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Case Report

Anatomy Section

Multiple Variations in the Pelvic Vasculature – A Case Report

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ABSTRACT

A thorough knowledge of possible variations of pelvic vasculature is very useful for surgeons, gynaecologists, radiologists, urologists and orthopaedic surgeons. We report multiple vascular variations in the left half of the pelvis of an adult male cadaver. Iliolumbar artery arose from the main trunk of the internal iliac artery. Posterior division of the internal iliac artery gave two lateral sacral arteries and a superior gluteal artery. The anterior division of the internal iliac artery gave origin to superior vesical, inferior vesical, inferior gluteal and internal pudendal arteries. The internal pudendal artery gave origin to a common trunk before leaving the pelvis. The common trunk divided into middle rectal artery and deep artery of the penis. The obturator artery took origin from the inferior epigastric artery and descended downward to the pelvis and left the pelvis by passing through the obturator foramen. Most of the other veins accompanying the arteries joined to form a plexus on the superior surface of the pelvic diaphragm. This plexus condensed to form anterior and posterior divisions of the internal iliac vein. Apart from this, the posterior part of the plexus drained directly into the common iliac vein through a large unnamed vein.

Keywords: Deep artery of penis, Internal iliac artery, Internal iliac vein, Internal pudendal artery, Obturator artery

CASE REPORT

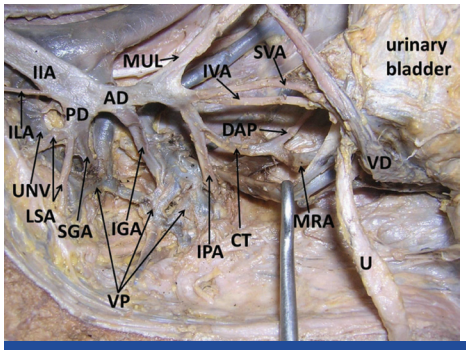
During dissection classes for undergraduate medical students, we observed multiple vascular variations in the left half of the pelvis. These variations were found in an adult male cadaver aged approximately 70 y. Iliolumbar artery arose from the main trunk of the internal iliac artery. Posterior division of the internal iliac artery gave two lateral sacral arteries and a superior gluteal artery. The anterior division of the internal iliac artery gave origin to superior vesical, inferior vesical, inferior gluteal and internal pudendal arteries. The internal pudendal artery gave origin to a common trunk before leaving the pelvis. The common trunk divided into middle rectal artery and deep artery of the penis. The deep artery of the penis ran along the lateral wall of the pelvis above the pelvic diaphragm and entered the crus of the penis by passing below the body of the pubis. On the way to penis, this artery gave a prostatic branch in the anterior part of the pelvic cavity. The obturator artery took origin from the inferior epigastric artery and descended downward to the pelvis and left the pelvis by passing through the obturator foramen. Obturator vein drained into the anterior division of the internal iliac vein. Most of the other veins accompanying the arteries joined to form a plexus on the superior surface of the pelvic diaphragm. This plexus condensed to form anterior and posterior divisions of the internal iliac vein. Apart from this, the posterior part of the plexus drained directly into the common iliac vein through a large unnamed vein. All the variations are shown in [Table/Fig-1-3]. There were no notable variations in the right half of the pelvis.

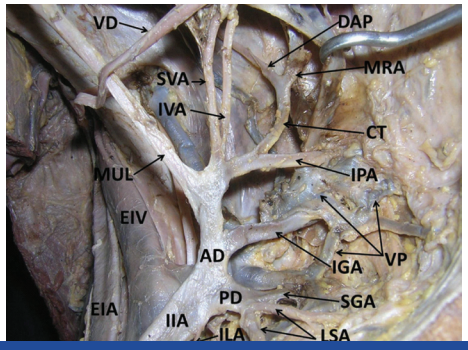
DISCUSSION

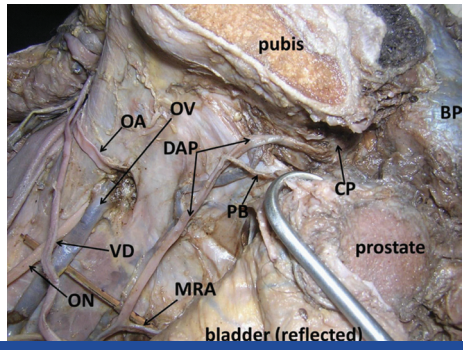
Branches of internal iliac artery supply oxygenated blood to the pelvic viscera, walls of pelvis, external genitalia and proximal part of lower limbs. Tributaries of the internal iliac vein collect the venous blood from corresponding areas. The internal iliac artery first divides into anterior and posterior divisions. Obturator, superior and inferior vesical, middle rectal, internal pudendal, inferior gluteal arteries arise from the anterior division in males and iliolumbar, lateral sacral and superior gluteal arteries arise from the posterior division [1]. The veins accompanying the branches of the internal iliac artery terminate into internal iliac vein.

Internal iliac artery frequently shows variations in its branching pattern classified into different types by previous studies. Jastschinski [2] has classified the branching of internal iliac artery into four types. Adachi et al., [2] and Yamaki [3] have classified the branching pattern into five types. Though the textbooks of anatomy describe the iliolumbar artery as a branch from the posterior division of the internal iliac artery, in many cases it takes origin from the main trunk of internal iliac artery. One of the recent studies [4] reports its origin from common iliac artery in 4.8%, from main trunk of internal iliac artery in 71.4 % and from posterior division of internal iliac artery in 19% of cases. In the current case it arose from the main trunk of internal iliac artery. Lateral sacral artery is one of the constant branches of posterior division of the internal iliac artery. It usually divides into upper and lower lateral sacral arteries; which re-divide to give four branches. These four branches enter the four ventral sacral foramina. In the current case, two lateral sacral arteries arose from the posterior division of the internal iliac artery. Obturator artery is one of the variable branches of internal iliac artery. It may arise directly from internal iliac artery, posterior division of internal iliac artery, external iliac artery or inferior epigastric artery [5-7]. Aberrant origin of the obturator artery, especially from the inferior epigastric artery is dangerous in pelvic fractures. Its injury can result in unidentified haemorrhage [8]. It can also bleed during widening of femoral ring for femoral hernia reduction. Hence, this origin of the artery and its anastomosis is often termed “corona mortis” or “crown of death”. In the current case, the obturator artery arose from the inferior epigastric artery, but there was no accompanying vein. The obturator vein terminated into the anterior division of the internal iliac vein.

One of the unique features of the current case is the origin of the deep artery of the penis and middle rectal artery through a common trunk from the internal pudendal artery. The deep artery of the penis ran anteriorly through the pelvic cavity, above the pelvic diaphragm before reaching the crus of the penis. It also gave a branch to the prostate. The deep artery of the penis observed here resembles the accessory pudendal artery which has been already reported in the literature [9,10]. But it varies from the earlier reports as it arose with middle rectal artery from a common trunk. Knowledge of this artery is extremely important because it might result in bleeding during







[Table/Fig-1]: Neatly dissected branches of left internal iliac artery
(IIA – internal iliac artery; AD – anterior division; PD – posterior division; ILA – iliolumbar artery; LSA – lateral sacral artery; SGA – superior gluteal artery; IGA – inferior gluteal artery; IPA – internal pudendal artery; CT – common trunk; MRA – middle rectal artery; DAP – deep artery of penis; U – ureter; VD – vas deferens; SVA – superior vesical artery; IVA – inferior vesical artery; MUL – medial umbilical ligament; VP – venous plexus; UNV – unnamed vein opening directly into the common iliac vein)

[Table/Fig-2]: Superior view of the branches of left internal iliac artery
(IIA – internal iliac artery; AD – anterior division; PD – posterior division; ILA – iliolumbar artery; LSA – lateral sacral artery; SGA – superior gluteal artery; IGA – inferior gluteal artery; IPA – internal pudendal artery; CT – common trunk; MRA – middle rectal artery; DAP – deep artery of penis; VD – vas deferens; SVA – superior vesical artery; IVA – inferior vesical artery; MUL – medial umbilical ligament; EIA – external iliac artery; EIV – external iliac vein; VP – venous plexus)

[Table/Fig-3]: Anterolateral part of the left pelvic wall showing the abnormal course of the deep artery of the penis
(MRA – middle rectal artery; DAP – deep artery of penis; VD – vas deferens; ON – obturator nerve; OA – obturator artery; OV – obturator vein; PB – prostatic branch of deep artery of the penis; CP – crus of the penis; BP – bulb of penis)

prostatectomy and can also be the cause of erectile dysfunctions [11,12].

Internal iliac vein and its tributaries are also known to show variations. A recent Multidetector computed tomography study has classified these variations into 8 types [13]. In the current case, we observed a venous plexus formed by union of veins coming from prostate, bladder, rectum and other pelvic viscera. There is no report yet on a venous plexus uniting most of the pelvic veins. This plexus may be the route of spread of prostate cancer to all the pelvic organs. Posterior part of the plexus drained directly into common iliac vein through a sufficiently large vein. The knowledge of this unusual plexus may be of importance during sacral screw placement [14], treating organic impotence [15] and in pelvic surgeries [16].

CONCLUSION

Though some of the variations mentioned in the current case have been reported earlier, the pelvic venous plexus and the common trunk of origin for middle rectal artery and the deep artery of the penis are two unreported variations having tremendous functional, surgical and radiological importance.

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