

**Case report****VARIATIONS IN THE BRANCHING PATTERN OF THE INTERNAL ILIAC ARTERY IN AN ADULT MALE – A CASE REPORT****Satheesha Nayak B\*, Srinivasa Rao Sirasanagandla, Narendra Pamidi, Raghu Jetti***Department of Anatomy, Melaka Manipal Medical College (Manipal Campus), Manipal University, Manipal, Udupi District, Karnataka State, India***RESUMEN**

Variaciones en el patrón de ramificación de la arteria iliaca interna son ocasionalmente encontradas en las disecciones cadavéricas y las cirugías. Algunas de las variaciones son de importancia quirúrgica y clínica e ignorarlas podría derivar en alarmantes sangrados durante las prácticas quirúrgicas. Evaluamos las variantes en el patrón de la arteria iliaca interna en un cadáver masculino. La división de la arteria iliaca interna dio origen a las arterias rectal media y obturatriz. La arteria vesical superior tenía su origen en la arteria obturatriz. La división posterior de la arteria iliaca interna dio lugar a las arterias iliolumbar, sacra lateral, glútea superior y pudenda interna. La arteria glútea inferior estaba ausente.

**Palabras clave:** *Arteria iliaca interna; vasos pélvicos; arteria glútea inferior; arteria obturatriz; arteria vesical superior.*

**ABSTRACT**

Variations in the branching pattern of the internal iliac artery are occasionally encountered during cadaveric dissections and surgeries. Some of the variations are of surgical and clinical importance and ignoring them might result in alarming bleeding during surgical procedures. We report variant branching pattern of the right internal iliac artery in a male cadaveric specimen. The anterior division of the internal iliac artery gave origin to obturator and middle rectal arteries. Superior vesical artery took its origin from the obturator artery. The posterior division of the internal iliac artery gave iliolumbar, lateral sacral, superior gluteal and internal pudendal arteries. The inferior gluteal artery was absent.

**Key words:** *Internal iliac artery; pelvic vessels; inferior gluteal artery; obturator artery; superior vesical artery*

**INTRODUCTION**

Internal iliac artery is one of the terminal branches of the common iliac artery. It supplies the organs of the pelvis and the proximal part of the thigh, the gluteal region and the perineum. A number of complications can be caused when the artery or its branches are damaged during surgery. The complications include buttock claudication, sexual dysfunction, colon ischemia, and distal spinal cord infarction and gluteal necrosis. Normally the artery divides into anterior and posterior divisions. The anterior division in males gives superior vesical, inferior vesical, middle rectal, obturator, internal pudendal and inferior gluteal arteries. In females the inferior vesical artery is usually absent and the vaginal and uterine arteries are the additional branches from the anterior division (Williams et al, 1995). The posterior division gives iliolumbar, lateral sacral and superior gluteal arteries. The knowledge of variations in the course and branching pattern of these vessels is very useful in planning surgeries of the pelvis and gluteal regions.

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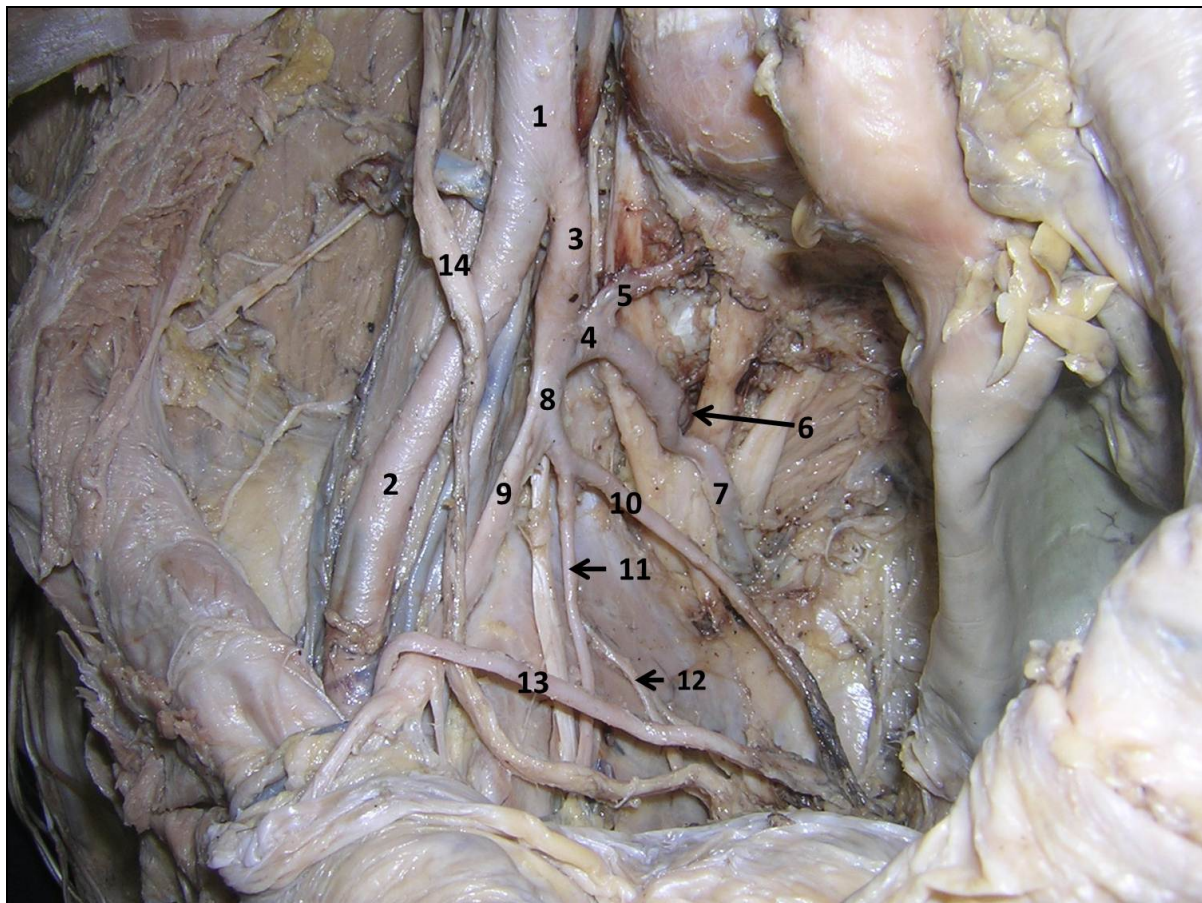
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## CASE REPORT

During dissection classes for medical under graduates, we observed variations in the branching pattern of the right internal iliac artery. The variations were found in an adult male cadaver of Indian origin aged approximately 65 years (Fig. 1 and Fig. 2). The variant vessels were dissected and photographed according to conventional dissection methods (Romanes, 2004). The internal iliac artery first divided into anterior and posterior divisions. The anterior

division divided into obturator and middle rectal arteries. The superior vesical artery arose from the obturator artery. The inferior vesical artery was absent. The middle rectal and superior vesical arteries supplied the areas that are usually supplied by the inferior vesical artery. The posterior division of the internal iliac artery gave iliolumbar, lateral sacral, superior gluteal and internal pudendal arteries. The inferior gluteal artery was absent. The superior gluteal artery supplied the gluteus maximus muscle in addition to gluteus medius and minimus muscles.



**Figure 1.** Dissection of the right internal iliac artery showing its abnormal branching pattern. 1 – Common iliac artery; 2 – external iliac artery; 3 – internal iliac artery; 4 – posterior division; 5 – lateral sacral artery; 6 – superior gluteal artery; 7 – internal pudendal artery; 8 – anterior division; 9 – medial umbilical ligament; 10 – middle rectal artery; 11 – obturator artery; 12 – superior vesical artery; 13 – vas deferens; 14 – ureter.

## DISCUSSION

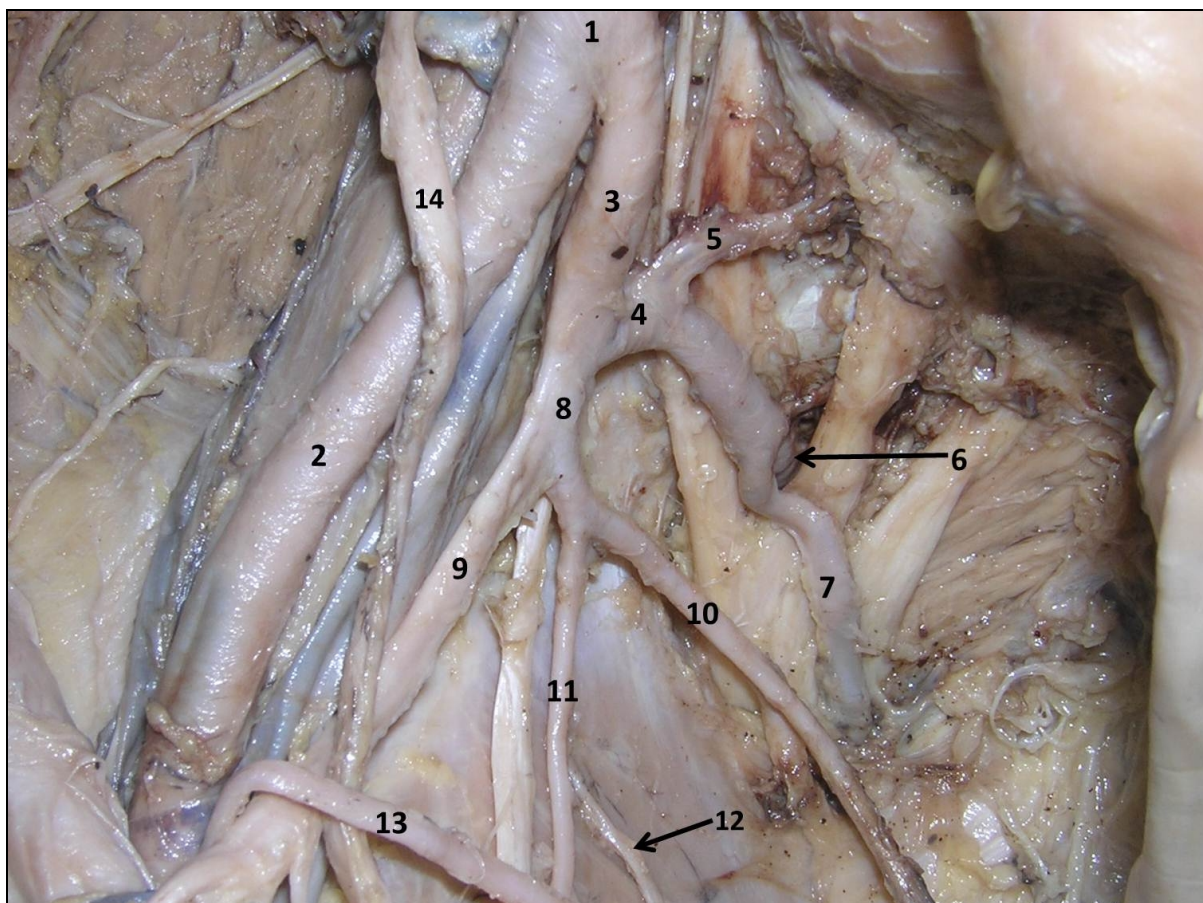
Variations in the branching pattern of internal iliac artery (IIA) are common. Erroneous interpretation

and ligation of branches of IIA is the unexpected source of hemorrhage in obstetrics and gynaecology surgeries. Therefore, knowledge of distribution pattern of this artery is pivotal for



successful performance of pelvic surgeries. Successful ligation of IIA is important for surgeons, as efficacy of ligation of this artery in pelvic surgeries varies between 42–75% (Das and Biswas, 1998; Papp et al, 2006). Jastschinski (1891) was the first person who grouped the variations of parietal branches of the IIA in the Polish population; he classified the vessels into four definite types. Later, Adachi et al (1928) classified the branching pattern of IIA into five types with 8 groups by slightly modifying Jastschinski's method in a study on Japanese

subjects. In both studies classification was based on the variations in the origin of parietal branches namely umbilical, superior gluteal, inferior gluteal and internal pudendal arteries. Adachi in his classification defined umbilical artery as a continuation of stem of IIA. However, umbilical artery is the main branch during embryological development and is no longer important in postnatal life. So to clarify and simplify the original basic branching pattern of IIA, Yamaki et al (1998) modified the Adachi's classification by excluding umbilical artery.



**Figure 2.** Closer view of the dissection of the right internal iliac artery showing its abnormal branching pattern. 1 – Common iliac artery; 2 – external iliac artery; 3 – internal iliac artery; 4 – posterior division; 5 – lateral sacral artery; 6 – superior gluteal artery; 7 – internal pudendal artery; 8 – anterior division; 9 – medial umbilical ligament; 10 – middle rectal artery; 11 – obturator artery; 12 – superior vesical artery; 13 – vas deferens; 14 – ureter.

In Yamaki's classification, the mode of branching of IIA is divided into four groups (Yamaki et al, 1998). In group A, the internal iliac artery divides into two branches, the common trunk of the inferior gluteal and internal pudendal arteries and

the superior gluteal artery. In group B, the internal iliac artery divides into two branches, the common trunk of the superior gluteal and inferior gluteal arteries and the internal pudendal artery. In group C, the internal iliac artery simultaneously

divides into three major branches. In group D, the internal iliac artery divides into the common trunk for the superior gluteal and internal pudendal arteries and the inferior gluteal artery. He conducted a study in 645 pelvic halves of Japanese cadavers wherein 79.5% specimens showed group A pattern. Furthermore, group B, group C and group D pattern was found respectively in 15%, 5.3% and 0.2% specimens. In the present case, we report a unique variant branching pattern of IIA. It is in conformity with group D pattern where internal iliac artery gave a common trunk for superior gluteal and internal pudendal arteries but there was complete absence of inferior gluteal artery. During embryonic life the most appropriate channels of developing IIA enlarge whereas the others get retracted or disappear to give final arterial pattern (Fitzgerald, 1978). In this process sometimes there is chance of disappearance of one of the major appropriate channels which will result in variant arterial pattern.

Understanding of normal and abnormal anatomy of branching pattern of IIA is essentially important in medical practice for arterial ligation and during various surgical procedures of pelvic organs. This knowledge is also useful to radiologists to guide the interventional intra-arterial devices to prevent the hemorrhages of pelvic fractures during arterial embolization, during embolization for pelvic tumors and for selective catheterization of intra-arterial chemotherapy.

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