

Case Report: Bilateral Variation of Internal Iliac Artery

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ABSTRACT

Understanding anatomical variations can help physicians achieve better results in clinical practice. During routine dissection, we found variations in the branches of Internal Iliac Artery (IIA) of a 65-year-old Iranian female cadaver. The IIA ended by dividing to an unusual smaller anterior and a greater posterior trunk which was branched to the inferior gluteal arteries. Both pelvis and the uterine artery were separated from the umbilical artery in the left side. In addition, the left iliolumbar artery arose from the main trunk of IIA. Although this cadaver had some uncommon variations, the findings are significant from clinical perspective.

1. Introduction

Internal Iliac Artery (IIA) is the main artery supplying the pelvis. This artery originates as one of the final branches of common iliac artery. It passes the upper brim of true pelvis and finally divides to anterior and posterior trunks at upper border of greater sciatic foramen. The anterior trunk gives rise to the inferior gluteal, internal pudendal, and obturator arteries as parietal branches and the umbilical, superior vesical, inferior vesical (replaced by vaginal artery in women), middle rectal and uterine (only in women) arteries as visceral branches. Normally, the iliolumbar, lateral

sacral, and superior gluteal arteries originate from the posterior trunk of the IIA [1]. Investigating variations in body structures is one the interesting aspects of anatomical sciences, which has a large clinical application. The arteries are seen among the most variant anatomical structures [2]. Diverse variations in dividing IIA into its branches have been reported by other researchers [3]. Here, we report a case with some variations in branching of internal iliac artery.

2. Materials and Methods

We observed some variations in the IIA of both right and left pelvis of a 65-year-old Iranian female cadaver

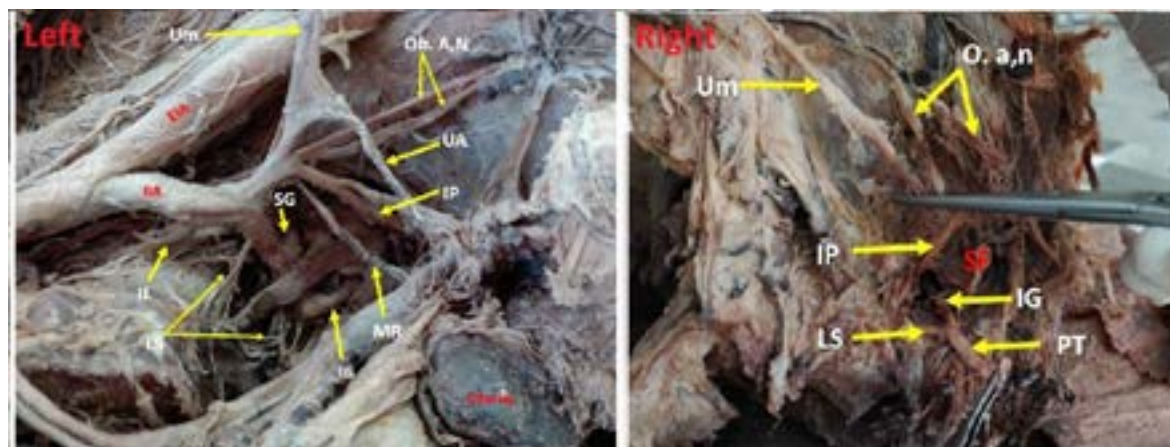
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Figure 1. Internal iliac artery branches in left and right halves of pelvis. IIA: Internal Iliac Artery; EIA: External Iliac Artery; IL: Iliolumbar artery; LS: Lateral Sacral artery; SG: Superior Gluteal artery; IG: Inferior Gluteal artery; IP: Internal Pudendal artery; Um: Umbilical artery; O.a,n: Obturator Artery and Nerve; UA: Uterus Artery; VA: Vaginal Artery; MR: Middle Rectal artery; and SF: Sciatic Foramen. Roots of sacral plexus and sciatic nerve are also seen in left pelvic half.

during routine dissection in the Anatomy Department of Tehran University of Medical Sciences. The IIA was carefully dissected to identify all its branches. To confirm naming of the superior gluteal, inferior gluteal and internal pudendal branches, their route were distally traced in the gluteal region. The artery was photographed by a digital camera.

3. Results

The IIA ended by dividing to an unusual smaller anterior and a greater posterior trunk at upper border of greater sciatic notch. In both right and left IIA, the inferior gluteal artery was unusual in its origin as it arose from the posterior trunk. Following the inferior gluteal branch in left hip showed that this artery passed behind the roots of sacral plexus unlike its usual route on the front of the plexus. Other two branches of the posterior trunks in the left pelvis were lateral sacral and superior gluteal arteries. In the present case, the left iliolumbar artery that usually originates from the posterior trunk, was found to arise from the main stem of the IIA before its bifurcation.

We could not detect the right iliolumbar artery because of its cutting by other students before the report. The end of anterior trunk in both right and left IIA continued as a single internal pudendal artery passing around the ischial spine. Another variation in branching of the IIA was seen in the left uterine artery that originated from umbilical artery. We also could not detect the right uterine artery for the same reason mentioned (Figure 1).

4. Discussion

We reported an Iranian female cadaver with some variations in branching of her internal iliac artery in which the inferior gluteal artery was uncommonly a branch of posterior trunk and the iliolumbar artery originated directly from the main stem of the IIA. According to Chase study, the internal iliac artery separates to its branches in a completely variant way [4]. Based on three large parietal branches of the IIA, including the internal pudendal, superior and inferior gluteal arteries, Adachi described 5 different patterns for dividing this artery into its branches [5].

In the present specimen, the IIA places in type 2 category of Adachi's classification in which the superior and inferior gluteal arteries arose from posterior trunk and the internal pudendal artery was the end branch of the anterior trunk. Different studies have shown that type 2 pattern have second or third prevalence (5.3%-27%) among others [3] with a higher occurrence in women [6]. A study indicates that 20.7% of IIA do not bifurcate to typical anterior and posterior trunks and give rise its branches directly [7]. In the present study, we observed a smaller anterior trunk than usual at the bifurcation of the IIA. Maybe this small trunk is the reason why the uterine artery has originated from the umbilical artery.

Although the main branches do not usually originate from the main trunk of the IIA, one or more small branches like iliolumbar and lateral sacral arteries commonly separate from IIA before its bifurcation [7] as our observation of this separation in iliolumbar artery in this cadaver. Recently, one study has reported the origina-

tion of iliolumbar artery from common iliac artery, main stem of internal iliac artery, and posterior trunk of IIA in 4.8%, 71.4% and 19% of cases, receptively [8]. Apparently, high variation in arterial branching originates in fetal period. Formation of vessels with their divisions into the branches is a complex embryonic process. The vessels are formed, degenerated, and remodeled into their final mature form during fetal period using different genes and complicated signaling pathways. Anatomical arterial variations may develop when these pathways do not work properly [9].

In fetal period, the internal iliac artery is developed by embryonic umbilical artery [9]. Variability in IIA branching pattern is likely due to the different point of origins in fetal vasculature. Understanding of internal iliac artery anatomy as well as course and variations of pelvic vasculature is clinically important and necessary to control hemorrhage and treat other intra- and post-operative complications [10]. Variations of IIA, especially in large branches, are also of importance in radiological procedures like particle embolization of gluteal arteries [11].

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Conflict of Interest

All authors certify that this manuscript has neither been published in whole nor in part nor being considered for publication elsewhere. The authors have no conflicts of interest to declare.

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