Mediterranean Journal of Basic and Applied Sciences (MJBAS)
Volume 10, Issue 2, Pages 520-527, April-June 2026

A typical Unilateral Origin of Obturator Artery from Posterior Division of Right Internal Iliac Artery in an Adult Black African Male Cadaver of a Kenyan Population, its Embryological Relationship and Clinical Significance: A Case Report

Khisa Wanjala Allan[1*], Ayonga Warren Oyale[2], Aswani Clevin[1], Uluma Wanjala Edwin[2], Libamila Hans Lwunza[3], Papa Stella Imade[3], Odhiambo Zablon[2], Mutai Peter[2], Maina Derrick[2] & Anthony Ngugi[2]

[1]Department of Clinical Medicine, School of Health Sciences, Karatina University, P.O. Box 1957-10101, Karatina, Nyeri, Kenya. [2]Department of Human Anatomy, School of Medicine, Maseno University, P.O. Box 3275-40100, Kisumu, Kenya. [3]Department of Clinical Medicine, School of Health Sciences, Kaimosi Friends University, P.O. Box 385-50309, Kaimosi, Vihiga, Kenya. Email: allanwanjala345@gmail.com[*]

DOI: https://doi.org/10.46382/mjbas.2026.10232

Article Received: 06 June 2026 *Article Accepted: 27 June 2026* *Article Published: 02 July 2026*

ABSTRACT

Introduction: The obturator artery is typically a branch of the anterior division of the internal iliac artery, supplying the medial compartment of the thigh. However, variations in its origin are common due to the complex embryological development of the pelvic vasculature and may have important clinical implications during pelvic procedures.

Objectives: To describe an unusual origin of the obturator artery in a Kenyan cadaver, highlight its anatomical course and discuss its embryological and clinical significance. Findings: During routine cadaveric dissection of an adult Black African male, the obturator artery was observed arising from the posterior division of the right internal iliac artery as a terminal branch. It coursed along the lateral pelvic wall and entered the obturator canal in close relation to the obturator nerve superiorly and obturator vein inferiorly. The left obturator artery exhibited normal anatomy arising from the anterior division of the internal iliac artery.

Conclusion: The obturator artery may present rare anatomical variations, including origin from the posterior division of the internal iliac artery. Such variations reflect embryological persistence of primitive vascular channels and are clinically significant due to the risk of iatrogenic injury during pelvic surgeries and interventions.

Recommendations: Increased awareness of pelvic vascular variations is essential among clinicians and surgeons. Preoperative imaging is recommended in complex pelvic procedures, and further cadaveric studies in African populations are necessary to document the prevalence and patterns of such variations.

Keywords: Obturator Artery; Internal Iliac Artery; Anatomical Variation; Pelvic Vasculature; Cadaveric Study; Kenya; Black Africa; Population; Compartment; Aberrant and Embryological.

1.0. Introduction

Obturator artery is a branch of internal iliac artery which plays a crucial role in supplying blood to muscles of medial compartment of the thigh (Thampi et al., 2021; Zaunbrecher & Samra, 2023). It typically arises from anterior division of internal iliac artery along with superior and inferior gluteal arteries. It then courses inferolateral towards the obturator foramen (Thampi et al., 2021). The obturator artery gives off several branches as it courses which includes pubic, anterior and posterior branches. Whereby the pubic supplies blood to pubic region, anterior to adductor muscles of medial compartment of the thigh while posterior supplies obturator externus and hip joint which is a normal anatomy.

Even though obturator artery originates from internal iliac artery in majority of the population, variations in origin have been reported in anatomical studies. Here listed are some of the common variations; Origin from inferior epigastric artery also known as epigastric origin of obturator artery (Lee et al., 2013; Rajive & Pillay, 2015), origin from external iliac artery just before entering the pelvis commonly known as aberrant origin of obturator artery (Pai et al., 2009) and double origin where obturator artery originates from both internal and external iliac arteries a variation mostly known as double origin of obturator artery (Sañudo et al., 2011).

The obturator artery has an interesting embryological origin because it shows considerable variation due to the complex development of the pelvic arterial system. During embryogenesis, the blood supply to the lower limb and pelvis develops from a primitive vascular plexus derived mainly from the umbilical artery system and branches of the posterior division of the internal iliac artery (Qazi et al., 2022). This is marked by the following stages: Primary vascular source (early stage): Initially, the umbilical artery gives off a ventral branch that contributes to the blood supply of the developing lower limb bud. This early vessel system forms a plexiform network around the pelvic region (MacLennan, 2012). Formation of the external iliac system: As development progresses, the external iliac artery enlarges and becomes the dominant supply to the lower limb. It gives rise to the femoral artery, which takes over major limb perfusion. Development of obturator artery: The obturator artery typically develops as a branch of the anterior division of the internal iliac artery. It arises from the pelvic vascular plexus, particularly from channels associated with the umbilical artery remnants. Collateral anastomoses and variations: A key embryological feature is the development of an anastomosis between the external iliac system (via the inferior epigastric artery) and the internal iliac system (via obturator branches). The obturator artery may therefore originate from Internal iliac artery (usual pattern), Inferior epigastric artery (aberrant/accessory obturator artery) due to persistence of this anastomotic channel and occasionally from a common trunk with inferior epigastric artery. Regression and persistence: Normally, the internal iliac-derived channel predominates, while the external iliac connection regresses. If the external iliac contribution persists, it results in the "aberrant obturator artery" or corona mortis variant (clinically important in pelvic surgery).

These variations in the origin of obturator artery are important to be aware of as they have surgical implications of the pelvic region or may also be a source of anomalous blood supply to muscles of the medial thigh. Therefore, clinicians and surgeons need to have knowledge about these variations to prevent unnecessary injuries to blood vessels during surgical procedures. Most studies on variations of origin of obturator artery have focused more on non-African populations. This is most likely because of insufficient studies in most African regions which perpetuates limited data on these variations that may lead to increased risk in prevalence of iatrogenic injuries in these regions.

1.1. Study objectives

The present study therefore sought to:

1) Expose the obturator artery, determine its course and anatomical relations. 2) Examine the origin of obturator artery. 3) Determine the embryological relationship with its evident anatomical variation. 4) Establish its clinical significance.

2.0. Methodology

The obturator artery was exposed through a routine pelvic cadaveric dissection performed on an embalmed adult Black African male cadaver preserved using formaldehyde, phenol, alcohol and glycerine. The cadaver was placed in supine position and a midline incision was made along anterior abdominal wall extending from xiphoid process to pubic symphysis. The skin, superficial fascia and abdominal muscles including external oblique, internal

oblique, transversus abdominis and rectus abdominis muscles were carefully reflected to expose peritoneal cavity. The intestines and associated mesentery were displaced superiorly to provide a clear view of posterior abdominal wall and pelvic cavity.

The abdominal aorta was identified and traced inferiorly to its bifurcation into right and left common iliac arteries. Further dissection revealed division of right common iliac artery into external and internal iliac arteries at pelvic brim. Using blunt and sharp dissection techniques, connective tissue, fat and fascia surrounding pelvic vessels were carefully removed to expose branching pattern of internal iliac artery. The anterior and posterior divisions of internal iliac artery were identified and followed along their courses within the pelvis.

During dissection, the obturator artery was observed arising abnormally as a terminal branch from the posterior division of the right internal iliac artery instead of the usual anterior division. The artery was then traced along lateral pelvic wall towards the obturator canal. Further careful dissection exposed its anatomical relations, revealing the obturator nerve superiorly and the obturator vein inferiorly as the structures accompanied the artery through the obturator canal. The left obturator artery was also examined and found to have a normal origin from anterior division of internal iliac artery, confirming that the variation was unilateral.

The exposed vessels and surrounding structures were cleaned thoroughly to improve visualization and allow accurate identification of vascular variation. Photographic documentation was then performed to capture the branching pattern and anatomical relations of obturator artery. This detailed dissection was significant because it demonstrated a rare variation in origin of obturator artery, which has important embryological and clinical implications. Knowledge of such variations is essential during pelvic surgeries, orthopaedic procedures, hernia repairs and radiological interventions to reduce the risk of accidental vascular injury and severe haemorrhage.

3.0. Findings

It was noted that right obturator artery originated from posterior division of right internal iliac artery as a terminal branch, rather than the typical anterior division. It then passed along the lateral pelvic wall, coursed anteriorly into obturator canal accompanied by obturator nerve superiorly and obturator vein inferiorly while the left side had a normal anatomy.

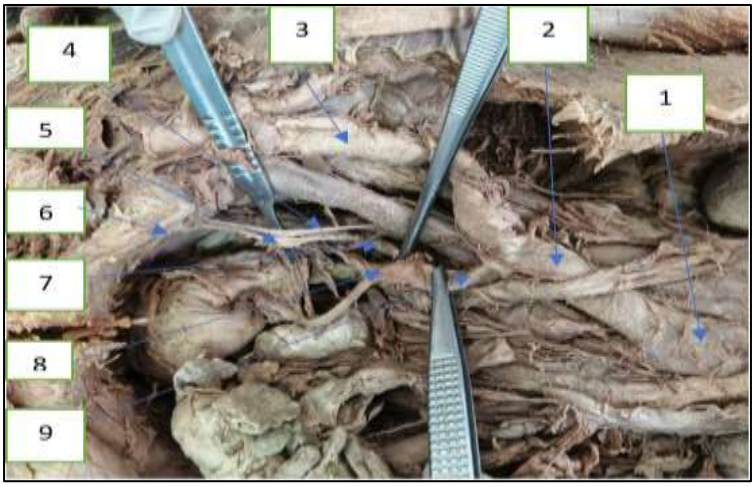

Figure 1. Shows the branching pattern of Internal iliac artery into anterior and posterior divisions.

KEY: *1-abdominal aorta, 2- right common iliac artery, 3- right external iliac artery, 4-obturator nerve, 5-obturator artery, 6-pelvic wall, 7-posterior division of right internal iliac artery, 8- anterior division of right internal iliac artery and 9- right internal iliac artery.*

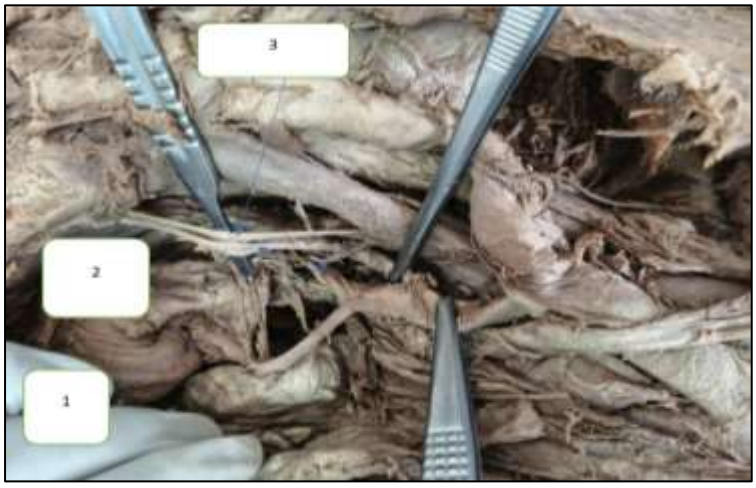

Figure 2. Shows anatomical relationship of obturator artery to obturator nerve and obturator vein.

KEY: *1-Obturator vein, 2- Obturator artery and 3- Obturator nerve.*

Figure 3. Branching pattern of right common iliac artery into external iliac artery and internal iliac artery.

KEY: *1-Right common iliac artery, 2- External iliac artery and 3- Internal iliac artery.*

4.0. Discussion

The obturator artery typically arises from the anterior division of the internal iliac artery and courses along the lateral pelvic wall to reach the obturator canal, where it accompanies the obturator nerve and vein. During its course, (Sakthivel et al., 2022) notes that a normal obturator artery gives off a pubic branch which passes above the pubic ramus and anastomoses with the pubic branch of the inferior epigastric artery before entering the obturator canal (Simm, 2025). Its origin and course is associated with a high frequency of variation which could have both positive and negative impact on the affected body parts (Sume & Mulu, 2023). In the present case, however, the artery originated as a terminal branch of the posterior division on the right side, representing a notable deviation

from classical descriptions. From a gross anatomical perspective, this variation is clinically significant because the posterior division is primarily associated with parietal branches supplying the pelvic wall and gluteal region, rather than visceral branches such as the obturator artery. The observed course, tracking along the lateral pelvic wall and entering the obturator canal in close relation to the nerve superiorly and vein inferiorly remains consistent with its usual distal pathway, suggesting that the variation is limited to its origin rather than its distribution. Such deviations are well documented but relatively uncommon, with reported prevalence varying between populations, and are particularly important in pelvic surgeries, orthopedic procedures, and hernia repairs due to the risk of inadvertent vascular injury (Standring, 2021).

Embryologically, the variation can be explained by the complex development of the pelvic arterial system from a primitive capillary plexus derived from the dorsal aorta. During normal development, selective enlargement and regression of vascular channels result in the definitive branching pattern of the internal iliac artery, with the obturator artery usually persisting from channels associated with the anterior division. In this case, persistence of a vascular channel linked to the posterior division, coupled with regression of the typical anterior division connection, likely accounts for the anomalous origin. This reflects the inherent plasticity of embryonic vascular remodeling, where minor shifts in hemodynamic dominance can lead to significant anatomical variation in adulthood. Recent anatomical and radiological studies have emphasized that such variants are not merely incidental findings but may correlate with altered pelvic hemodynamics and surgical risk profiles, particularly in procedures involving the pelvic brim and obturator foramen (Šaherl & Rakuša, 2022). Therefore, recognition of this variation underscores the need for careful preoperative imaging and anatomical awareness to minimize complications during pelvic interventions.

Furthermore, (Granite et al., 2020) highlights that aberrant or variant obturator arteries are those that originate from the external iliac arteries which is mostly dangerous because of the increased risk of ligation and injury during surgical intervention or pelvic fractures (Zaunbrecher & Samra, 2023). On the other hand, ligation after surgery may not be done well as a result of the variation leading to pronounced bleeding which can be fatal. In most cases, it leaves the pelvic region through the obturator canal accompanied by the obturator vein inferiorly and the nerve superiorly terminating by dividing into anterior and posterior branches (Thampi et al., 2021). Although the study notes that their occurrence is common in human anatomy, it emphasizes on the importance of the knowledge mostly to health care providers and surgeons hence proper ligation of the arteries to avoid fatal accidents.

5.0. Conclusion and Future Recommendations

This case report describes a rare variation of the obturator artery arising from the posterior division of the right internal iliac artery in an adult Black African male cadaver from a Kenyan population, deviating from its typical origin in the anterior division. The finding reflects the embryological persistence of variable pelvic vascular channels and highlights the complex development of the internal iliac arterial system. Clinically, such variations are important as they may increase the risk of inadvertent vascular injury during pelvic and obturator region surgeries, emphasizing the need for careful anatomical awareness among clinicians and surgeons. Additionally, this report contributes valuable population-specific anatomical data from Africa, where such studies remain

limited, reinforcing the importance of continued regional cadaveric research to improve surgical safety and anatomical understanding.

Based on the findings of this case report, the following recommendations are made:

1. Enhanced anatomical awareness in clinical practice to reduce the risk of inadvertent vascular injury during pelvic and lower abdominal procedures.
2. Routine consideration of vascular variations in preoperative planning to identify atypical vascular patterns.
3. Strengthening cadaveric anatomical research in African populations to document vascular variations within African populations, as current literature is predominantly based on non-African data.
4. Integration into medical education should be emphasized in undergraduate and postgraduate anatomy curricula to improve clinical preparedness among healthcare trainees.
5. Further research should be conducted to determine the prevalence, patterns, and clinical implications of obturator artery variations in different populations.

Declarations

Source of Funding

This study did not receive any kind of funding.

Competing interests' statement

Authors declare no competing interests.

Consent for publication

All authors consented for publication.

Authors contributions

All authors contributed in enrichment of this publication.

Availability of data and material

All data and materials that were used in development of this manuscript is available at the human anatomy laboratory of Maseno university.

Institutional review board statement.

Not applicable to this study.

Ethical approval

This study was conducted using a formalin-fixed human cadaver obtained for educational and research purposes within the Department of Human Anatomy, Maseno University. Ethical approval for the use of cadaveric material is granted under institutional guidelines governing anatomical dissection and teaching. All procedures were carried out in accordance with established ethical standards for the handling of human remains, ensuring respect, dignity and confidentiality of donor identity at all times. No identifying personal information was accessed or recorded

during the study. The cadaver was used strictly for academic and scientific purposes, with adherence to the principles of beneficence, respect for human dignity and responsible use of donated bodies in medical education and research. The authors affirm compliance with all relevant institutional and national regulations governing cadaveric studies.

Acknowledgement

The authors sincerely acknowledge the Department of Human Anatomy, School of Medicine, Maseno University, for providing the facilities and support that made this cadaveric study possible. Great thanks to prof. Marera for your outstanding support during development of this manuscript. We are grateful to the technical staff and laboratory attendants for their assistance during the dissection sessions and for ensuring proper maintenance of the anatomical specimens. We also extend our appreciation to the faculty members from the Department of Clinical Medicine, Karatina University and Kaimosi Friends University, for their valuable academic input and continuous encouragement throughout the preparation of this manuscript. Finally, we recognize the silent generosity of the body donor whose contribution to medical education and scientific advancement made this study possible.

Declaration of artificial intelligence

Artificial intelligence (AI) tools were used solely for language editing, sentence restructuring, and improvement of manuscript readability. No AI tool was involved in data collection, data analysis, or generation of scientific conclusions. The authors critically reviewed and verified all content before submission.

References

Granite, G., Meshida, K., & Wind, G. (2020). Frequency and clinical review of the aberrant obturator artery: A cadaveric study. Diagnostics, 10(8): 546. https://doi.org/10.3390/diagnostics10080546.

Lee, E.Y., Kim, J.Y., Kim, H.N., Sohn, H.-J., & Seo, J.H. (2013). Variant origin of obturator artery: A branch of inferior epigastric artery from external iliac artery. Korean Journal of Physical Anthropology, 26(3): 125–130.

MacLennan, G.T. (2012). Hinman's atlas of urosurgical anatomy. Elsevier Health Sciences.

Pai, M.M., Krishnamurthy, A., Prabhu, L.V., Pai, M.V., Kumar, S.A., & Hadimani, G.A. (2009). Variability in the origin of the obturator artery. Clinics, 64(9): 897–901. https://doi.org/10.1590/s1807-59322009000900015.

Qazi, E., Wilting, J., Patel, N.R., Alenezi, A.O., Kennedy, S.A., Tan, K.T., Jaberi, A., & Mafeld, S. (2022). Arteries of the lower limb—embryology, variations, and clinical significance. Canadian Association of Radiologists Journal, 73(1): 259–270. https://doi.org/10.1177/08465371211020140.

Rajive, A.V., & Pillay, M. (2015). A study of variations in the origin of obturator artery and its clinical significance. Journal of Clinical and Diagnostic Research, 9(8): ac12–ac15. https://doi.org/10.7860/jcdr/2015/14369.6371.

Šaherl, L.K., & Rakuša, M. (2022). An anatomical description of the obturator region with clinical aspects. Journal of the Anatomical Society of India, 71(3): 234–241. https://doi.org/10.4103/jasi.jasi_111_21.

Sakthivel, S., Devi, K.S., & Verma, S. (2022). Anatomical study of the origin of obturator artery in Indian cadavers. Indian Journal of Clinical Anatomy and Physiology, 9(3): 212–217.

Sañudo, J.R., Mirapeix, R., Rodriguez-Niedenführ, M., Maranillo, E., Parkin, I.G., & Vázquez, T. (2011). Obturator artery revisited. International Urogynecology Journal, 22(10): 1313–1318. https://doi.org/10.1007/s00192-0 11-1431-7.

Simm, A. (2025). Management of complex pelvic fracture. Vilnius University.

Standring, S. (2021). Gray's anatomy e-book. Elsevier Health Sciences.

Sume, B.W., & Mulu, A. (2023). Anatomical variations of obturator artery and its clinical significances: A systematic review and meta-analysis. Translational Research in Anatomy, 30: 100237. https://doi.org/10.1016/j.tria.2022.100237.

Thampi, S., Oommen, A.M., Rajasekharan, S., & Sarasammal, S.R. (2021). Anatomical variants of the obturator artery and their clinical importance. Indian Journal of Vascular and Endovascular Surgery, 8(s2): 142–146. https://doi.org/10.4103/ijves.ijves_103_20.

Zaunbrecher, N., & Samra, N.S. (2023). Anatomy, abdomen and pelvis: Internal iliac arteries. In StatPearls. StatPearls Publishing.