

Morphometric Study of the Internal Iliac Artery: A Cadaveric Study with Clinical Correlation (Length of Internal Iliac Artery)**Ashok Kumar¹, Vimal Modi²**¹Ph.D. Scholar, Department of Anatomy, Index Medical College Hospital and Research Centre, Malwanchal University, Indore, M.P., India²Professor, Department of Anatomy, Index Medical College Hospital and Research Centre, Malwanchal University, Indore, M.P., India

Received: 01-05-2026 / Revised: 15-06-2026 / Accepted: 21-07-2026

Corresponding author: Ashok Kumar

E-mail: ashokkumartmu71@gmail.com

Conflict of interest: Nil

Abstract**Background:** The internal iliac artery (IIA) is the principal arterial supply to the pelvic organs, gluteal region, perineum, and medial thigh. Knowledge of its morphometry, especially its length, is essential for vascular surgeons, interventional radiologists, urologists, gynaecologists, and orthopaedic surgeons performing pelvic procedures. Variations in the length of the internal iliac artery may influence surgical exposure, catheterisation, embolisation, and ligation procedures.**Aim:** To determine the morphometric characteristics of the internal iliac artery with special emphasis on its length in adult human cadavers and to correlate the findings with their clinical significance.**Materials and Methods:** This descriptive cross-sectional cadaveric study was conducted on 60 internal iliac arteries (30 embalmed adult cadavers) in the Department of Anatomy. Following routine dissection, the common iliac artery and its bifurcation were exposed. The length of the internal iliac artery was measured from the point of origin at the common iliac artery bifurcation to its division into anterior and posterior divisions using a digital Vernier calliper. Measurements were recorded in Millimetres. Statistical analysis was performed using SPSS software.**Results:** The mean length on the right side was 11.34 ± 2.16 mm, while on the left side it was 11.68 ± 2.11 mm. Statistically significant difference was observed between the two sides ($p > 0.01$).**Conclusion:** The present study demonstrated considerable variation in the length of the internal iliac artery. These findings provide valuable anatomical information for pelvic surgeries, vascular reconstruction, and endovascular interventions, thereby minimizing the risk of iatrogenic injury.**Keywords:** Internal iliac artery, Morphometry, Cadaveric study, Length, Pelvic anatomy, Clinical correlation.**DOI:** 10.25258/ijcpr.18.8.192

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The internal iliac artery (IIA), formerly known as the hypogastric artery, is one of the two terminal branches of the common iliac artery. It originates at the level of the lumbosacral intervertebral disc, anterior to the sacroiliac joint, and descends into the pelvis where it divides into anterior and posterior divisions. [1,2] These divisions give rise to numerous visceral and parietal branches supplying the pelvic viscera, gluteal muscles, pelvic walls, reproductive organs, urinary bladder, rectum, and perineum. [3]

The internal iliac artery is usually 11–18 mm in length, although considerable anatomical variations have been documented.

The point of bifurcation and length of the artery may vary among individuals due to developmental changes during embryogenesis. Such variations have important implications during pelvic surgeries, arterial embolization, pelvic trauma management, and vascular reconstruction. [4,5] The increasing use of minimally invasive vascular procedures such as pelvic embolization and angiographic interventions has highlighted the importance of detailed morphometric knowledge of the internal iliac artery. [6] A short trunk may complicate selective catheterization, whereas an unusually long trunk may alter the branching pattern and surgical landmarks. Cadaveric studies remain the gold standard for documenting arterial morphology because they permit direct

visualization and accurate morphometric measurements. [7,8] The present study was therefore undertaken to measure the length of the internal iliac artery and evaluate its clinical relevance.

Materials and Methods

This descriptive, cross-sectional cadaveric study was conducted in the Department of Anatomy, Index Medical College & Research Centre, Indore, over a period of three years. A total of 30 embalmed adult human cadavers (60 internal iliac arteries) were included in the study.

Cadavers used for routine undergraduate and postgraduate anatomy teaching were selected. Fine dissection of the lower abdomen and pelvic region was performed according to standard anatomical dissection procedures. The internal iliac artery was identified at its origin from the bifurcation of the common iliac artery and carefully traced to its terminal division into the anterior and posterior divisions on both the right and left sides (Figure 1) In specimens exhibiting variations in the branching pattern of the internal iliac artery, the point of termination was considered as the origin of the

superior gluteal artery, in accordance with the Adachi classification. The length of the internal iliac artery was measured from its origin at the bifurcation of the common iliac artery to its point of division into the anterior and posterior divisions. Measurements were obtained using a digital Vernier calliper (accuracy 0.01 mm). Each measurement was recorded in millimetres and repeated three times to minimize observer error; the mean value was considered for statistical analysis. Only the internal iliac arteries of both sides were included in the morphometric analysis. The lengths of the right and left internal iliac arteries were compared to determine side-to-side differences. The collected data were entered into Microsoft Excel.

Inclusion Criteria

- Adult embalmed cadavers.
- Intact pelvic region.
- No evidence of previous pelvic surgery.

Exclusion Criteria

- Damaged pelvic vessels.
- Congenital pelvic anomalies.
- Advanced decomposition.



Figure 1: Measurement of length of internal iliac artery.

Results

The length of the internal iliac artery was measured on both the right and left sides. On the right side, the length of the internal iliac artery ranged from 7.02 mm to 15.00 mm, with a mean length of the internal iliac artery of 11.34 ± 2.16 mm. On the left side, the length of the internal iliac artery ranged from 7.08 mm to 15.03 mm, with a mean length of the internal iliac artery of 11.68 ± 2.11 mm (Table

1 and Table 2). Comparison of the mean length of the internal iliac artery between the two sides revealed that the left internal iliac artery was slightly longer than the right. Statistical analysis demonstrated a highly significant difference between the right and left sides ($t = 4.140$, $p < 0.001$), indicating that the observed variation in length was statistically significant.

Table 1: Shows the minimum and maximum lengths of the internal iliac artery.

Parameter	Side	Min. (mm)	Max.(mm)	Mean
Length of Internal iliac artery	Right	7.02	15	11.34
	Left	7.08	15.03	11.68

Table 2: shows the mean & standard deviation, p-value of the internal iliac artery.

Parameter	Side	Mean±SD		Interpretation
Length of Internal iliac artery	Right	11.34±2.16		p < 0.001
	Left	11.68±2.11		t value=-4.140

Discussion

The internal iliac artery (IIA) is the principal arterial supply to the pelvic viscera, gluteal region, perineum, and pelvic walls. Detailed knowledge of its morphometric anatomy, particularly its length, is of considerable importance for vascular surgeons, interventional radiologists, gynecologists, urologists, and orthopedic surgeons performing pelvic and reconstructive procedures. Variations in the length of the internal iliac artery may influence surgical exposure, arterial ligation, catheterization, and endovascular interventions. [9] In the present study, the mean length of 11.34 ± 2.16 mm on the right side and 11.68 ± 2.11 mm on the left side. Although the left internal iliac artery was slightly longer than the right, the difference was statistically significant ($p < 0.001$). These findings indicate that the internal iliac artery demonstrates minor side-to-side variation while maintaining an overall consistent anatomical pattern. The present findings are comparable with those reported by Fātu et al., who performed a morphometric analysis of the internal iliac artery and its branches and observed variations in arterial length and caliber between individuals. Although their study also reported differences between males and females, these variations were not statistically significant, which is consistent with the findings of the present study. The observed variability is likely attributable to developmental differences in the pelvic arterial system during embryogenesis. [10] Similarly, Yamaki et al. conducted a statistical study of the branching pattern of the internal iliac artery and emphasized that variations in the level of arterial division are common. Such variations directly influence the effective length of the internal iliac artery before its bifurcation into anterior and posterior divisions.

Differences in measurement techniques, sample size, ethnicity, age, and preservation of cadaveric specimens may also contribute to the variations reported across different studies. From a clinical perspective, accurate knowledge of the length of the internal iliac artery is essential during internal iliac artery ligation for the management of postpartum hemorrhage, pelvic arterial embolization, pelvic trauma surgery, radical hysterectomy, prostatectomy, and pelvic lymph node dissection. A short arterial trunk may make

selective catheterization technically challenging, whereas a longer trunk provides greater ease during endovascular procedures but may alter the anatomical relationships of its branches. Therefore, preoperative awareness of these morphometric variations can help reduce the risk of inadvertent vascular injury and improve surgical outcomes. Despite the increasing number of studies on the branching pattern of the internal iliac artery, morphometric studies focusing specifically on its length remain limited, particularly in the Indian population. The present study contributes valuable baseline anatomical data that may assist clinicians during diagnostic and therapeutic procedures involving the pelvic vasculature. [11]

Conclusion

The present study states that the mean length of the internal iliac artery was 11.34 ± 2.16 mm on the right side and 11.68 ± 2.11 mm on the left side. The left internal iliac artery was found to be slightly longer than the right. Statistical analysis revealed that this difference was highly significant ($t = 4.140$, $p < 0.001$). The length of the artery showed considerable variation, ranging from 7.02–15.00 mm on the right side and 7.08–15.03 mm on the left side. These findings provide important morphometric data on the internal iliac artery and may serve as a useful anatomical reference for vascular surgeons, interventional radiologists, and pelvic surgeons during diagnostic and therapeutic procedures involving the pelvic vasculature.

References

1. Pavan P Havaladar, Sameen Taz, Angadi A.V, Shaik Hussain Saheb. Morphological Study Of Internal Iliac Artery. Int J Anat Res 2014, 2(2):358-62. ISSN 2321-4287.
2. E. Panagouli, I. Antonopoulos, V. Protogerou, T. Troupis. Anatomical study of the common iliac arteries Folia Morphol., 2021, Vol. 80, No. 4.
3. Snell R. Clinical anatomy. Lippincott Williams & Wilkins, Philadelphia 2004: 63–64.
4. Hamabe A, Harino T, Ogino T, et al. Analysis of anatomical variations of intrapelvic vessels for advanced pelvic surgery. BMC Surg. 2020; 20(1): 47, doi: 10.1186/s12893-020- 00711-0, indexed in Pubmed: 32178647.

5. K. Priyanka, S.K. Rajesh, B. Naresh. A Morphometric Study of Common Iliac Artery, Internal Iliac Artery and External Iliac Artery at SMS Medical College, Jaipur. International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 12, No. 4, Oct-Dec 2023.
6. Ozguner G, Sulak O: Development of the abdominal aorta and iliac arteries during the fetal period : a morphometric study. Surg Radiol Anat 2011;33:35-43.
7. Morita S, Kato S, Sugawara E. Corrosions anatomical studies on the arterial system of the Japanese fetus.VIII. The common iliac arteries and the branches of the internal iliac artery. Acta Med Nippon 1974;49:79-83.
8. Mateusz Koziej et al., The anatomy of the internal iliac artery: a meta-analysis. Folia Morphol., 2024, Vol. 83, No. 3.
9. Bleich AT, Rahn DD, Wieslander CK, et al. Posterior division of the internal iliac artery: anatomic variations and clinical applications. Am J Obstet Gynecol. 2007; 197(6): 658. e1–658.e5, doi: 10.1016/j.ajog.2007.08.063, indexed in Pubmed: 18060970.
10. Naveen NS, Murlimanju BV, Kumar V, Jayanthi KS, Rao K, Pulakunta T. Morphological Analysis of the Human Internal Iliac Artery in South Indian Population. Online J Health Allied Scs. 2011;10(1):11.
11. Fătu C, Puișoru M, Fătu IC. Morphometry of the internal iliac artery in different ethnic groups. Ann Anat. 2006 Nov;188(6):541-6. doi: 10.1016/j.aanat.2006.05.016. PMID: 17140147.