

VARIABLE ORIGIN OF OBTURATOR ARTERY AND ITS CLINICAL SIGNIFICANCE IN NORTH INDIAN POPULATION

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Abstract

Introduction: One of the anatomical variations of obturator artery the corona mortis, a vascular anomaly that may lead to dangerous hemorrhage and possible death. Hernioraphy is a surgical procedure of treating hernia and Gynecological surgeries in which there is surgery of inguinal, femoral and pelvic region, variation in the origin and course of obturator artery make it vulnerable during such surgeries.

Methods: In eighty Four formalin fixed human pelvises (51males and 33 females), the obturator artery was identified and traced from its origin, course till its exit.

Results: In our study we found that the obturator artery originated in a variable manner in 32.1% (27cases). In right side, it was observed in 43.9% cases and in left side it was 20.9%. We observed the different types origin of obturator artery from external and internal iliac artery, from anterior division of internal iliac artery in 67% cases, posterior division in 3.5%, inferior gluteal artery in 4.7%, direct branch from external internal iliac in 5.9%, common trunk for obturator artery and inferior epigastric in 10.7% and inferior epigastric in 7.1%.

Conclusion: A good knowledge of these variations which were observed in the present study is essential for surgeons for repairing any type of hernias as well as for radiologist who deal different angiographies.

Key words: Obturator artery, variations, internal iliac artery, external iliac artery, pelvis, inferior epigastric artery.

Introduction

Obturator artery is a branch of anterior division of internal iliac artery normally runs anteroinferiorly on the lateral pelvic wall to upper part of the obturator foramen and leaves

the pelvis via obturator canal where it divides into anterior and posterior branches to supply medial compartment of thigh [1]. Vascular variations have always been a subject of curiosity, because of its clinical significance.

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Interesting variations in the origin and course of the obturator artery have long received attention of anatomists, radiologist and surgeons by Pick et al., 1942 [2]. The obturator artery runs a greater risk of being wounded during the operation for strangulated femoral hernia, than surgeons are inclined to admit; and if this be the case, the varieties in the origin and course of this artery deserve a fuller consideration than what is usually allotted [3]. One of the anatomical variations of obturator artery is a condition known as the corona mortis, a vascular anastomoses between the obturator artery and the external iliac or inferior epigastric arteries [4]. This aberrant obturator artery partially encircles the neck of a hernia sac and could be injured during femoral hernia repair or while exposing the Cooper's ligament from the areolar connective tissue. Orthopedic surgeons operating around the superior pubic ramus may fail to ligate them as they retract back into the obturator canal after being injured. Surgeons must be conscious of an unexpected iliopubic vessel and take

appropriate precautions to avoid injury to these vascular channels. This study was conducted with an objective to evaluate the incidence of variable origin of obturator artery and to describe their relevance in surgical practices.

Materials and Methods

The present study was conducted in the department of Anatomy, M.R.A. Medical College Ambedkar Nagar U.P. and Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, U.P. India, during routine dissection. The study was performed using formalin fixed human pelvis (n=84, male pelvis-51, female pelvis-33). The pelvis selected for this study comprised of both complete pelvis (n=31) and hemi-pelvis (n=22). The branches of the internal and external iliac artery were dissected. The obturator artery was identified and traced from its origin to its exit, through the obturator canal. The course of artery and its relation to surrounding structures were noted. Variations of obturator artery was carefully recorded and photographed.

Results

In present study we found that obturator artery had a variable origin in 27 pelvises (32.1%), right side it was 43.9% and on left side 20.9%. We observed the different types origin of obturator artery from external and internal iliac artery, from anterior division of IIA in 67% of specimens, posterior division in 3.5%, inferior gluteal artery in 4.7% [figure4], direct branch from EIA in 5.9% [figure1], common trunk for OBA and IEA in 10.7% [figure2] and inferior epigastric in 7.1% [figure3] are given in table1.

Discussion

The superior border of the iliopubic ramus is an area of considerable concern for a variety of surgical sub specialists, as it serves as an anchoring site for inguinal and femoral hernia repairs reported by Gilroy et al [5]. The most common type of variation is anastomosis between OBA of internal iliac artery origin & inferior epigastric of external iliac origin. Out of these only in 30% of cases this anastomoses opens up to become accessory obturator artery,

replacing the normal branch from internal iliac artery studied by Bergman et al [6]. The embryological explanations for such anomalies which affect the arterial patterns of the limbs are based on an unusual selection of channels from a primary capillary plexus wherein the most appropriate channels enlarge while others retract and disappear, thereby establishing the final arterial pattern reported by Arey in 1963 and Fitzgerald in 1978 [7,8]. The OBA arises comparatively late in development as a supply to a plexus which in turn is joined by the axial artery of lower limb that accompanies the sciatic nerve studied by Sanudo et al [9]. The origin of OBA from the posterior division of IIA is due to vascular channels in relations to the posterior division that might have resulted in giving rise to OBA, whereas the vascular channels related to the anterior division of the internal iliac artery destined for the OBA got obliterated reported by Kumar & Rath in 2007 [10]. The parietal branches of OBA are important collaterals in aortoiliac and femoral arterial occlusive diseases. Tracing along the

aberrant vessels can easily identify the obturator foramen, which is an anatomic landmark that indicates an adequate inferior dissection of the preperitoneal space studied by Lau H & Lee F [11]. In the cases of ligation of internal iliac arteries and their branches in women undergoing pelvic surgery, on postoperative angiography, it is seen that collateral channels start functioning soon after surgery reported by Chiat et al [12].

Conclusion

The present study describe variations in origin of the obturator artery that could be a cause of serious problem because of unexpected presence of the variant vessels in the retro pubic region can become a matter of great concern to orthopaedic surgeons, urologists, gynaecologists and general surgeons.

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Table 1: The different types of origin of obturator artery from external and internal iliac artery.

Artery	Male		Female		Total No. (84)	Percentage (%)
	Right (25)	Left (26)	Right (16)	Left (17)		
Internal Iliac: Anterior Division	14	20	9	14	57	67.8%
Other than Anterior Division of IIA	11	6	7	3	27	32.1%
Posterior Division:	1	0	1	1	3	3.5%
Inferior Gluteal	2	1	1	0	4	4.7%
External Iliac: Direct branch	3	1	1	0	5	5.9%
Common Trunk for OBA & IEA	3	2	3	1	9	10.7%
Inferior Epigastric	2	2	1	1	6	7.1%

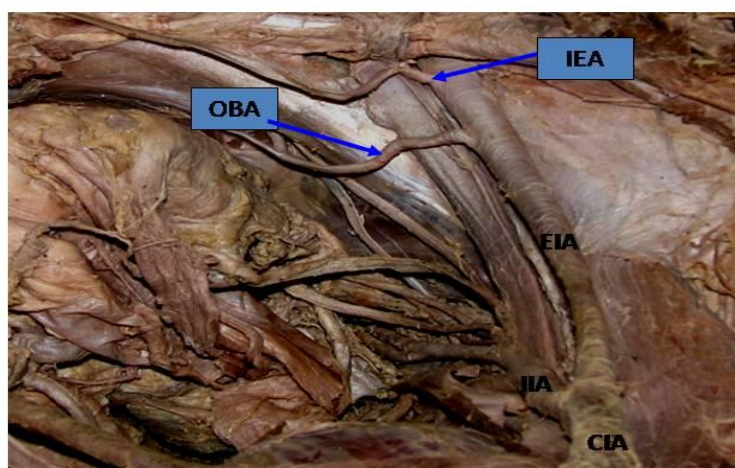


FIG1- right sided pelvis shows origin of right sided obturator artery directly from EIA (CIA- Common Iliac Artery, EIA - External Iliac Artery, IEA- Inferior Epigastric Artery, OBA- Obturator Artery).

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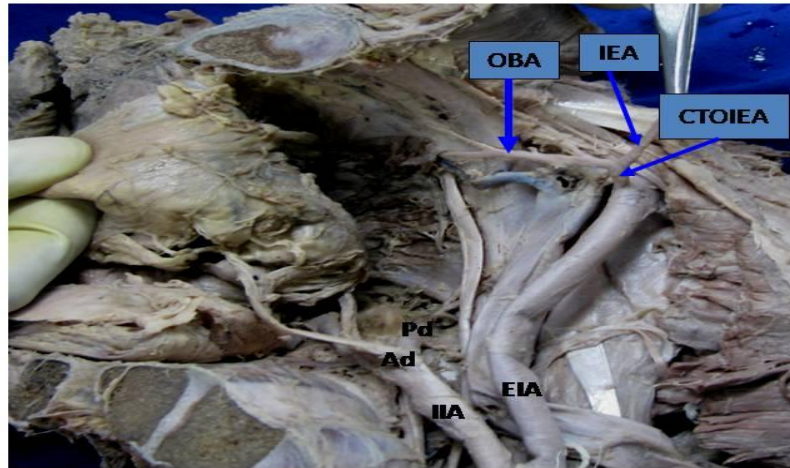


FIG-2-right sided pelvis shows origin of obturator artery from a common trunk (CT), which also gives origin of inferior epigastric artery (IEA). (OBA- Obturator artery, Ad- Anterior division, Pd- Posterior division of IIA- internal Iliac Artery).

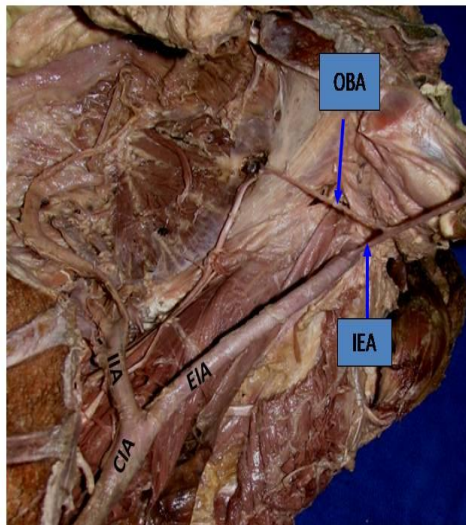


FIG-3- Left sided pelvis shows origin of obturator artery from inferior epigastric artery. (CIA- Common Iliac Artery, OBA-Obturator Artery, IEA- Inferior Epigastric Artery, EIA- External Iliac Artery, IIA- Internal Iliac Artery).

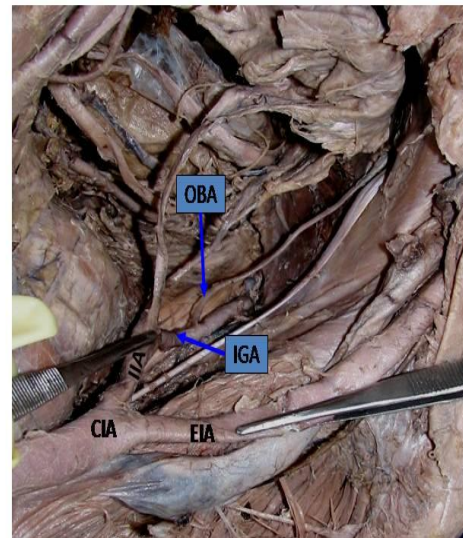


FIG-4 Right sided pelvis shows origin of obturator artery from inferior gluteal artery. (IIA- Internal Iliac Artery, OBA- Obturator Artery , CIA- Common Iliac Artery, EIA- External Iliac Artery, IGA- Inferior Gluteal Artery).