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ROLE OF DEXAMETHASONE IN REDUCING PAIN, NAUSEA AND VOMITING AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

Introduction: Laparoscopic cholecystectomy is one of the most common elective surgical procedures performed throughout the world. Despite the introduction of new anti-emetic drugs, short-acting anaesthetic agents and minimal invasive surgical techniques, the incidence of postoperative nausea and vomiting has remained largely unchanged. This study was undertaken to find out the incidence of nausea and vomiting and compare these rates between cases (subjects with dexamethasone prophylaxis) and controls (subjects not with dexamethasone prophylaxis), to compare the level of pain between cases and controls and to compare the change in serum CRP levels between cases and controls.

Materials & Methods: This Prospective case-control study was done at Department of Surgery, Era's Lucknow Medical College & Hospital, Lucknow from January 2012 to August 2013. All the patients undergoing laparoscopic cholecystectomy during the period were included. The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

Results: Dexamethasone reduces the postoperative pain as well as has fewer episodes of nausea and vomiting when used as a preemptive medication in laparoscopic cholecystectomy. The reduction in pain might be attributed to its better control over inflammatory activity as evidenced by reduced CRP levels.

Conclusion: Dexamethsone shows to reduce: 1. Post-operative scores.2. Incidence of nausea, vomiting.3.Raised CRP levels.No side effects of dexamethasone were present. Hence, it is recommended to be used as a preemptive drug in cases undergoing laparoscopic cholecystectomy.

Key words: Pain, nausea, dexamethasone, cholecystectomy

INTRODUCTION

Laparoscopic cholecystectomy (LC) is one of the most common elective surgical procedures performed throughout the world[1,2,3] . With the advent of newer techniques in anaesthetic and surgical management, up to 84% of elective LC patients can be discharged on the day of surgery itself[4]. However, a variety of metabolic, hormonal,

inflammatory, and immune responses are still activated during minimally invasive procedures, which may impair clinical recovery. Despite the introduction of new anti-emetic drugs, short-acting anaesthetic agents and minimal invasive surgical techniques, the incidence of postoperative nausea and vomiting (PONV) has remained largely unchanged. Use of anti-emetic prophylaxis has become the standard approach to minimize the nausea and vomiting postoperatively.

As a matter of fact, PONV can lead to serious complications such as aspiration, dehydration, electrolyte disturbances and disruption of incision site. Another impact of PONV, is the effect on patient, some regard it as more disabling than the operation itself.Early postoperative pain is the most common complaint after elective laparoscopic cholecystectomy[7]. Postoperative pain is the dominating complaint and the primary reason for prolonged convalescence after laparoscopic cholecystectomy[11,12]. Glucocorticosteroids are well known for their analgesic, anti-inflammatory, immune- modulatory and anti-emetic effects. Dexamethasone is effective, alone or in combination with other antiemetic agents, in reducing nausea and vomiting after laparoscopic procedures[14]. Furthermore, small doses of steroids have been demonstrated to attenuate postoperative pain, improve mood, decrease fatigue, and increase appetite in a variety of medical and surgical patients[15,16,17,18,19.]. The administration of a long-acting steroid like dexamethasone to LC patients may therefore reduce complications and improve the quality of recovery during the first 24 h after surgery[22,23]. The incidence of postoperative nausea and vomiting has been significantly decreased by preoperative single dose steroid administration in several studies[6,22,23].Evidence has also shown that preoperative administration of dexamethasone improves the surgical outcome in terms of reduced inflammatory activity as measured by CRP levels[12].In present study, an attempt has been made to evaluate the role of prophylactic use of dexamethasone to attenuate post-operative pain, nausea and vomiting, to study its impact on the surgical outcome in terms of inflammatory activity as measured by CRP levels in patients undergoing laparoscopic cholecystectomy.

MATERIAL AND METHODS

This Prospective case-control study was done at Department of Surgery, Era's Lucknow Medical College & Hospital, Lucknow starting from January 2012 to August 2013. All the patients proposed to undergo laparoscopic cholecystectomy during the this period were included in the study.

Inclusion Criteria:

Adult individuals >18 years of age of either gender and patients with ASA Grade I / II were included.

Exclusion criteria:

Patients in whom steroids were contraindicated, those with uncontrolled diabetes mellitus, existing GI ulceration, suffering from Cushing syndrome, severe hypertension, severe tuberculosis or severe systemic viral, bacterial and fungal infections and Cases of acute cholecystitis were excluded.

After obtaining informed consent from the patients, demographic details of the patients were noted and they were subjected to laboratory and clinical investigations.

Allocation to Groups

The patients were allocated to one of the two study groups randomly using random number table. On the basis of random number table, the patients were allocated to one of the two groups (of 25 each) as follows:

Controls : These were the patients in whom normal saline, was used as placebo.

Cases: These were the patients in whom Dexamethasone, 8 mg, i.v. was proposed to be given as a preemptive drug.

Administration of Test Drugs

The preemptive drug was administered intravenously 90 minutes prior to start of surgery.

Post-Operative Evaluation

Post-operatively the following parameters were recorded at 6, 12 and 24 hour time intervals:

1.**Pain:** It was recorded on a 10-point visual analogue scale where score 0 represented no pain and score 10 indicated worst pain.
2.**Nausea**: Feeling of nausea at the time of recording was recorded at each of the follow up intervals.
3.**Vomiting**: It was recorded in terms of "absence" or "presence" during two consecutive follow up intervals.
4.**hs-CRP**: hs-CRP levels were assessed only once at 6 hour post-operative interval.
5.
Statistical Analysis: The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

RESULTS

Out of total 50 patients enrolled in the study, a total of 25 (50%) were not given any prophylactic analgesic and comprised the control group of study while remaining 25 (50%) were administered dexamethasone preoperatively as a prophylactic analgesic and comprised the case group of study.

Table 1: Age wise distribution of patients

Age Group (Yrs)	Total (n=50)		Control (n=25)		Cases (n=25)	
	No.	%	No.	%	No.	%
≤20	3	6	2	8	1	4
21-30	9	18	4	16	5	20
31-40	16	32	9	36	7	28
41-50	12	24	8	32	4	16
>50	10	20	2	8	8	32
Mean Age±SD (Range in years)	40.14±11.86 (18-65)		38.64±11.53 (18-65)		41.64±12.23 (18-60)	

χ^2=5.628 (df=4); p=0.229

Although, proportion of patients in age group >50 years was higher in cases as compared to controls yet this difference between two groups was not significant statistically (p=0.229).

Table 2: Gender wise distribution of patients

Gender	Total (n=50)		Control (n=25)		Cases (n=25)	
	No.	%	No.	%	No.	%
Male	9	18	2	8	7	28
Female	41	82	23	92	18	72

χ^2=3.388 (df=1); p=0.066

Majority of patients irrespective of group were females. Overall, there were 9 (18%) males. Among controls, only 2 (8%) were males while among cases 7 (28%) were males. Statistically, both the groups were matched for gender and did not show a significant difference (p=0.066).

Table 3: Comparison of post operative pain between two groups at different time intervals

Parameter	Control (n=25)		Cases (n=25)		Significance of Difference (Mann-Whitney U test)	
	Mean	SD	Mean	SD	"z"	"p"
6 hrs	5.20	1.53	4.72	1.40	1.651	0.099
12 hrs	4.16	1.14	3.04	1.02	3.235	0.001
24 hrs	1.76	0.88	1.68	0.75	0.305	0.760

Mean VAS scores for pain were lower in cases as compared to controls at all the post-operative intervals, however, the difference was significant statistically only at 12 hrs.

Table 4: Comparison of post operative nausea between two groups at different time intervals

Parameter	Control (n=25)		Cases (n=25)		Significance of difference	
	No.	%	No.	%	"χ^2"	"p"
6 hrs	6	24	4	16	0.500	0.464*
12 hrs	13	52	7	28	3.000	0.083
24 hrs	1	4.0	0	0	1.020	1.000*

*Fisher exact test

On comparing the data statistically, no significant difference was observed between two groups at any of the post-operative intervals (p>0.05).

Table 5: Comparison of post operative vomiting between two groups at different time intervals

Para meter	Control (n=25)		Cases (n=25)		Significance of difference	
	No.	%	No.	%	"χ^2"	"p"
6 hrs	0	0	0	0	-	-
12 hrs	8	32	5	20	0.936	0.520*
24 hrs	0	0	0	0	-	-

*Fisher exact test

On comparing the data statistically, no significant difference was observed between two groups at any of the post-operative intervals (p>0.05).

Table 6: Comparison of post operative CRP levels between two groups

CRP Levels	Control (n=25)		Cases (n=25)	
	No.	%	No.	%
≤10 ng/ml	8	32	16	64
>10 ng/ml	17	68	9	36

χ^2=5.128 (df=1); p=0.024

Significantly higher proportion of cases (64%) as compared to controls (32%) had CRP levels ≤10 ng/ml, thereby showing a significant difference between two groups (p=0.024).

DISCUSSION

Postoperative nausea vomiting (PONV) is a commonly observed phenomenon after laparoscopic procedures. In some recent studies, Dexamethasone has been reported as an effective anti-emetic in patients (Italian Group, 1995)**Error! Bookmark not defined.**. With this background, the present study was carried out to evaluate the role of prophylactic use of dexamethasone to attenuate post-operative pain, nausea and vomiting among patients undergoing laparoscopic cholecystectomy. An attempt was also made to study its impact on the surgical outcome in terms of inflammatory activity as measured by CRP levels.For this purpose, a total of 50 patients proposed to undergo laparoscopic cholecystectomy were enrolled in the study and were divided equally into two groups - a total of 25 (50%) were not given any prophylactic analgesic and comprised the control group of study while remaining 25 (50%) were administered dexamethasone preoperatively as a prophylactic analgesic and comprised the case group of study. The two groups were found to be matched and did not show a statistically significant difference between two groups, thus showing that the two groups were comparable and did not have any confounder effect.Postoperatively, pain, nausea and vomiting were evaluated at 6, 12 and 24 hr intervals. CRP levels were assessed once after 6 hrs post-operative interval.Mean VAS scores for pain were maximum at 6 hours and minimum at 24 hrs. On evaluating the data statistically, mean VAS scores for pain were lower in cases as compared to controls at all the post-operative intervals, however, the difference was significant statistically only at 12 hrs. The impact of dexamethasone on pain scores has been observed by Bisgaard *et al.* (2003)**Error! Bookmark not defined.** who however used a different study design studying the long term impact of preemptive dexamethasone administration on visceral pain during first postoperative week and found a significant impact of dexamethasone on visceral pain scores. Our study was limited to 24 hour postoperative pain assessment only and hence varies in design from that of Bisgaard *et al.*(2003)**Error! Bookmark not defined.**. In present study in the early assessment at 6 hours dexamethasone did not show any edge over placebo in terms of pain score. Generally, studies evaluating 24-hr impact of Dexamethasone on pain score have shown little or no superiority as compared to placebo as observed in our study. Though in present study, at 12 hrs significantly lower VAS pain scores were recorded in dexamethasone group as compared to placebo group but on rest of the time intervals there was no significant difference between two groups, thus indicating that dexamethasone has some definitive role in post-operative pain control. In present study we assessed the mean pain and did not categorically classified the pain scores. In present study, we observed, pain scores to be lower

in dexamethasone group at all the three follow up intervals and statistically significant difference at 12 hrs interval. In terms of overall post-operative pain scores draw the inference that dexamethasone significantly reduced the pain scores and thus showed a useful analgesic ability.

However, with respect to nausea, although at all the three follow up intervals, fewer episodes of nausea were reported in dexamethasone groups as compared to placebo group yet the difference was not significant at any of the intervals. In present study, we evaluated the effect in terms of categorical events and found the frequency of nausea events to be lower in dexamethasone group but could not provide a significant difference. The reason for this could be the overall low frequency of nausea complaints and fewer number of cases in each group. Fujii and Itakura reported both 4 and 8 mg dexamethasone groups to be having fewer PONV episodes as compared to placebo but showed statistically significant difference for 8 mg group only. In present study, we used 8 mg dexamethasone protocol but recorded nausea and vomiting as separate events and could not find a significant difference from placebo despite showing fewer episodes of nausea. Thus overall, we found that despite statistically not proven, our results showed similar trend as reported in literature and absence of statistical corroboration could be attributed to small sample size and difference in approach to measure the outcome.

In present study, episodes of vomiting were reported between 6 and 12 hr post-operative intervals only. It was observed that the dexamethasone group had fewer episodes of vomiting (20%) as compared to placebo group (32%) but the difference was not significant statistically (p=0.520). Wang *et al.* reported similar results with 34% patients in placebo group reporting to have vomiting as compared to 10% in dexamethasone group, however, in their study these differences were significant statistically too. In present study, we showed fewer episodes of vomiting in dexamethasone group (20%) as compared to placebo group (32%) but could not reduce them to the level to achieve a statistically significant difference. Most of the studies taking vomiting as a separate variable and showing dexamethasone to be effective in controlling episodes of vomiting had larger number of cases as compared to that in present study while a large number of other studies have not studied vomiting as an independent variable. In present study, CRP levels of 17 (68%) of control group and 9 (36%) of case group were found to be >10 ng/ml, thus showing the proportion of patients with raised CRP levels to be significantly lower in case group as compared to control group (p=0.024). These findings are in agreement with the observations of Bisgaard (2003)**Error! Bookmark not defined.** who also reported that preemptive use of dexamethasone reduces the CRP levels significantly.No side effects were noted in either of two groups. No side effect of dexamethasone upto 8 mg level has been reported in literature too.The findings in present study indicated that dexamethasone reduces the postoperative pain as well as has fewer episodes of nausea and vomiting when used as a preemptive medication in laparoscopic cholecystectomy.

CONCLUSION

Dexamethsone shows to reduce post-operative scores, incidence of nausea, vomiting and raised CRP levels. No side effects of dexamethasone were present. Hence, it is recommended to be used as a preemptive drug in cases undergoing laparoscopic cholecystectomy.

REFERENCES

-Johnson A: Laparoscopic surgery. Lancet 1997; 349:631–5

2-Eikermann M, Siegel R, Broeders I, Dziri C, Fingerhut A, Gutt C, Jaschinski T, Nassar A, Paganini AM, Pieper D, Targarona E, Schrewe M, Shamiyeh A, Strik M, Neugebauer EA. Prevention and treatment of bile duct injuries during laparoscopic cholecystectomy: the clinical practice

guidelines of the European Association for Endoscopic Surgery (EAES). Surg Endosc. 2012 Nov; 26(11): 3003-39.
3- Pahwa HS, Kumar A, Srivastava R. Laparoscopic cholecystectomy in situs inversus: points of technique. BMJ Case Rep. 2012 Jun 5;2012.
4- Briggs CD, Irving GB, Mann CD, Cresswell A, Englert L, Peterson M, Cameron IC: Introduction of a day-case laparoscopic cholecystectomy service in the UK: A critical analysis of factors influencing same-day discharge and contact with primary care providers. Ann R Coll Surg Engl 2009; 91:583–90
5- Fujii Y, Saitoh Y, Tanaka H. Ramosetron vs. granisetron for the prevention of postoperative nausea and vomiting after laparoscopic cholecystectomy. Can J Anaesth 1999;46:991–3.
6-Wang JJ, Ho ST, Liu HS, Ho CM. Prophylactic antiemetic preoperative dexamethasone in woman undergoing ambulatory laparoscopic surgery. BJA 2000; 84: 459-62.
7- Dubois F, Icard P, Berthelot G, Levard H. Coelioscopic cholecystectomy: Preliminary report of 36 cases. Ann Surg 1990; 211: 60–2.
8- Callesen T, Klarskov B, Mogensen TS, Kehlet H. Ambulatory laparoscopic cholecystectomy. Feasibility and convalescence. Ugeskr Laeger 1998; 160: 2095–2100.
9- Lau H, Brooks DC. Predictive factors for unanticipated admissions after ambulatory laparoscopic cholecystectomy. Arch Surg 2001; 136: 1150–3.
10- Bisgaard T, Klarskov B, Rosenberg J, Kehlet H. Characteristics and prediction of early pain after laparoscopic cholecystectomy. Pain 2001; 90: 261–9.
11- Bisgaard T, Kehlet H, Rosenberg J. Pain and convalescence after laparoscopic cholecystectomy. Eur J Surg 2001a; 167: 84–96.
12- Bisgaard T, Klarskov B, Rosenberg J, Kehlet H. Factors determining convalescence after uncomplicated laparoscopic cholecystectomy. Arch Surg 2001b; 136: 917–21.
13- Bronicki RA, Backer CL, Baden HP, Mavroudis C, Crawford SE, Green TP. Dexamethasone reduced the inflammatory response of cardiopulmonary bypass in children. Ann Thoracic Surg 2000;69:1490-5.
14- Karanicolas PJ, Smith SE, Kanbur B, Davies E, Guyatt GH: The impact of prophylactic dexamethasone on nausea and vomiting after laparoscopic cholecystectomy: A systematic review and meta-analysis. Ann Surg 2008; 248:751– 62
15- Plihal W, Krug R, Pietrowsky R, Fehm HL, Born J: Corticosteroid receptor mediated effects on mood in humans. Psychoneuroendocrinology 1996; 21:515–23
16- Bisgaard T, Klarskov B, Kehlet H, Rosenberg J: Preoperative dexamethasone improves surgical outcome after laparoscopic cholecystectomy: A randomized double-blind placebo-controlled trial. Ann Surg 2003; 238:651– 60
17- Inoue A, Yamada Y, Matsumura Y, Shimada Y, Muro K, Gotoh M, Hamaguchi T, Mizuno T, Shirao K: Randomized study of dexamethasone treatment for delayed emesis, anorexia and fatigue induced by irinotecan. Support Care Cancer 2003; 11:528 –32
18- Romundstad L, Breivik H, Roald H, Skolleborg K, Haugen T, Narum J, Stubhaug A: Methylprednisolone reduces pain, emesis, and fatigue after breast augmentation surgery: A singledose, randomized, parallel-group study with methylprednisolone 125 mg, parecoxib 40 mg, and placebo. Anesth Analg 2006; 102:418 –25
19- Fukami Y, Terasaki M, Okamoto Y, Sakaguchi K, Murata T, Ohkubo M, Nishimae K: Efficacy of preoperative dexamethasone in patients with laparoscopic cholecystectomy: A prospective randomized double-blind study. J Hepatobiliary Pancreat Surg 2009; 16:367–71.
20- Bisgaard T, Klarskov B, Rosenberg J, Kehlet H: Factors determining convalescence after uncomplicated laparoscopic cholecystectomy. Arch Surg 2001; 136:917–21
21- Coloma M, White PF, Markowitz SD, Whitten CW, Macaluso AR, Berrisford SB, Thornton KC: Dexamethasone in combination with dolasetron for prophylaxis in the ambulatory setting: Effect on outcome after laparoscopic cholecystectomy. Anesthesiology 2002; 96:1346 –50

22- Callery MP. Preoperative steroids for laparoscopic surgery. Ann Surg. 2003; 238: 661-2.
23- Gupta P, Khanna J, Mitramustafi AK, Bhartia VK. Role of pre-operative dexamethasone as prophylaxis for postoperative nausea and vomiting in laparoscopic surgery. J. Minimal Access Surgery 2006; 2(1): 12-15.

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