

THE ORIGIN VARIABILITY OF THE ILIOLUMBAR ARTERY: A CADAV- ERIC STUDY WITH CLINICAL SIGNIFICANCE

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ABSTRACT

Introduction: Hemorrhage represents has been considered as the leading cause of maternal death in developing countries and one of the major causes of morbidity and mortality in obstetrics and gynecological surgery. Iliolumbar artery (ILA) is one of the branches of the posterior division of the internal iliac artery. The source of ILA has been documented from all possible neighboring arteries. So the course and ramification of the ILA have received attention for gynecologists and surgeons.

Materials and methods: Study was conducted on 30 bisected pelvises specimens in Department of Anatomy, Gulbarga Institute of medical sciences, Gulbarga. The pattern of origin of the iliolumbar artery (ILA) was identified. The origin and course of ILA were evaluated.

Results: In the present study, we observed the ILA was most commonly originated from the trunk of IIA in 36.67%, from posterior division of IIA in 23.33%, and from the common iliac artery in 13.33%. The incidence of absence of ILA was recorded in 26.67% specimen.

Conclusion: The surgeons, especially while doing pelvic surgeries or obstetrics and gynecology surgeries, should be aware of the normal anatomy of the internal iliac artery and its variations for the successful ligation of the internal iliac artery and for the safe surgical outcomes.

KEY WORDS: iliolumbar artery, posterior division, sacroiliac joint, pelvic hemorrhage.

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Access this Article online	Journal Information
Quick Response code  DOI: 10.16965/ijar.2018.320	International Journal of Anatomy and Research ICV for 2016 90.30 ISSN (E) 2321-4287 ISSN (P) 2321-8967 https://www.ijmhr.org/ijar.htm DOI-Prefix: https://dx.doi.org/10.16965/ijar 
	Article Information
	Received: 12 Jul 2018 Peer Review: 12 Jul 2018 Revised: None
	Accepted: 13 Aug 2018 Published (O): 05 Sep 2018 Published (P): 05 Sep 2018

INTRODUCTION

The internal iliac artery (IIA) is one of the branches of the common iliac artery originates at the level of sacroiliac joint, descends posterior to the greater sciatic foramen and divides into the anterior and posterior division. The branches of the posterior division include iliolumbar artery, lateral sacral artery and the superior gluteal artery [1, 2]. The internal iliac

artery passes through several complex steps during their development in utero which includes angiogenesis, vasculogenesis, arteriogenesis, and remodeling. During development, the IIA derives from the umbilical artery which persists in its proximal part and the distal part gets obliterated postnatally [3].

ILA, as a rule, splits into the lumbar branch running to psoas and quadratus lumborum and

to supply the fifth lumbar vertebrae, and the iliac branch passing to iliacus muscle in the iliac fossa to supply iliac crest. In addition to iliac branch, the iliac crest is supplied by a branch of neighboring arteries i.e. from deep circumflex iliac artery, superior gluteal artery, and fourth lumbar artery. The vascular variations of origin of the iliolumbar artery (ILA) have been well acknowledged in the literature. The source of ILA has been documented from all possible neighboring arteries i.e. common iliac, the trunk of internal iliac, external iliac or from any branch of the internal iliac in both sexes. So the course and ramification of the ILA have received attention for gynecologists and surgeons because the anomalous origin of ILA and its variation are the one of the main etiology of bleeding.

Considering anatomical and clinical importance, an attempt has been made to study the incidence of origin variability of the iliolumbar artery (ILA) from specimens obtained from cadavers as well as to discuss its clinical relevance as described in the literature.

MATERIALS AND METHODS

Out of fifty human cadaveric bisected pelvises, we selected thirty formalin-fixed specimens irrespective of side and sex during the routine dissection in the Department of Anatomy, Gulbarga Institute of medical sciences, Gulbarga. 20 bisected pelvises were excluded due to the previously disrupted vascular structures. The branches of the internal and external iliac artery were dissected after the fat and loose connective tissue surrounding the IIA and vein was removed. After locating the posterior division of IIA, the course of each posterior division branch was traced. The pattern of origin of the iliolumbar artery (ILA) was identified. The origin and course of ILA were evaluated.

RESULTS

In the present study, out of 30 specimens, we categorized our observation into three different sources which give origin to the iliolumbar artery (ILA). They are 1) from the posterior division of internal iliac artery proper 2) from the trunk of internal iliac artery 3) from the common iliac artery. It was observed that 23 of

the 30 (76.67%) bisected pelvises demonstrated a variation of the iliolumbar artery origin (Tab.1).

Table 1: Shows the incidence of different sources of origin of iliolumbar artery.

Sl.No	Origin	No. of Cases (%)
1	From posterior division proper	07 (23.33)
2	From the trunk of the internal iliac artery	11 (36.67)
3	From common iliac artery	04 (13.33)
4	Absent	08 (26.67)

Fig. 1: Origin of the iliolumbar artery from the trunk of the internal iliac artery.

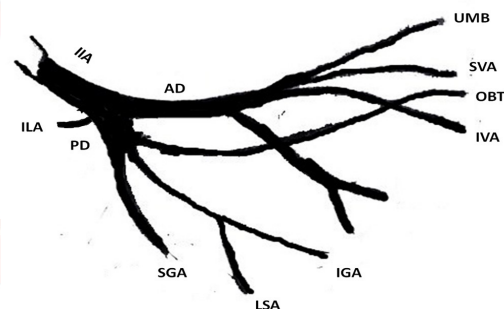


Fig. 2: Origin of the iliolumbar artery from Common iliac artery.

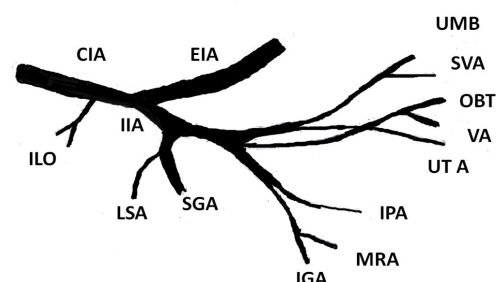
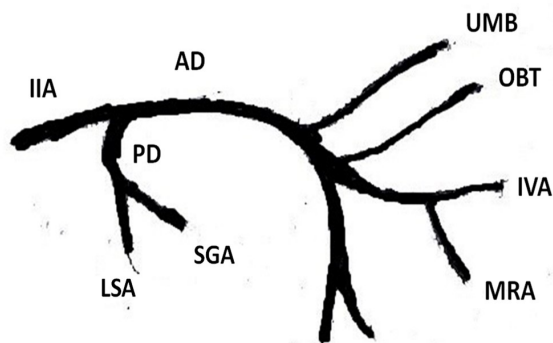
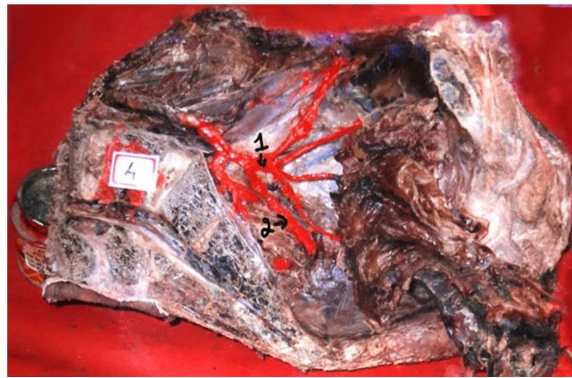


Fig. 3: Absent iliolumbar artery.



The ILA was arising from the posterior division of internal iliac artery which considered as the normal pattern was found in 07 specimens i.e. 23.33%. The iliolumbar artery was found to arise from the trunk of an internal iliac artery in 11 specimens (36.67%) and from common iliac artery, as a direct branch in 04 specimens (13.33%). The iliolumbar artery was found to be absent in (26.67%) 08 specimens (Fig1, 2 & 3).

DISCUSSION

Hemorrhage represents has been considered as the leading cause of maternal death in developing countries and one of the major causes of morbidity and mortality in obstetrics and gynecological surgery⁴. As a consequence, there is renewed interest and a number of studies done in recent years about the branching pattern of the internal iliac artery. However, Kelly was the first to describe ligation of the internal iliac artery during pelvic surgeries to control hemorrhage as early as in 1894⁵. Recent studies suggest that the efficacy of the internal iliac artery ligation during any pelvic surgeries to control hemorrhage varies between 42-75% [6,7]. The surgeons, especially while doing pelvic surgeries or obstetrics and gynecology surgeries, should be aware of the normal anatomy of the internal iliac artery and its variations for the successful ligation of the internal iliac artery and for the safe surgical outcomes. We observed the three different sources from which iliolumbar artery arises. They are 1) from the posterior division of internal iliac artery proper 2) from the trunk of internal iliac artery 3) from the common iliac artery. Comparison of variations related to the origin of the iliolumbar artery (ILA) with different studies was tabulated and compared with present study in table 2.

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

Authors	Origin Variability of iliolumbar artery			
	From posterior division proper	From the trunk of the internal iliac artery	From common iliac artery	Absent
Parson & Keith (1897)[8]	29.80%	1.40%	-	-
Lipshutz (1918) [9]	-	-	-	5%
Chen et al (1999) [10]	-	96.30%	3.70%	-
Yiming et al (2002) [11]	-	100%	-	-
Heye et al (2005) [12]	-	61%	-	-
Bleich et al (2007) [13]	-	28.30%	-	-
Naguib et al (2008) [14]	44%	50%	-	-
Rusu et al (2010) [15]	32.50%	52.50%	8.80%	-
Kiray A et al (2010) [16]	19%	71.40%	4.80%	-
Teli et al (2013) [17]	80%	20%	-	-
Talalwah WA et al (2014) [18]	77.90%	13.80%	2%	4.7
Koc T et al (2016) [19]		70.60%	29.40%	-
Present Study (2018)	23.33%	36.67%	13.33%	26.67%

Based on the series study as well as current study, the origin of the iliolumbar artery was more commonly from the trunk of the internal iliac artery (36.67%). Chen et al, Naguib et al, Rusu et al, Kiray et al & Koc T et al recorded the origin of iliolumbar artery from the trunk of

internal iliac artery as most common origin pattern in 96.3%, 50%, 52.5%, 71.4% and 70.6% cases respectively [10,14,15, 16 & 19]. Our findings were comparable to and consistently lower than the results of Naguib et al [14] (50%) and Rusu et al [15] (52.5%) and higher than the

percent given by the Bleich et al, Teli et al and Al Talalwah et al with the incidence 28.3%, 20% and 13.8% of cases respectively [13,17 & 18]. The highest incidence (100%) was recorded by Yiming et al [11]. He conducted a study on 10 cadavers and found that iliolumbar artery arises from an internal iliac artery in all.

In the present study, next to the trunk of the internal iliac artery, the origin of the iliolumbar artery from the posterior division of IIA proper being common was in 23.33% cases. A study conducted by Teli et al showed that the most common origin of the iliolumbar artery was from the posterior division of IIA proper with the incidence 80% of cases [17]. A similar pattern of origin was observed by Al Talalwah et al with the incidence of 77.9% [18]. The iliolumbar artery arises from posterior division of IIA proper was documented by Naguib et al, Rusu et al in 44% and 32.5% of cases respectively [14,15]. Lowest incidence was reported by Kiray et al in 19% of cases [16].

The third origin variability of the iliolumbar artery (ILA) was from the common iliac artery. In the present study, ILA originated from the common iliac artery in 13.33%. Our findings were comparatively lower than the results of Koc T et al (29.4%)[19] but higher than the percent given by the Talalwah et al (2%) [18].

Last and very rare variation i.e. absence of ILA was also observed in 8 specimens (26.67%). So far very few reports have been documented on the absence of iliolumbar artery. Lipshutz et al and Al Talalwah et al reported the absence of ILA in 5% and 4.7% respectively [9, 18].

Additional to the efficacy of the IIA ligation during any pelvic surgeries to control hemorrhage, ILA and its branches are used in bone reconstructions and particularly in lumbar spinal surgery because it's not a sole and chief artery to supply iliac crest. Due to the close association of the artery with the sacroiliac joint, there is a high risk of the artery being severed during trauma or surgical procedures such as anterior approaches to sacroiliac joint, lumbosacral spinal surgery, and posterior pelvis fractures [20].

CONCLUSION

A detailed analysis of the ILA and its origin

variability can improve our understanding of the vascular complication and complex clinical hemorrhage affecting this region. This study was done in the hope to increase the success of diagnostic evaluation and to improve the effectiveness of surgical approaches to this region.

Conflicts of Interests: None

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How to cite this article:

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