

Variant branching pattern of the posterior division of internal iliac artery: a case report

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Introduction

Internal iliac artery (IIA) is a branch of the common iliac artery arising at the level of the lumbosacral intervertebral disc anterior to the sacroiliac joint. Obturator artery, a branch of the anterior division of the internal iliac artery normally runs anteroinferiorly on the lateral pelvic wall to the upper part of the obturator foramen and leaves the pelvis via the obturator canal, where it divides into anterior and posterior branches to supply the medial compartment of the thigh (1). The anomalous origin of obturator artery has been documented in 41.4% of cases from the common iliac or anterior division of the internal iliac, in 25% from the inferior epigastric, in 10% from the superior gluteal, in 10% from inferior the gluteal/internal pudendal trunk, in 4.7% from the inferior gluteal, in 3.8% from the internal pudendal and in 1.1% from the external iliac artery (2). In very rare occasions, it may arise from the posterior division of the internal iliac artery (3). Inferior gluteal artery is a branch of the anterior division of the internal iliac artery and passes below the ventral ramus of the first sacral nerve, then between the piriformis and coccygeus and enter the gluteal region through the greater sciatic foramen. The origin of inferior gluteal artery from a common trunk with the superior gluteal artery is common but not from the posterior division of the internal iliac artery (1, 2).

Case Report

The variation was observed during routine dissection of a 60-year old male cadaver in the dissection hall of the Department of Anatomy, Yenepoya Medical College, Mangalore, India. The posterior division of

the internal iliac artery gave its usual branches such as iliolumbar, lateral sacral and superior gluteal arteries. The posterior division was terminated by superior and inferior gluteal arteries with ventral ramus of first sacral nerve descending between them. The obturator artery was arising close to the bifurcation of posterior division of the internal iliac artery (**Figure**). The obturator artery was descending inferolateral (deep) to the internal iliac vein, in the lateral pelvic wall and was crossed by the ureter as well as ductus deferens on its medial side. The obturator artery coursed downward and forward, deep to the internal pudendal artery. Further the course and relations of the artery was normal. The branching pattern of the obturator artery was normal.

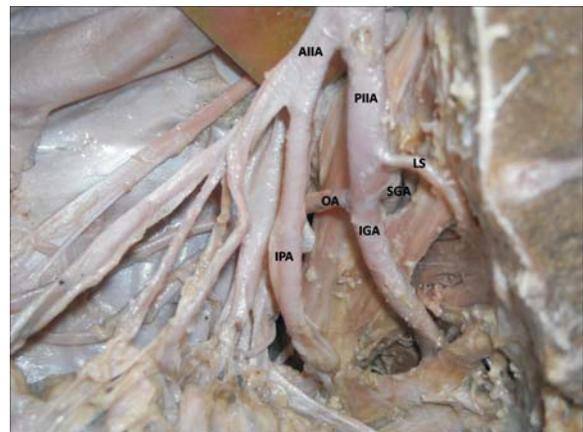


Figure: Showing the anomalous branches from posterior division of internal iliac artery.

Abbreviations: AIIA, Anterior division of internal iliac artery; PIIA, Posterior division of internal iliac artery; IGA, Inferior gluteal artery; SGA, Superior gluteal artery; OA, Obturator artery; LS, Lateral sacral artery; IPA, Internal pudendal artery.

Discussion

The obturator artery has been documented to be arising from all possible neighboring arteries. Obturator artery arising from the posterior division of the internal iliac artery can occur in only 3.28 % of cases in western population (4). The relevance of this paper is to draw attention to those engaged in interventional maneuver into the human pelvis, as a variant obturator vessel can be inadvertently cut resulting serious complications (5). The anatomy of the obturator artery in the pelvis makes this vessel and its branches prone to iatrogenic injury during pelvic surgeries (6). Ischemic necrosis of the head of the femur following decreased blood flow through obturator artery (in case of obstruction of either anterior or posterior division of the internal iliac artery) bypass grafting is considered. In such cases to avoid complications during surgery the radiologists and pelvic surgeons should be aware of this variation. The obturator artery arises comparatively late in development from a plexus which in turn is joined by the axial artery of lower limb that accompanies the sciatic nerve (7). It is currently accepted that the anomalies affecting the arterial patterns of the limbs are based on an unusual selection of channels from primary capillaries. The most appropriate channel enlarges, whilst others retract and disappear, thereby establishing the final arterial pattern classified as “normal” (8). Surgeons operating on the lower abdomen and pelvis often retract the abdominal muscles laterally placing pressure on the lateral pelvic walls. Thus, a complete understanding of the anatomy of this area is critical (9).

In this case, persistence of vascular channels related to the posterior division might have resulted in giving rise to obturator artery; whereas the vascular channels related to the anterior division of the internal iliac artery destined for the obturator artery got obliterated. The present case was different from the other case reports in that the inferior gluteal artery was also originated from the posterior division of internal iliac artery.

References

1. Standring S. Gray's anatomy. 39th ed. London: Elsevier Churchill Livingstone; 2005. p.1101, 1361.
2. Bergman RA, Thompson SA, Afifi AK, Saadeh FA. Compendium of human anatomic variations. Munich: Urban and Schwarzenberg; 1988. p. 84.
3. Kumar D, Rath G. Anomalous origin of obturator artery from the internal iliac artery. *Int J Morphology*, 2007; **25**: 639-41.
4. Pick JW, Anson B, Ashley FL. The origin of the obturator artery. *Am. J. Anat*, 1942; **70**: 317-43.
5. Jakubowicz M, Czarniawska-Grzesińska M. Variability in origin and topography of the inferior epigastric and obturator arteries. *Folia Morphol (Warsz)*, 1996; **55**: 121-6.
6. Lorenz, Jonathan M. Leef, Jeffrey A. Seminars in Interventional Radiology. *Case-Based Interventional Radiology*, 2007; **24**(1): 68-71.
7. Sanduno JR, Roig M, Rodriguez A, Ferreira B, Domenech JM. Rare origin of the obturator artery, inferior epigastric and femoral arteries from a common trunk. *J Anat*. 1993; **183**(Pt 1): 161-3.
8. Fitzgerald MJT. Human embryology. New York: Harper & Row; 1978; p.38-56.
9. Gilroy AM, Hermey DC, Dibenedetto LM, Marks SC Jr., Page DW, Lei QF. Variability of the obturator vessels. *Clin Anat*, 1997; **10**: 328-32.