



Figure 1: Photograph showing the abnormal origin and drainage pattern of *obturator* vessels on the left side of the pelvic wall of a female adult cadaver.

IM = iliacus muscle; FN = femoral nerve; CIA = common iliac artery; EIA = external iliac artery; EIV = external iliac vein; IIA = internal iliac artery; OV = obturator vein; ON = obturator nerve; PT = posterior trunk; SGA = superior gluteal artery; LST = lumbosacral trunk; OA = obturator artery; AT = anterior trunk; SP = sacral promontory.

of the anterior margin of the greater sciatic notch and proceeded into the anterior and posterior trunk. The anterior trunk continued into the pelvis and supplied blood to the pelvic viscera through its branches. The posterior trunk divided into the iliolumbar, lateral sacral and superior gluteal arteries. The superior gluteal artery passed along the upper margin of the *piriformis* through the greater sciatic foramen.

The left *obturator* artery originated from the superior gluteal artery in the pelvic cavity and passed along the lateral pelvic wall to enter the *obturator* canal, below the *obturator* nerve. The left *obturator* vein, instead of draining normally into the internal iliac vein, drained into an external iliac vein and crossed the pelvic brim [Figure 1]. The right-sided anatomy of the *obturator* vasculature was normal, as were relations between the vasculature and *obturator* nerve in the *obturator* foramen and canal. No variations were observed in any of the other arteries, nerves or muscles.

Discussion

Anatomical knowledge of the *obturator* vasculature is important in surgeries related to the pelvic brim and the gluteal and adductor compartments of the thigh.^{3,4} The *obturator* artery chiefly supplies blood to the adductor compartment of the thigh as well as the smaller pelvic branches. Generally, the *obturator* artery originates from the anterior trunk of the internal iliac artery and follows the normal route along the lateral pelvic wall, to enter the thigh through the *obturator*

canal.¹ However, the origin of the *obturator* artery is highly variable.⁵ In a study of 50 cadavers, Rajive *et al.* found *obturator* arteries arising from various locations, including the common trunk of the internal iliac artery (4%), anterior trunk of the internal iliac arteries (54%), inferior epigastric artery (22%), superior gluteal artery (2%), internal pudendal trunk (2%), inferior gluteal artery (2%) and the external iliac artery (4%).⁶ Bilgiç *et al.* reported a female newborn with a common arterial trunk arising from the medial side of the external iliac artery which subsequently divided into the *obturator* and inferior epigastric arteries.⁷

In more than one-third of cases, the anastomotic connection between the pubic branch of the inferior epigastric and *obturator* arteries can become enlarged; this is known as an “abnormal” *obturator* artery.⁸ Jusoh *et al.* reported that the origin of the *obturator* artery was the posterior division of the internal iliac artery in approximately 5.8% of cases and that this anomalous artery divided into an inferior vesical branch leading to the prostate.⁹ In the present case, the *obturator* artery originated from the superior gluteal artery on the left side and traversed the lateral pelvic wall along with the *obturator* nerve to enter the *obturator* canal. An abnormal origin of the *obturator* artery from the superior gluteal artery may have important surgical implications, particularly for female patients undergoing superior gluteal artery perforator flap surgery for breast augmentation/construction or to treat sacral pressure sores.¹⁰ Usually, veins in the pelvis and in the lower limbs follow the same course as the arteries; Nagabhooshana *et al.* reported a case wherein the *obturator* artery arose from the external iliac artery and the *obturator* vein drained into the external iliac vein, implying that the arteries were followed by the veins.¹¹ However, in the present case, the artery arose from the superior gluteal artery while the left *obturator* vein drained into the external iliac vein and crossed the pelvic brim before termination. This type of vasculature may affect laparoscopic surgeries or open pelvic brim surgeries.³

The embryological basis for such variations in the vasculature of the limbs depends on the selection of the channels from the primary capillary plexus; the most appropriate channels will enlarge while others will retract and gradually disappear, thus establishing the final vascular pattern.^{12,13} Another explanation for abnormal vasculature could be angiogenesis as a result of hypoxia.¹⁴ Low oxygen saturation leads to the stabilisation of hypoxia-inducible factor 1- α which upregulates vascular endothelial growth factor A and nitric oxide synthase expression. Subsequently, the production of nitric oxide causes dilatation of the existing vessels and extravasation of plasma proteins,