How to Cite:
Bhardwaj, R., Bhatnagar, S., Suttarwala, I., Joshi, H. R., Hathila, S., & Vaniya, V. H. (2022). Variations in the origin of iliolumbar artery with its clinical significance. *International Journal of Health Sciences*, *6*(S8), 3018–3025. https://doi.org/10.53730/ijhs.v6nS8.12818

Variations in the origin of iliolumbar artery with its clinical significance

Rashmi Bhardwaj
Ph.D. Research Scholar Department of Anatomy, Medical College Baroda, Vadodara, Gujarat

Supriti Bhatnagar
Assistant Professor Department of Anatomy, TMMC & RC, Moradabad

Ila Suttarwala
Associate Professor Department of Anatomy, Medical College Baroda, Vadodara, Gujarat

Himanshu R. Joshi
Associate Professor Department of Pathology, Autonomous State Medical College, Etah
Corresponding author email: drhimanshu1987@gmail.com

Shital Hathila
Assistant ProfessorDepartment of Anatomy, Medical College Baroda, Vadodara, Gujarat

V. H. Vaniya
Professor Department of Anatomy, Medical College Baroda, Vadodara, Gujarat

***Abstract*---**Introduction: The Iliolumbar artery mainly arises from the posterior division of the internal iliac artery. It extends oblique superiorly and laterally in front of the sacroiliac joint and lumbosacral trunk. It crosses the obturator nerve and external iliac vessels & reaches the medial edge of the psoas major. The aim of our study was to know the origin variability of the Iliolumbar artery. This helps to prevent any iatrogenic injury during various surgeries. Materials and Methods: 50 formalin-fixed adult human pelvic halves with known sex were procured from the Department of Anatomy, Medical College, Baroda. Site of origin of the Iliolumbar Artery was identified. Results: In the current study, we observed that the origin of the Iliolumbar Artery was from the posterior division of IIA in 52%, 38% from the trunk of the internal iliac artery, 4% from the single trunk with obturator artery from posterior division, and 6% absent. Conclusion:

The variable origins of the ILA from different branches of the internal iliac artery should be taken into account during the surgical procedures involving the lower abdominal & pelvic region so as to modify the surgical tactics to prevent undesired hemorrhagic complications.

***Keywords*---**Iliolumbar artery, pelvic hemorrhage, clinical significance.

Introduction

The iliolumbar artery (ILA) arises from the posterior division/trunk of the internal iliac artery, a branch of the common iliac artery (from the abdominal aorta). It originates within the pelvic cavity and from its origin it arches backwards and ascends laterally out of the pelvic inlet towards the iliac fossa. It travels anterior to the sacroiliac joint and lumbosacral nerve trunk, passing behind theobturator nerve, external iliac vessels to reach the medial border of the psoas major muscle**.** The iliolumbar artery divides into lumbar and iliac branches just posterior to the medial border of the psoas major muscle. These two branches supply the surrounding structures and muscles of the posterior abdominal wall. The iliolumbar artery is usually the first branch of the posterior division of the internal iliac artery &the only pelvic artery ascending from pelvic cavity. The variability of originof the ILA leads to variability in its course result in modifying arterial supply of the surrounding structures (lumbosacral trunk etc.) which is significant for surgeons, radiologists, orthopedics, Obstetricians and Gynecologists to minimize the postoperative complications.The Iliolumbar artery can be damaged during the surgical procedures of lumbar/lumbosacral vertebrae,lumbosacral spinal endoscopic procedures[2,3] and in procedures of embolization.Iliolumbar artery is used as a feeding pedicle in iliac crest flaps.[1]Its proximity to the sacroiliac joint leads iliolumbar artery at risk of damage during posterior pelvic fractures (open book or shearing fractures).[4,5]The presentstudy aims to discover the variations in the origin of theIliolumbar artery as well as review the incidence of the variations in the ILA origin in the various otherstudies.

Materials and Methods

50 formalin-fixed adult human pelvic halves with known sex (11 males and 14 females) were procured from the Department of Anatomy, Medical College, Baroda. Specimens were collected for the routine dissection. Any cadavers with previously operated pelvic region were excluded from the study. Thecommon iliac artery, the externaland internal iliac artery with its branches were dissected after removing the fat, and loose connective tissue surrounding the arteries. The site of origin of the iliolumbar Artery (ILA) was identified & noted. Thecourse of ILA was traced & its relation with surrounding structures was observed.

Observations & Results

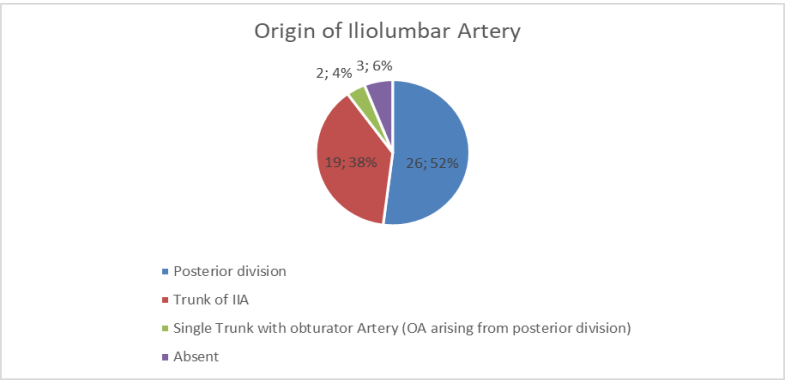
The origin of the iliolumbar artery, observed in the total 50 specimens of our study, was classified into 3 different categories.

1. From the posterior division of the internal iliac artery which is normal type.
2. Directly from the trunk of the internal iliac artery before its division into anterior & posterior trunk. (Figure 1)
3. From the Single trunk with obturator artery arising from posterior division of the internal iliac artery. (Figure 2)

It was observed that 24 out of 50 (48%) bisected pelvises demonstrated a variation of the iliolumbar artery origin, as given in table 1.

Table 1.Shows the incidence of variations in the origin of the iliolumbar artery

S. No	Origin of Iliolumbar Artery	No. of Specimen	Percentage
1	Posterior division proper	26	52%
2	Trunk of IIA	19	38%
3	Single Trunk with obturator Artery (Arising from posterior division)	2	4%
4	Absent	3	6%



The pie chart shows the incidence of variations in the origin of the iliolumbar artery

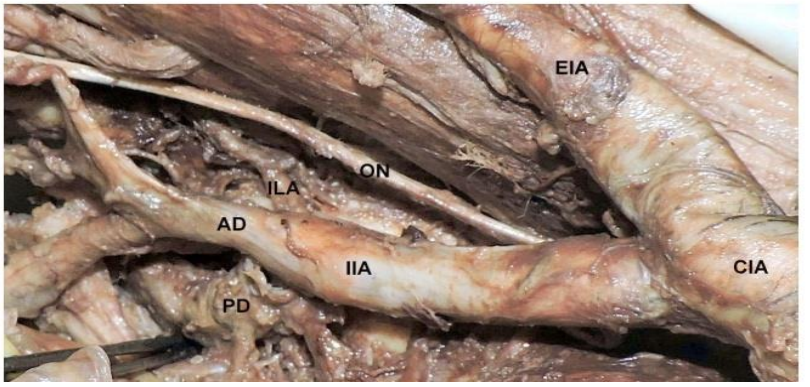


Figure 1: Right pelvic half shows the origin of the Iliolumbar artery directly from the trunk of the internal iliac artery. CIA: Common iliac artery; EIA: External iliac artery IIA: internal iliac Artery; AD: Anterior Division; PD: Posterior Division; IlA: Iliolumbar Artery ON: Obturator nerve

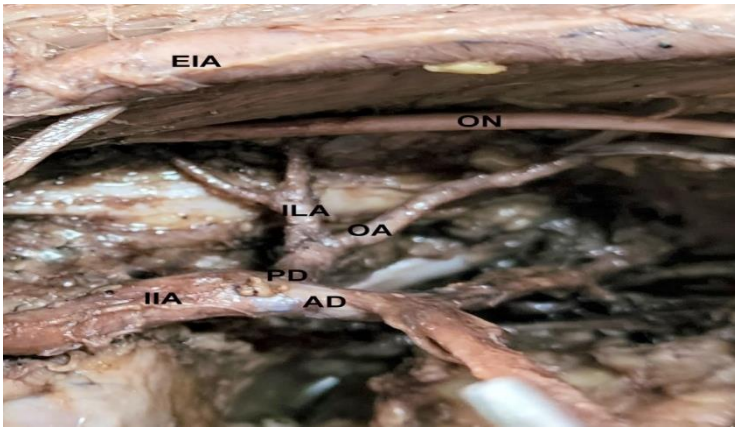
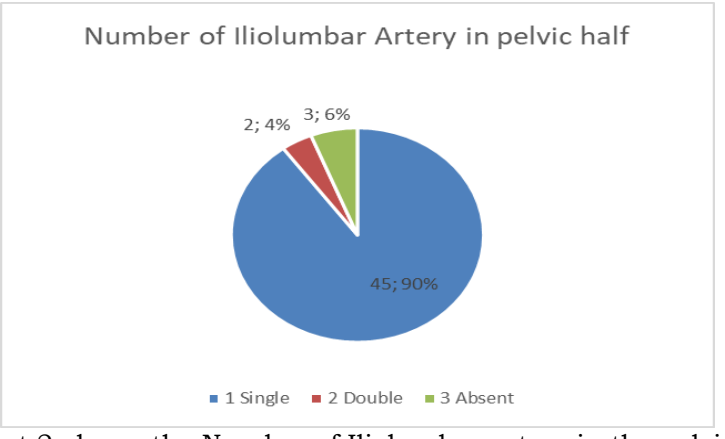


Figure 2: Left pelvic half shows the origin of the Iliolumbar artery from the common Trunk with obturator Artery arising from Posterior division of the internal iliac artery. EIA: External iliac artery IIA: internal iliac Artery; AD: Anterior Division; PD: Posterior Division; IlA: Iliolumbar artery OA: Obturator artery

Current study also shows the number of iliolumbar arteries present in the hemipelvis Iliolumbar artery is present as a single branch in 45out of 50 (90%) specimen,as doublebranches arising from two different points from internal iliac artery in 2specimens(4%) (Figure 3) and is absent in 3 specimens(6%) as shown in Table 2.

Table 2 shows the number of Iliolumbar arteriespresentin the pelvic half

S. No.	Number	Frequency	Incidence (%)
1	Single	45	90 %
2	Double	2	4 %
3	Absent	3	6 %
Total		50	100%



Pie chart 2 shows the Number of Iliolumbar artery in the pelvic half.

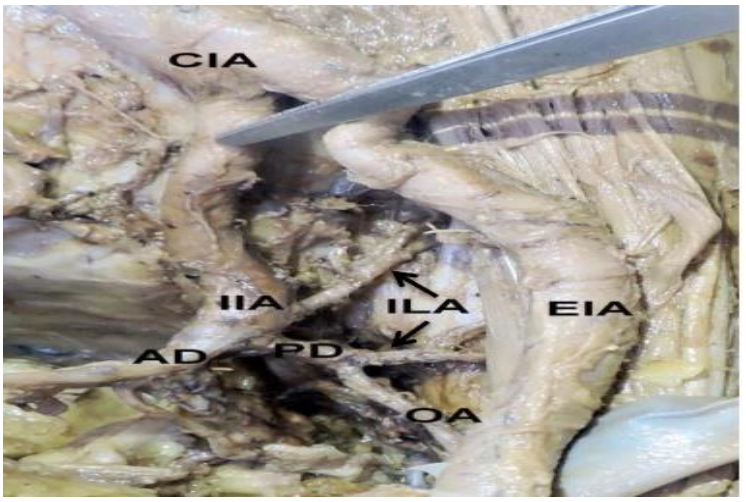


Figure 3: Left pelvic half shows the double origin of the Iliolumbar artery, one direct from the trunk of the Internal iliac Artery & other from the Posterior division of the internal iliac artery. CIA: Common iliac artery; EIA: External iliac artery IIA: internal iliac Artery; AD: Anterior Division; PD: Posterior Division; IlA: Iliaolumbar artery OA: Obturator artery

Discussion

The iliolumbar artery and its branches are susceptible to iatrogenicinjuries during various surgical procedures involving sacroiliac joint like anterior approaches to the sacroiliac joint for arthrodesis or internal fixation, resulting in intraoperative hemorrhages.[6]The surgeons, especially while doing pelvic surgeries, should be aware of the normal anatomy of the iliolumbar arteryand its variations for the successful ligation of the internal iliac artery and for the safe surgical outcomes.
The location and the variations of the iliolumbar artery are significant for surgeons since it is used as a supply pedicle in bone flaps .In our study, we observed that the origin of the Iliolumbar Artery wasfrom the posterior division in 52% (26), 38% (19) from the trunk of the internal iliac artery, 4% (2) from the single trunk with obturator artery from posterior division, and 6%(3) it was absent. The posterior division of the internal iliac artery is the most common origin of the ILA. Valchkevich Dzmitry et al [8], Waseem Al Talalwah et al [11]&Teli CG et al[12] observed that the origin of Iliolumbar Artery was from the posterior division in 73.3%(22) 77.90%& 80%(32) respectively, a findingwhich was similar with our study. While in other studies ofparul et al [7] , Ravi Shankar Gadagi et al[9], TuranKoç et al [10],Kiray A et al [13,]Yuvaraj Maria Francis [14],Rusu MC et al [15], the iliolumbar artery originated from trunk of IIAin 66.66% (16), 36.67%(11), 57.14%(12), 71.4% (30), 75%, 52.50% respectively -a findingwhich was different from our study.A comparison of variations with respect to the origin of the iliolumbar artery (ILA), with different studies is tabulated in table 2. In our study we found origin of ILA mainly from either posterior division of IIA or from the trunk of IIA. There were no branches coming from thecommon iliac, external iliac or gluteal arteries as has been reported by various other authors.

Several authors have classified the origin of ILA differently. Rusu et al classified the ILA origin into different levels;Level A: ILA from the CIA. Level B: ILA from the CIAbifurcation. Level C: ILA from the main trunk of the IIA.Level D: ILA from the origin of the posterior division ofthe IIA. Level E: ILA from the posterior division of theIIA.[15]. In our study, type 1 corresponds to level E categorywhereas type 2 corresponds to level C category. Theatypical type 3 in which ILA was arising from single trunk with obturator Artery from posterior division did not correspond to any of the above Rusuet al levels of classification& was not reported by any other study.

In one cadaver, on both sides, it was observed that the ILA was taking the double origin from two different points, one from trunk & other from posterior divisionof IIA. TuranKoçet al[10]&AmaçKiray[13] also reported such cases in4 &2(4.8%) specimens respectively. In our study we also observed absence of ILA in 3 specimens (6%). So far very few reports have been documented on the absence of iliolumbar artery. Ravi Shankar Gadagiet al[9]Lipshutz et al[18] and Al Talalwah et al[11] reported the absence of IA in8 specimens (26.67%), 5 subjects and 4.7% respectively.In case ILA was absent, it was replaced by fourth lumbar artery[18].

Table 2 Incidence of origin variability of the iliolumbar artery by different authors

S.No	Author	Sample Size	Trunk	Posterior Division of IIA	Lateral sacral artery	Obturator Artery	Superior Gluteal Artery	Common Iliac Artery	External Iliac Artery	From 2 Different point	Absent
1	Parul (2021) [7]	24	66.66% (16)	29.17%(7)	4.16%(1)	-	-	-	-	-	-
2	ValchkevichDzmitry[5](2020)	30	16.6% (5)	73.3%(22)	3.3%(1)	3.3% (1)	3.3%(1)	-	-	-	-
3	Ravi Shankar [9] (2018)	30	36.67% (11)	23.33% (7)	-	-	-	13.33% (4)	-	-	26.67% (8)
4	Yuvaraj Maria F [14] (2018)	80	75%	25%	-	-	-	-	-	-	-
5	Turan Koç[10] (2016)	21	57.14% (12)	23.8% (5)	-	-	-	-	-	19.4 (4)	-
6	Waseem Al Talalwah[11] (2014)	342	13.80%	77.90%	-	-	0.70%	2%	0.30%	-	4.70%
7	TeliChanrika[12](2013)	40	20% (8)	80% (32)	-	-	-	-	-	-	-
8	Kiray A[13] (2010)	42	71.4% (30)	19% (8)	-	-	-	4.8% (2)	-	4.8% (2)	-
9	Rusu et al [15](2010)	30	52.50%	32.50%	-	-	-	8.75%	-	-	-
10	Chen et al [16](1999)		96.30%	-	-	-	-	3.70%	-	-	-
11	Present study	50	38% (19)	52% (26)	-	-	-	-	-	4% (2)	6% (3)

Conclusion

A detailed analysis of the ILA and its origin variability can improve our understanding of the vascular complications and complication ofserious hemorrhage affecting this region. The present study is done to increase the success of diagnostic evaluation and to improve the effectiveness of surgical approaches in this region.The ILA may have distinct and important patterns that are important to identify during surgical procedures. Acute hemorrhages or postoperative hematoma may occur if the iliolumbar artery is injured during surgery. The iliolumbar artery's anatomical variations may be significant when gathering the vascular iliac bone graft. The surgeon should keep in mind that the variant origin of ILA can make anterior lumbosacral junction exposure and posterior sacroiliac fixations, more difficult. The branching and distribution

patterns along with sexual differences can be further highlighted with future studies in a greater number of subjects.

References

1. Al Talalwah W, Al Dorazi SA, Soames R. The origin variability of the iliolumbar artery and iatrogenic sciatica. European Journal of Orthopaedic Surgery & Traumatology. 2015 Jul 1;25(1):199-204.
2. Chen R, Liu Y, Liu C, Hu Y, Xu D, Zhong S, Li ZH. Anatomic basis of iliac crest flap pedicled on the iliolumbar artery. SurgRadiol Anat. 1999; 21(2):103–107.
3. Ebraheim NA, Lu J, Biyani A, Yang H. Anatomic considerations of the principal nutrient foramen and artery on the internal surface of the ilium. *SurgRadiol Anat*. 1997;19: 237-39.
4. Harrington JF Jr. Far lateral disc excision at L5-S1 complicated by iliolumbar artery incursion: case report. *Neurosurgery*. 2001;48: 1377-80
5. Kelly HA. Ligation of both internal arteries for hemorrhage in hysterectomy for carcinoma uteri. Bull Johns Hopkins Hosp 1894; 5:53-4
6. Kiray A, Akçal O, Güvencer M, Tetik S, Al›c› E. Iliolumbar veins have a high frequency of variations. ClinOrthopRelat Res 2004;(425):252-7.
7. Kiray A, Akçalý O, Tayefi H, Koþay C, Ergür I. Anatomical variations of iliolumbar artery and its relation with surgical landmarks. Actaorthopaedicalettraumatologicaturcica. 2010; 44(6):464-8.
8. Koç T, Gilan ÝY, Aktekin M, Kurtoðlu Z, Daðtekin A, Aytaç G, Coþgun E. Evaluation of the origin and branching patterns of the iliolumbar artery and its implications on pelvic and vertebral surgery. Saudi Medical Journal. 2016 Apr; 37(4):457.
9. Kulkarni SS, Lowery GL, Ross RE, Ravi Sankar K, Lykomitros V. Arterial complications following anteriorlumbar interbody fusion: report of eight cases. Eur Spine J 2003;12:48-54.
10. Lipshutz B. A composite study of the hypogastric artery and its branches. Ann Surg. 1918; 67: 584–608
11. ParulUpadhayay, RanjeetaHansdak, Sneh Agarwal Assessment of the iliolumbar artery: its structural variations and applied aspectInternational Journal of Research in Medical Sciences *2021 Aug;9(8):2304-2308* DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20213074.
12. Ravi Shankar Gadagi, Santosh Kumar Mulage. The origin variability of the iliolumbar artery: a cadaveric study with clinical significance. Int J Anat Res 2018;6(3.3):5708-5712. DOI: 10.16965/ijar.2018.320
13. Rusu MC, Cergan R, Dermengiu D, Curcã GC, Folescu R, Motoc AG, Jianu AM. The iliolumbar artery—anatomic considerations and details on the common iliac artery trifurcation. Clinical Anatomy: 2010 Jan; 23(1):93-100.
14. Teli CG, Kate NN, Kothandaraman U. Morphometryof the iliolumbar artery and the iliolumbar veinsand their correlations with the lumbosacral trunkand the obturator nerve. JCDR: 2013 Mar; 7(3):422.
15. Valchkevich D, Borel A. Anatomical Variation of Iliolumbar Artery and its Clinical Significance. Arch Biomed Eng&Biotechnol. 3(5): 2020. ABEB.MS.ID.000572. DOI: 10.33552/ABEB.2020.03.000572.

16. Winters HA, van Harten SM, van Royen BJ. The iliolumbar artery as the nutrient pedicle for an iliac crest graft: a new technique in the reconstruction of the lumbar spine. PlastReconstrSurg 2002;109:249-52.
17. Yiming A, Baqué P, Rahili A, Mayer J, Braccini AL, Fontaine A, et al. Anatomical study of the blood supply of the coxal bone: radiological and clinical application. *SurgRadiol Anat.* 2002;24:81-86
18. Yuvaraj Maria Francis1, Thotakura Balaji2, Hannah SugirthabaiRajilaRajendran3, Vaithianathan Gnanasundaram4, Aruna Subramanian5 andBalaji Karunakaran6 Study on Variations in the Origin and Branching Pattern of Internal Iliac Artery in Cadavers *Biomedical & Pharmacology Journal*, December 2018 Vol. 11(4), p. 2201-2207.

Rabindra Bharati Journal of Philosophy
ISSN: 0973-0087

MORPHOLOGICAL AND MORPHOMETRICAL STUDY ON THE ORIGIN OF THE INTERNAL ILIAC ARTERY

Rashmi Bhardwaj*
PhD. Research Scholar, Department of Anatomy, Medical College Baroda, Vadodara, Gujarat.

Shital Hathila
PhD. Research Scholar & Assistant Professor, Department of Anatomy, Medical College Baroda, Vadodara, Gujarat.

Himanshu R. Joshi
Associate Professor, Department of Pathology Autonomous State Medical College, Etah.

V. H. Vaniya
Professor, Department of Anatomy, Medical College Baroda, Vadodara, Gujarat.

Abstract: Background: The internal iliac artery (hypogastric) artery is voluminous with an extended territory of vascularity, being the main artery of the pelvis, distributing the pelvic walls, pelvic viscera, perineum, genitalia, gluteal region, hip, and lumbar wall. Material &Methods: 50 formalin-fixed adult human pelvic halves with known sex (11 males and 14 females) were procured from the Department of Anatomy, Medical College, Baroda. A horizontal incision through the abdomen at the fourth lumbar vertebral level is taken. The whole pelvic is dissected to expose the common iliac arteries. After evisceration, the Common Iliac artery (CIA) is traced to find the external iliac artery (EIA) extending in line with the CIA towards the inguinal ligament and the internal iliac artery directed towards the pelvic cavity. Result: -we observed that 8% of a male had IIA between & L4 and L5 on the right side, whereas 4% on the left side showing at between L4 & L5; while comparing females, we didn't get any female cadavers which having the Origin of IIA at this level. At the L5 level, in the case of males, it was 4 % on the right side and 2 % on the left side, while in the female, it was 4% on both rights and left. Between L5 & S1, it was 8% on the right side and 12% on the left side; in the case of the female cadaver, it was 14% on the right side and 12% on the left side. At the S1 level, it was 2% on the right side and 4 % on the left side, while in the case of female cadaver, it was 10% on the right and 12% on the left side. Out of 25 cadavers having 50 sides shows that 12 % IIA had an origin point between L4 & L5, 14% observed at the level of L5, 46% of cadavers showed the origin level between L5 & S1 and 28% of cadavers showed the origin point at S1 level. In Max of the cases, we found that the Origin of IIA B/W L5 & S1 was 46%.the average distance of the internal iliac artery from the mid-sagittal plane of the pelvis was 33.39 which on the right side it was 32.27 mm, on the left 34.57mm, in the case of males 32.84 mm, and in females 33.88mm
Keywords: Internal Iliac Artery origin, Pelvic Surgery, vascular anatomy.

Introduction

The internal iliac (hypogastric) artery is voluminous with an extended territory of vascularity, being the main artery of the pelvis, distributing the pelvic walls, pelvic viscera, perineum, genitalia, gluteal region, hip, and lumbar wall. The Origin of the Internal iliac artery corresponds to the bifurcation of the common iliac artery, which is usually 4.5 cm from the midline and slightly medial to the sacroiliac interlining[1].Each internal iliac artery is about 4 cm long and arises at the common iliac bifurcation,level with the lumbosacral intervertebral disc, and anteriorly to the sacroiliac joint[2].Thepoint of division of the common iliac artery &length of the Internal iliac artery varies considerably. The study aimed to know the morphometry &

morphology of the origin of the internal iliac artery. Knowledge regarding the Origin of the internal iliac artery is vital while applying ligature to the artery during various pelvic surgeries. Bilateral internal iliac artery ligation is an effective life-saving method to control obstetrical & gynecological hemorrhages. Prior knowledge of the anatomical variations benefits the vascular surgeons ligating the internal iliac artery and the radiologists interpreting angiograms of the pelvic region.

Materials: -50 formalin-fixed adult human pelvic halves with known sex (11 males and 14 females) were procured from the Department of Anatomy, Medical College, Baroda. Specimens were collected for the routine dissection.

Methods: -A horizontal incision through the abdomen at the fourth lumbar vertebral level is taken. The whole pelvic is dissected to expose the common iliac arteries. After evisceration, the Common Iliac artery (CIA) is traced to find the external iliac artery (EIA) extending in line with the CIA towards the inguinal ligament and the internal iliac artery directed towards the pelvic cavity.

Then, the peritoneum is removed from the bladder, uterus (in females), rectum, and the lateral pelvic wall from each side of the pelvis.

1. The level of Origin of the internal iliac artery was noted.
2. The location of the site of Origin of the Internal Iliac Artery: The distance of Origin to the mid sagittal plane represented by the line connecting the middle of the symphysis pubis with the middle of the lumbosacral promontorium was measured.

Statistical Analysis: Statistical analysis was performed by using computer-based software, Statistical Package for Social Science (SPSS).

Results: A total of fifty adult human pelvic halves were dissected (Right 25, Left 25) with known gender. All measurements, Branching Pattern, and the level of Origin of internal iliac artery were taken & observed respectively in the Department of Anatomy, medical college, Baroda. Data was measured by using a digital vernier caliper. Recorded observation & Data were enlisted below in detail.

Table No 1: Results on Vertebral Level of Origin of the internal iliac artery.

Vertebral level	Male				Female				Total	
	Right		Left		Right		Left			
	No.	%	No.	%	No.	%	No.	%	No.	%
B/W L4 & L5	04	8%	02	4%	-	-	-	-	06	12%
L5	02	4%	01	2%	02	4%	02	4%	07	14%
B/W L5 & S1	04	8%	06	12%	07	14%	06	12%	23	46%
S1	01	2%	02	4%	05	10%	06	12%	14	28%
Total	11	22%	11	22%	14	28%	14	28%	50	100%

The artery takes origin from different vertebral levels varying from between L4& L5 to S1 Table 1. Notably, the most common vertebral level of Origin was at the L5/S1 intervertebral disk level (23/50). Bilateral Asymmetry was also observed in many cases on Origin's vertebral level as shown in **Figure 1.** There is a well marked tendency for the left common iliac artery to bifurcate at a lower level than the right, this similar finding was also observed by Lipshutz B There is also the tendency in females to bifurcate at a lower level & level of variability was also less similar to **Popa Oana** [6]

Pie chart 1 showing Origin from different vertebral levels

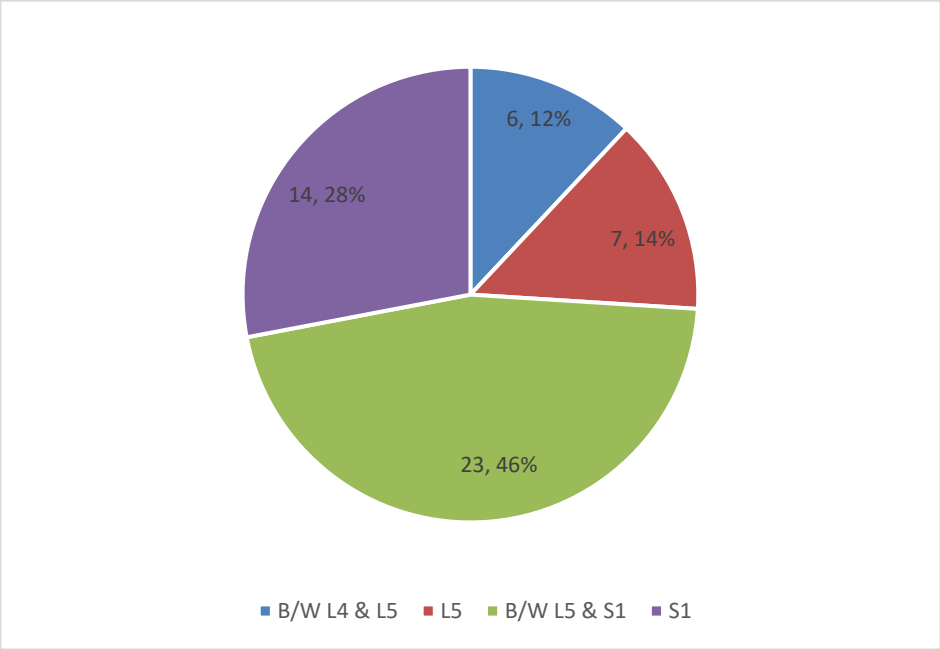


Figure 1: Male cadaver showing different vertebral level of Origin of internal iliac artery. AA: Abdominal Aorta; CIA: Common iliac artery; EIA: External iliac artery; IIA: internal iliac artery.

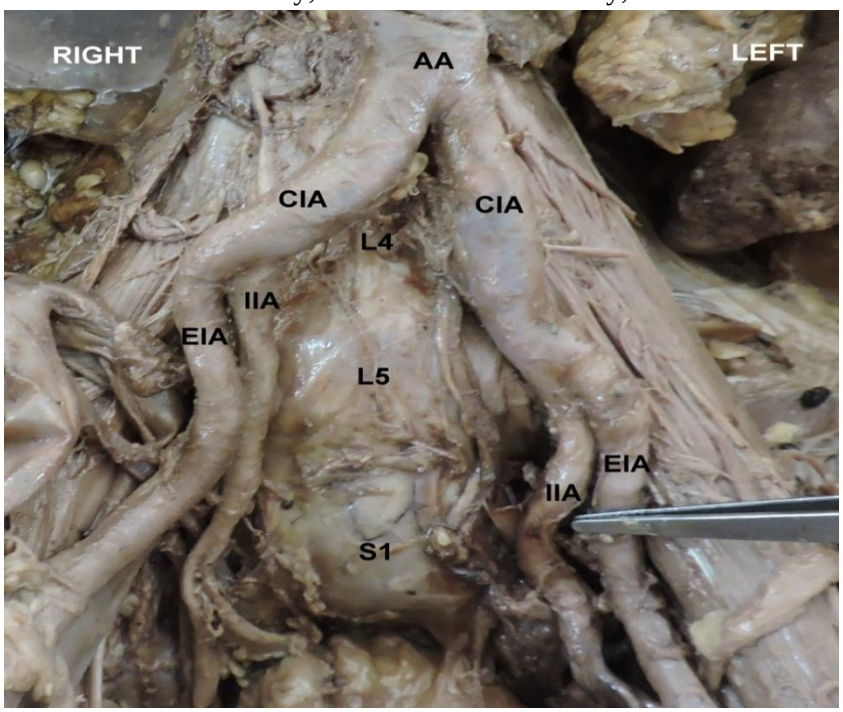


Table No 2: Results on Distance of Origin of the internal iliac artery to the mid sagittal plane The average distance of the internal iliac artery from the mid-sagittal plane of the pelvis was 33.39. Distance from the mid sagittal plane is more on the left side

	Mean (mm)	**Minimum (mm)**	**Maximum (mm)**
Right	32.27	23.65	41.86

Left	34.57	28.12	43.26
Male	32.84	23.65	43.26
Female	33.88	28.37	42.67

Bar grapha 1showsthe mean average distance of the internal iliac artery from the mid-sagittal plane of the pelvis was 33.39.

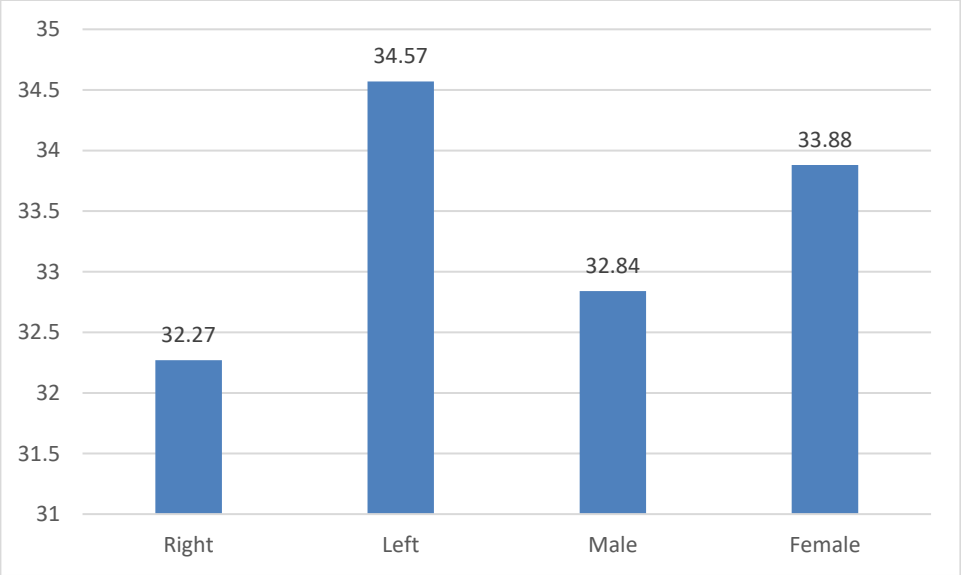


Figure 2: Distance of the right internal iliac artery to the midsagittal plane; CIA: Common iliac artery; EIA: External iliac artery; IIA: internal iliac artery.

Discussion:

In our current study, we observed that 8% of a male had IIA between & L4 and L5 on the right side, whereas 4% on the left side showing at between L4 & L5; while comparing females, we didn't get any female cadavers which having the Origin of IIA at this level. At the L5 level, in the case of males, it was 4 % on the right side and 2 % on the left side, while in the female, it was 4% on both rights and left. Between L5 & S1, it was 8% on the right side and 12% on the left side; in the case of the female cadaver, it was 14%

on the right side and 12% on the left side. At the S1 level, it was 2% on the right side and 4 % on the left side, while in the case of female cadaver it was 10% on the right and 12% on the left side. Out of 25 cadavers having 50 sideshows that 12 % IIA had an origin point between L4 & L5, 14% observed at the level of L5, 46% of cadavers showed the origin level between L5 & S1, and 28% of cadavers showed the origin point at S1 level. In Max of the cases, we found that the Origin of IIA B/W L5 & S1 was 46%. While comparing our study with **Benjamin lipshutz** [4],observed on 181 and found that the origin of the internal iliac artery at the 5th vertebra level in 24 (14.5%) cadavers and between 5th and the superior margin of the sacrum was 120 (85.5%) which was similar with our study another study of **Naveen NS** [3] they observed that the Origin of the internal iliac artery was at the level of the S1 vertebra in the majority (58.3%) of the cases, which was not similar to our study. Another study of **Popa Oana** [6] reported that in most of the cadavers it originated at L4 and L5 levels in cases of male cadavers, but in females, it was the lower half of the L5 - middle sacral fin, 94.44% of female cases found it is not similar with our study. **Sumathilatha Sakthivelavan** [7] observed that the internal iliac artery originate date the level of lumbosacral articulation in 94 (81%) specimens and in 22 (19%) it was above that level similar to our study. Another study by **Ibsen Henric Ongidi** [5] observed that IIA originated above the vertebral level of the L5 disk in 30/57 (52.6%) cases, with the highest vertebral level observed at L4. the most common vertebral level of Origin was at the L5/S1 intervertebral disk level (24/57 [42.1%] This is similar to our study. H. Mamatha[8] observed that the Origin of the Internal Iliac Artery at the level of the S1 vertebra was seen in 36 cases (72 %), at the level of L5-S1 in 12 cases (24 %), and in two cases (4 %) which was not similar with our study. another study by **Pavan P Havaldar** [10] observed the most common site of origin of the internal iliac artery was at the level of the lumbosacral intervertebral disc found in 30 specimens (60%). Opposite L5 vertebra in 10 specimens (20%), at the level of L4 and L5 disc in 8 specimens (16%) and opposite S1 vertebra in 2 specimens (4%) which is also similar to our study.

Average Distance of the Internal Iliac Artery from The Mid-Sagittal Plane

In our study, we observed that the average distance of the internal iliac artery from the mid-sagittal plane of the pelvis was 33.39;on the right side it was 32.27 mm, and on the left 34.57mm, in the case of males 32.84 mm, and in female 33.88mm. While comparing our study with **Ibsen Henric Ongidi** [5] observed that the average distance of the IIA from the mid-sagittal plane of the pelvis was 31.47 mm ± 7.85 which was similar to our study. In another study of **C. Fa tu** [9], they observed that the mean distance from the mid sagittal plane to the Origin of the internal iliac artery ranged between 29 and 36 mm on the right side and between 40 and 50 mm on the left side, according to **C. Fa tu** [9] There is a variation in the distance of the internal iliac artery to the mid sagittal plane in relation to gender: in females' distances are larger from the midline, both on the left and the right. This is probably an adaptative mechanism of the vascularization of the female pelvis & reflects in particular the postpuberal development of the female pelvis acc to **Kamina** [11].

Conclusion:

The internal iliac arteries show significant variability in terms of their Origin relative to the skeleton (lumbar-sacral spine). This variability is directly related to the termination mode of the corresponding common iliac arteries. The differences in the level origin that we meet on the gender showed lower variability in women. The origin level of the internal iliac arteries determines both their path and direction and especially their length, which is particularly important when practicing a ligature on the artery. Thus, a thorough knowledge of normal and abnormal anatomy of the Origin of Internal Iliac Artery is essential for its successful ligation.

References

1. Paturet, G. (1964). Traité d'Anatomie Humaine. (pp. 549-570). Paris: Ed.Masson
2. Gray's Anatomy. (1995). Thirty-eighth edition.(pp. 1559-1562). New York: Ed. Churchill Livingstone
3. Naveen NS, Murlimanju BV, Vishal Kumar, Jayanthi KS, Krishna Rao, Thejodhar Pulakunta, Morphological Analysis of the Human Internal Iliac Artery in South Indian Population Online Journal of Health and Allied Sciences Peer-Reviewed, Open Access, Free Online Journal Published Quarterly: Mangalore, South India: SSN 0972-5997 Volume 10, Issue 1; Jan-Mar 2011
4. Lipshutz B. A composite study of the hypogastric artery and its branches. *Ann Surg.* 1918 May;67(5):584–608.
5. Ibsen Henric Ongidi, Thomas Mombo Amuti, Fadhila Yusuf Abdulsalaam, Gloria Kabare Shani, Innocent Peter Ouko, Elisha Harry Otieno, Mary Kiria Koigi, Paul Kamau Koigi, Moses Madadi Obimbo, Variability in morphology and branching of the internal iliac artery: Implications for pelvic surgery, Translational Research in Anatomy, Volume 22, 2021,
6. PopaOana,BordeiP.,IliescuD.,IonescuC.Morphological considerations on the Origin and morphometry of the internal iliac arteries ARS Medica Tomitana - 2014; 4(79): 219 - 227 10.1515/arsm-2015-0010
7. Sumathilatha Sakthivelavan, Sharmila Aristotle, Anandarani Sivanandan, Sakthivelavan Sendiladibban, and Christilda Felicia Jebakani. "Variability in the Branching Pattern of the Internal Iliac Artery in Indian Population and Its Clinical Importance"- Anatomy Research International Volume 2014 (2014), Article ID 597103, 6 pages http://dx.doi.org/10.1155/2014/597103
8. H. Mamatha & B. Hemalatha & P. Vinodini & Antony Sylvan D. Souza & S. Suhani Anatomical Study on the Variations in the Branching Pattern of Internal Iliac Artery N Indian Journal of Surgery · January 2012.
9. Fatu C, Puisoru M and Fatu IC. Morphometry of the internal iliac artery in different ethnic groups. *Ann Anat.*2006;188:541-546.
10. Pavan P Havaldar, Sameen Taz, Angadi A.V, Shaik Hussain Saheb. Morphological study of internal iliac artery. Int J Anat Res 2014; Vol 2(2):358-62.
11. Kamina, P., 1981. In: Anatomie ginecologique, ed. Masson, Paris.

Rabindra Bharati Journal of Philosophy

ISSN No. 0973-0087

CERTIFICATE OF PUBLICATION

This is to certify that

Rashmi Bhardwaj*

PhD. Research Scholar, Department of Anatomy, Medical College Baroda, Vadodara, Gujarat.

For the paper entitled

MORPHOLOGICAL AND MORPHOMETRICAL STUDY ON THE ORIGIN OF THE INTERNAL ILIAC ARTERY

Volume No. XXIII, Issue I, 2022

in

Rabindra Bharati Journal of Philosophy

Impact Factor: 4.7

UGC Care Group 1 Journal

Editor-in-Chief