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Case Report

Anatomy Section

Aberrant Origin of Obturator Artery- A Case Report

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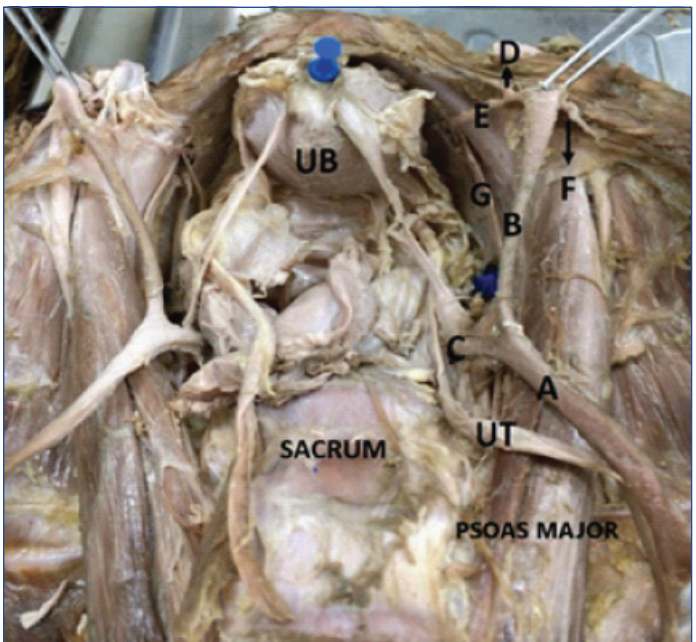
ABSTRACT

The medial compartment of thigh is nourished by a branch from anterior division of internal iliac artery called Obturator Artery (OA). However, many studies have documented variation in the origin of the artery from other neighboring vessels. Hence, any deviation from the normal pattern should be acknowledged to prevent any injuries during herniorrhaphy or other pelvic procedures. The study was conducted on a pelvis of female cadaver of age 55 years. Length of the artery and its distance from the bifurcation of common iliac artery using the measuring tape were noted. OA was seen to be originating from the inferior epigastric artery bilaterally along with several unusual but significant branches budding from it. The case report shows variant of OA which is of academics interest to students, anatomists, radiologist, general and orthopedic surgeons. Further dissection of more number of pelvic specimens might help to assess the frequency or prevalence of the variation.

Keywords: External iliac artery, Herniorrhaphy, Inferior epigastric, Pelvis, Reconstruction

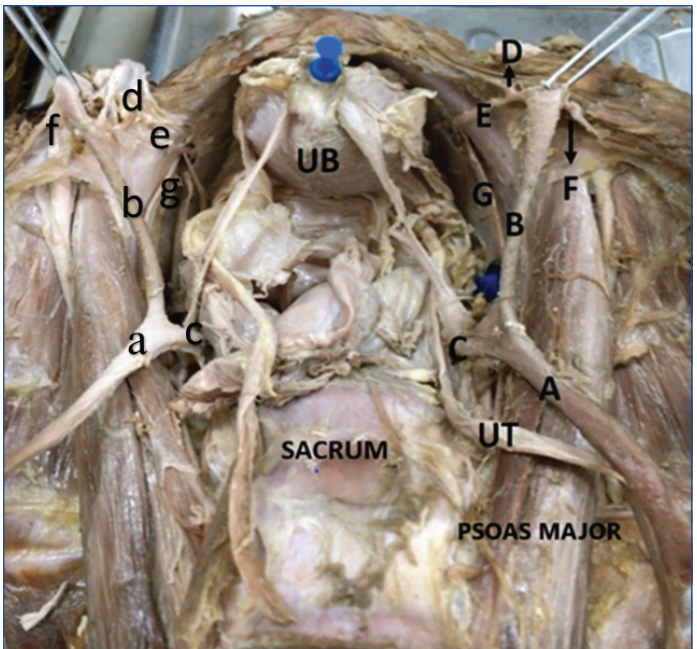
CASE REPORT

During routine dissection of pelvis of one adult female cadaver of 55 years for teaching undergraduate students in dissection hall of Lady Hardinge Medical College, Delhi; on the right hand side it was obseved that [Table/Fig-1] external iliac artery gave rise to two branches-deep circumflex iliac artery laterally at a distance of 7.8 cm from the point of bifurcation of common iliac artery. At the same level, a medial branch (inferior epigastric artery) was given off which after coursing for 2 cm bifurcated to give inferior epigastric artery proper and a large variant obturator artery. The artery coursed downwards, forwards and medially along the posterior surface of superior ramus of pubis for 5 cm. It then terminated by supplying the adductor compartment of thigh after passing through the obturator canal. At its exit, it was related to obturator vein and obturator nerve medially.



[Table/Fig-1]: Obturator artery seen arising from inferior epigastric artery on right-side. A) Common iliac artery; B) External Iliac Artery; C) Internal iliac artery; D) Inferior epigastric artery; E) Obturator artery; F) Deep circumflex iliac artery; G) Obturator nerve, UB: Urinary bladder; UT: ureter.

Similarly, on the left-side [Table/Fig-2], the external iliac artery gave two branches-deep circumflex iliac artery laterally at a distance of 6.1 cm from the point of bifurcation of common iliac artery and a medial branch (inferior epigastric artery) was given off 3.2 cm proximal to the lateral branch which after coursing for 1.7 cm bifurcated to give inferior epigastric artery proper and a large variant obturator artery. This 4.5 cm long variant obturator artery while coursing downwards, forwards and medially gave rise to 2-3 pubic branches; just before leaving the pelvic cavity through obturator canal the artery gave superior peritoneal branch and an inferior vaginal branch, and it itself terminated by supplying the medial compartment of thigh.



[Table/Fig-2]: Showing origin of obturator artery from inferior epigastric artery on left-side. a): Common iliac artery; b): External Iliac Artery; c): Internal iliac artery; d): Inferior epigastric artery; e): Obturator artery; f): Deep circumflex iliac artery; g): Obturator nerve, UB: Urinary bladder; UT: ureter.

Throughout its course, both right and left variant of obturator artery were related to obturator internus and its fascia laterally and ureter medially. The internal iliac artery, obturator vein and obturator nerve displayed normal anatomy.

DISCUSSION

In lateral wall of pelvis, a branch from anterior divison of internal iliac artery called obturator artery is present which courses downwards and forwards to reach the superior margin of obturator foramen. It then exits the pelvic cavity through obturator canal dividing into ventral and dorsal branches. However, many have documented variation in the origin of the artery from other neighboring vessels. Hence, any deviation from the normal pattern should be acknowledged and reported as the organs within the pelvis are confined within the limited space and any major surgical intervention requires ligation of the supplying arteries and veins and also to prevent any injuries during herniorrhaphy or other pelvic procedure. As reported earlier, in 41.4% cases OA arises from common iliac or ventral division of internal iliac artery, in 10% cases from superior gluteal artery, in 25% cases from inferior epigastric artery, in 4.7% cases from inferior gluteal artery and in 1.1% cases from external iliac artery [1].

The embryological basis for any vascular anomalies of the limb depends on the conduit selected from a main network of capillary whereby the best arterial conduit expands while some pull back and the result of such mechanism decides the final vascular fate of each artery [2,3]. In case of obturator artery, irregular inosculation between external and internal iliac artery has resulted in its formation, hence variations are commonly noticed in it [4,5].

Biswas S et al., reported anomalous origin of obturator artery from inferior epigastric artery in 23.2% cases, from superior gluteal artery in 16% cases, from posterior division of internal iliac artery in 12.5% cases, and directly from external iliac artery in 3.5% cases [4]. Variability pattern of the obturator artery as proposed by Sanduno JR et al., a) The obturator artery arises from the anterior division of the internal iliac artery (most common); b) The obturator artery arises from the inferior epigastric artery; c) The obturator artery is a branch of the posterior division of the internal iliac artery; d) The obturator artery arises from the internal iliac artery above its final branching; e) The obturator artery arises from the external iliac artery; f) The obturator artery arises from the femoral artery (least common) [6].

Kumar D and Rath G observed left obturator artery originating from dorsal division of internal iliac artery in one out of 316 cases and similar results were also found in the study of Rajive AV and Pillay M [7,8]. Vishnumukkala Tr et al., reported in 16 specimens (35.55%) obturator artery was a straight branch from ventral division of the internal iliac artery, in six specimens (13.33%) from common trunk of inferior gluteal and internal pudendal artery from the inferior epigastric artery in 12 specimens (26.66%) [5]. In some cases, an accessory obturator artery is seen supporting the normal obturator artery which forms a network of anastomosis at level of obturator canal known as “corona mortis” or “crown of death” [9,10]. The oncological surgeons performing pelvic lymphadenectomy in and around obturator canal and paravesical spaces must be aware of such aberrant retropubic vessels which may serve as a source of potential hemorrhage. Evolvement of minimally invasive surgeries has helped urogynaecologists perform scarless procedures for repairing prolapse of pelvic visceras by using obturator membrane as transfixator for supporting the mesh [11].

In our case report, obturator artery was seen originating from inferior epigastric artery bilaterally. The artery gave rise to several unnamed pubic branches, superior peritoneal branch and large inferior vaginal artery. These branches may form an important collateral channel in aortoiliac femoral arterial occlusive diseases. Thereby an alternative circulation pathway can be maintained whenever there is decrease blood flow to the head of femur leading to its ischemic necrosis. The Orthopedic Surgeons should take special precautions while carrying out modified Stoppa method for operating on the acetabular cavity through superior pubic ramus [12]. Emergency CT scans performed by radiologists should be acquainted of such variations to avoid misdiagnosis by surgeons and help them in better and safer planning of surgeries.

To further assess the frequency of variation from other neighboring arteries detailed dissection of more number of specimens is required.

CONCLUSION(S)

Knowledge of presence of OA is of academic interest to students and anatomists as well as very useful in management of femoral hernia and pelvic surgeries during ligation or to avoid any serious complications. Branches of obturator artery also supply neck of femur; hence any variant pattern might also help orthopedic surgeons in planning surgeries.

REFERENCES

[1] Bergman RA, Thompson SA, Afifi AK, Saadeh FA. Compendium of human anatomic variations: Catalog, Atlas and World literature. Baltimore and Munic: Urban and Schwazenberg; 1988.
[2] Arey LB. The Peripheral Blood Vessels. Baltimore: Williams & Wilkins; 1963. The development of peripheral blood vessels. In: Orbison JL, Smith DE (editors) Pp. 1-16.
[3] Fitzerald MJT. Human Embryology. New York: Harper International; 1978. Pp. 38-56.
[4] Biswas S, Bandopadhyay M, Adhikari A, Kundu P, Roy R. Variation of origin of obturator artery in Eastern Indian population- A study. J Anat Soc India. 2010;59(2):168-72.
[5] Vishnumukkala Tr, Yalakurthy S, Raj SJD. An anomalous origin of obturator artery and its clinical importance in humans. Int J Anat Res. 2013;01:02-06.
[6] Sanduno JR, Roig M, Rodriguez Aferreira B, Domenech JM. Rare origin of the obturator artery, inferior epigastric and femoral arteries from a common trunk. J Anat. 1993;183:161-63.
[7] Kumar D, Rath G. Anomalous origin of obturator artery from the internal iliac artery. Int J Morphol. 2007;25(3):639-41.
[8] Rajive AV, Pillay M. A study of variations in the origin of obturator artery and its clinical significance. J Clin Diagn Res. 2015;9:12-15.
[9] Pai MM, Krishnamurthy A, Prabhu LV, Pai MV, Kumar SA, Hadimani GA. Variability in the origin of the obturator artery. Clinics (Sao Paulo). 2009;64(9):897-901.
[10] Satheesha Nayak B. Presence of abnormal obturator artery and an abnormal venous plexus at the anterolateral pelvic wall. OA Case Reports. 2014;3(5):49.
[11] Perandini S, Perandini A, Puntel G, Puppini G, Montemezzi S. Corona mortis variant of the obturator artery: A systematic study of 300 hemipelvises by means of computed tomography angiography. Pol J of Radiol. 2018;83:640-44.
[12] Darmanis S, Lewis A, Mansoor A, Bircher M. Corona mortis: An anatomical study with clinical implications in approaches to the pelvis and actabulum. Clin Anat. 2007;20(4):433-39.

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