating microscope and facial nerve monitoring has accelerated successful outcomes after surgery. In many scenarios congenital EAC atresia is associated with silent or symptomatic presence of congenital cholesteatoma and facial nerve anomaly. Unilateral canal atresia is more commonly encountered than bilateral with right side predominance and hypoplastic middle ear structures[3,4].

High-resolution CT scan is of great importance to delineate the extent of disease and helps prognostically to predict the outcome of surgical correction. To create a new ear and patent ear canal without injury to facial nerve or the labyrinth is still a challenge for otorhinolaryngologist.

CASE SERIES

This retrospective study involved cases of congenital external ear canal atresia with cholesteatoma treated from 1st January to 31st December 2018. There were 3 cases which were operated in one year in Department of ENT and Head and Neck surgery, All India institute of Medical sciences, Patna (India).

Case 1

A 20 year old male came to us with complaints of fistula in left post aural region with discharge on and off for the last 2 to 3 years. On clinical examination he had left ear grade 2 microtia and right ear grade 4 microtia/anotia with complete external ear canal

atresia on both sides (bony and cartilaginous) since birth. He had bilateral facial palsy grade 2 as per House-Brack-mann classification[5] of facial function. Pure Tone Audiometry result showed bilateral mixed hearing loss (78.33dB).

A high resolution computed tomographic (HRCT) scan of the temporal bone revealed bilateral EAC atresia with bony atretic plate occluding the ear canal with medially soft tissue fibrous plug. On left side tympano-mastoid compartment was filled with soft tissue density with hypoplastic middle ear and absence of ossicles. Expansion of tympanic plate of temporal bone was seen with soft tissue opacity within, in continuation with the middle ear opacity. On right side ear ossicles were dysplastic and abnormally placed high in epitympanum with hypoplastic facial nerve. Radiological diagnosis of right congenital cholesteatoma with bilateral complete canal atresia was made.

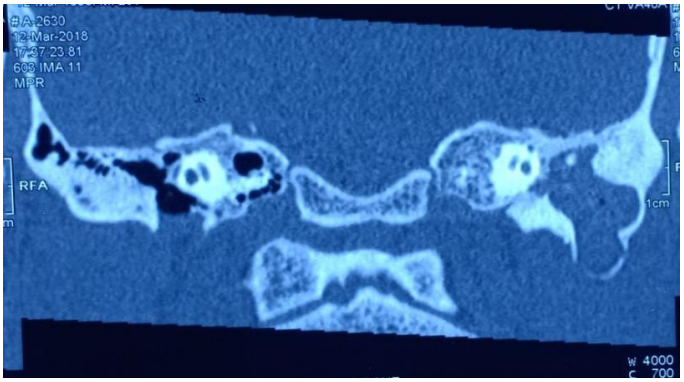

Figure 1- HRCT temporal bone, coronal cut showing extensive cholesteatoma in left tympano-mastoid compartment

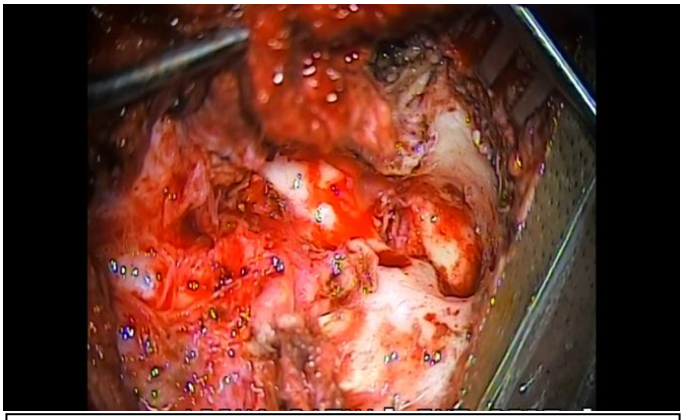

Figure 2- Intra operative finding showing cholesteatoma involving left mastoid extent upto the tip

A mastoidectomy was planned to remove cholesteatoma. No definite anatomy of middle ear and mastoid was visible and the site of EAC was represented with a small pit in concha. On drilling the mastoid bone a cavity full of cholesteatoma debris was found. Cholesteatoma was seen occupying whole of mastoid process including tip and extended upto the jugular bulb. Mastoid tip was also filled with purulent material which tracked down inferiorly along the sternocleidomastoid muscle. Complete removal of cholesteatoma was carefully performed with identification of hypoplastic middle ear with well delineated facial canal and semicircular canal bulge. Excellent preservation of jugular bulb and posterior fossa dura was made. Facial nerve was seen involved and bony canal was eroded anteriorly. Mastoid cavity was exteriorized to the exterior by doing a conchomeatoplasty. As the remnant pinna was lower down, alignment of conchomeatoplasty with the mastoid cavity was challenging. We could achieve an oblique pathway drainage of mastoid cavity.

Postoperative period was uneventful; facial nerve function remained at grade 2 level. Pure tone Audiometry was repeated after six weeks and showed no change in hearing level. Patient was under regular follow up. Due to oblique alignment of mastoid cavity and conchomeatoplasty, regular cleaning was done. The patient developed a well epithelised mastoid cavity.

Case 2

A 33 year old male presented with complaints of left ear deformed pinna, hearing loss and facial palsy since childhood. On clinical examination he had left ear grade 3 microtia with external ear canal atresia and a soft tissue pinkish mass coming out from a small sinus opening in the atretic canal. He had grade 2 facial palsy as per House-Brack-mann grading system[5] on left side with mandibular hypoplasia. On the Right side he had grade 1 microtia with normal external ear canal. Pure Tone Audiometry showed left ear moderately severe conductive hearing loss (65dB) and normal hearing right ear.

A high resolution computed tomographic (HRCT) study of the temporal bone showed irregular soft tissue filled cavity seen in place of expected middle ear with absence of middle ear ossicles as well as middle ear space. Soft tissue opacity extended upto the non-aerated mastoid air cells as well as inferiorly. The mandibular condyle was poorly formed with underdeveloped glenoid fossa. Facial nerve was seen

upto genu and was exiting anteriorly. Right side appeared normal on all parameters.

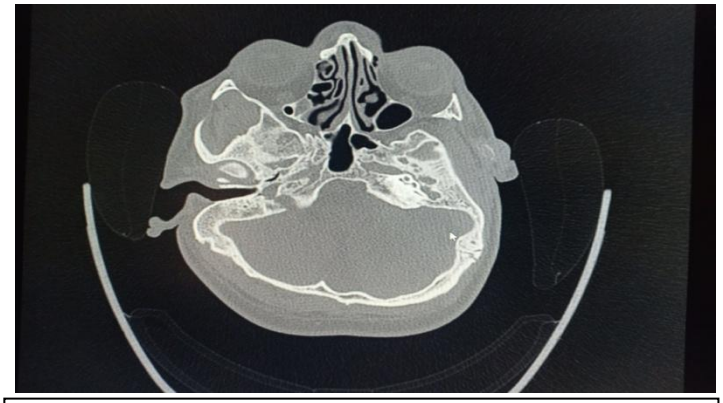

Figure 3-: HRCT temporal bone axial cut showing soft tissue filled cavity in place of expected middle ear.

Trans mastoid removal of granulation and cholesteatoma was performed. During surgery the site of EAC was represented by small bony pit. The mastoid process as well as the middle ear was entirely filled by granulation tissue and cholesteatoma with hypoplastic middle ear space. Ossicles were absent. Oval and round window was poorly appreciable because of hypoplastic middle ear. Facial nerve canal was completely covered by cholesteatoma and horizontal portion of facial canal was dehiscent. Complete removal of cholesteatoma and granulation was carefully performed from attic, antrum and hypoplastic middle ear with preservation of facial nerve. Canalplasty was performed with wide conchomeatoplasty.

Post-operative period was uneventful with return of normal facial function in 15 days. Post-operative pure tone audiometry revealed no change in hearing level.

Case 3

A four year old girl presented with bilateral deformed pinna with hearing loss and impairment of speech. On clinical examination she had grade 4 microtia or anotia on left side and grade 2 microtia on right side. Complete external ear canal atresia was present on both sides. She also had a persistent discharging sinus on left side anterior anotia. A final diagnosis of bilateral EAC atresia with right sided microtia and left sided anotia was made with preauricular sinus. Hearing evaluation was done with help of brainstem evoked response audiometry (BERA). It showed right sided moderate hearing loss and left sided moderate to severe hearing loss. A high resolution computed tomographic (HRCT) study of the temporal bone revealed bony atretic plate with soft tissue fibrous plug present medially on right side. Ossicles were eroded and malformed with soft tissue opacification in middle ear and mastoid. Oval window could not be visualized. On left side there was complete external ear canal atresia with bony atretic plate. Soft tissue opacification completely filled the middle ear and mastoid with hypoplastic and malformed middle ear. In view of soft tissue opacification and bony erosion, radiological diagnosis of bilateral congenital cholesteatoma was made. Mastoid exploration of right side with surgical excision of preauricular sinus of left side was done. The purpose was to ensure complete removal of cholesteatoma and make ear disease free along with restoration of some hearing. Post auricular incision and anteriorly based muscular flap was taken. The site of EAC was represented by a small bony pit. The bony atretic plate was encountered with medially based fibrous plug. Mastoid air cells were filled with congenital mesenchymal tissue. Fused malleus-incus assembly with malformed stapes was seen. Facial nerve was lying outside of its bony canal in its horizontal segment. Temporalis fascia graft was placed and layered with split thickness skin graft. A wide meatoplasty was done and covered with skin graft. In follow-up period a well epithelialized dry mastoid cavity with patent EAC was achieved with near normal hearing on right side.

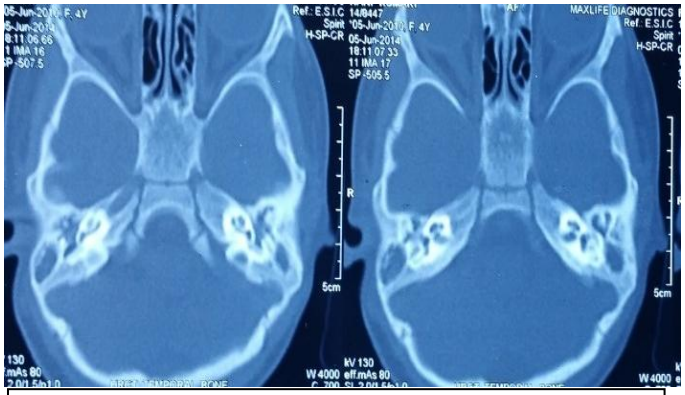

Figure 5-: HRCT temporal bone axial cut shows soft tissue shadow in mastoid bone.

DISCUSSION

Congenital external canal atresia is characterized by hypoplasia of EAC both bony as well as membranous. Unilateral Canal atresia is more common and the anomaly is associated with variety of different syndromes and disorders. Congenital canal atresia is also associated with craniofacial syndrome such as

Treacher Collins syndrome and hemifacial microsomia[6].

Congenital EAC atresia with congenital cholesteatoma is a rare entity. However it is more frequent in case of external ear canal stenosis than in case of complete atresia[7]. Invagination of the ectodermal element of first pharyngeal pouch forms EAC and it grows medially to meet the endoderm of middle ear. The mesodermal component gets entrapped between these ventral dorsal sites giving rise to meatal plug or plate. This plate resorbs by the end of 28th week of gestation and the EAC recanalizes. Failure of recanalization leads to congenital aural atresia[8]. The primary embryologic abnormality in congenital aural atresia (CAA) is failure of the first branchial groove epithelial plate to canalize[9]. Arrest of this process prior to canalization at six months of gestation results in complete atresia and arrest during canalization results in incomplete atresia or canal stenosis. Altmann[10] categorized canal atresia into three groups as per anatomical variation. In group 1(mild) part of the EAC is present with associated hypoplastic tympanic bone and middle ear cavity with possibility of ossicular malformation. In group 2(moderate) there is complete absence of EAC with small tympanic cavity and deformed ossicles. In group 3(severe) there is complete absence of EAC with hypoplastic middle ear space and absent ossicles. Schuknecht classification of external canal atresia is based on surgical observation. In type A or meatal atresia, only fibrocartilaginous portion of external ear canal is involved with small opening in the atretic area which predisposes to cholesteatoma formation because of spontaneous egress of desquamated epithelium. In type B or partial atresia, there is narrowing or tortuosity of both fibrocartilaginous and bony part of external ear canal with deformed middle ear ossicles. In type C or total atresia, there is total atretic canal and a well developed pneumatized middle ear cavity with fused ossicles along with more anterior course of facial nerve. In type D or hypopneumatic total atresia, there is full constellation of dysmorphic feature listed in type C. More recent classification systems have focused on high resolution computed tomography (HRCT) imaging findings with the goal of delineating the patients who are the best candidates for surgical repair[11, 12].

Congenital cholesteatoma may arise from cerebellopontine angle, petrous pyramid, middle ear cavity and mastoid antrum[13]. In contrast, congenital cholesteatoma of EAC is usually caused by congenital aural stenosis,[14] and the true existence of primary congenital cholesteatoma in this site is uncertain[15] . Congenital cholesteatoma of middle ear is the most frequent type and because of ossicular erosion and early occurrence conductive hearing loss is usually diagnosed in childhood.[16]

The mastoid process is undoubtedly the last reported site for the onset of congenital cholesteatoma[17].

The occurrence cholesteatoma formation with canal stenosis of diameter 4 mm or less and invagination of small pouch is explained by the trapping of the epidermoid elements during the embryological arrest of the external ear canal formation as to form a nidus for the cholesteatoma behind the atresia plate[18].

This theory is known as embryological rest theory and was credited as one of the possible mechanism of congenital cholesteatoma development in general[19]. Cholesteatoma originates in various sites within the temporal bone including EAC, medial to Ossicular chain and may extend upto whole length of mastoid process, labyrinth and petrous apex.

Levenson et al[20] have suggested strict criteria for diagnosis of congenital cholesteatoma which is a whitish mass present in middle ear cavity with normal tympanic membrane with no otorrhoea and no history of otological surgery.

Nishimura et al[21] reported a cholesteatoma case with aural atresia, arising behind the atresia plate that also caused mastoiditis and subperiosteal abscess.

Singh et[22] al also reported a case of cholesteatoma with unilateral congenital canal atresia (CAA) with preauricular fistulous opening and mastoid abscess.

Caughley et al[23] incidentally found an occult cholesteatoma within the middle ear in a child with complete EEC atresia.

In the present study, in all three cases cholesteatoma atypically developed behind the atretic plate and extensively involved the middle ear and mastoid.

According to McDonald et al[24] the essential step in canalplasty involves the generous widening of the posterior bony canal wall until mastoid cells are just encountered and emphasizes the importance of using two pieces of split-thickness skin graft to cover the new ear canal.

Atresia of the EAC can occur in isolation or it may be associated with middle ear and inner ear dysplasia. Isolated EAC atresia is amendable to surgery[25].

HRCT of the temporal bone is indicated for preoperative planning. Structures that may cause problems during surgery such as reduced volume of the middle ear cavity and poor pneumatisation of the temporal bone should be identified[27].

The complete removal of cholesteatoma with clearance of pathological mucosa and a wide mastoid cavity with a patent external ear canal, before and during surgery should be done. Surgical management is the mainstay of treatment and needs to be done with utmost care and precision for better result.

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