

MULTIPLE VASCULAR VARIATIONS IN A SINGLE CADAVER: A CASE REPORT

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Abstract

A sound knowledge of variations of blood vessels is important during operative, diagnostic and endovascular procedures in the abdomen and pelvis. Three variations were found during routine dissection in an approximately 55yr old male cadaver. Three arterial variations are described - presence of right accessory renal artery arising from the abdominal aorta, the testicular artery arising from the accessory renal artery and the obturator artery arising from the posterior division of internal iliac artery. These observations have implications for abdominal and pelvic surgeons and are of academic interest to anatomists. Surgeons dealing with kidney transplantation and obturator hernia need to be aware of these observations.

Keywords: Abdominal aorta, Accessory renal artery, Testicular artery, External iliac artery, Obturator artery

Introduction

Renal arteries are a pair of lateral branches of abdominal aorta just below the level of the origin of superior mesenteric artery. The accessory renal arteries also seen frequently (1,2,3), especially on the left. They usually enter above or below the renal hilum; if below, the accessory renal arteries crosses anterior to the ureter and on the right side, usually also anterior to the inferior vena cava. (1)

The testicular arteries usually arise anteriorly from the abdominal aorta at the level of the second lumbar vertebra, a little inferior to the origin of renal arteries. Each passes inferolaterally under the parietal peritoneum into the pelvic cavity. The right testicular artery lies anterior to the inferior vena cava. It may originate from the renal artery or as a branch from a suprarenal or lumbar artery (1). The rate of anatomical variation of testicular arteries has been reported to be 4.7% and their origin was either from unusually high level of aorta or from the renal artery (4).

The obturator artery is one of the branches of anterior division of internal iliac artery. It inclines anteroinferiorly on the lateral pelvic wall to the upper part of obturator foramen, leaving the pelvic cavity by obturator canal. It divides into anterior and posterior branches. Also it has got iliac branch, vesical branch and pubic branch (1).

The present case is an observation of variations in the origin and course of three vessels in a single

cadaver. The origin of right testicular artery from right accessory renal artery is very rare (5). The origin of Obturator artery as a separate branch from the posterior division of internal iliac artery is found in 9% of cases (6). The knowledge about anatomical variation of these arteries are very important for surgeons operating in abdomen and pelvis.

Case Report

During the routine dissection of an approximately 55 yr old male cadaver at Yenepoya Medical College, Mangalore, we observed the following variations; 1- presence of an accessory renal artery on the right side arising from abdominal aorta (Fig. 1A), 2 - right testicular artery arising from accessory renal artery (Fig. 1B), and 3 - the obturator artery from the posterior division of internal iliac artery (Fig. 2). The right accessory renal artery to the lower pole originated from lateral part of the abdominal aorta about 0.5 cm from the origin of right renal artery. The right testicular artery arose from right accessory renal artery for lower pole about 1 cm from its origin. The accessory renal artery and the right testicular artery were passing posterior to the inferior vena cava. The above variation was unilateral. The right obturator artery arose separately from the posterior division of internal iliac artery and passing posterior to the branches of anterior division and internal iliac vein to reach the obturator foramen.

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Fig. 1 – Photograph taken during dissection shows Origin of right accessory renal artery from abdominal aorta (A) and right testicular artery from accessory renal artery (B). (1-Inferior vena cava; 2-Abdominal aorta; 3-Right renal vein; 4-Left renal vein; 5-Right main renal artery; 6-Right Accessory renal artery; 7-Right testicular artery; 8-Right testicular vein; 9-Ureter; 10-Inferior mesenteric artery

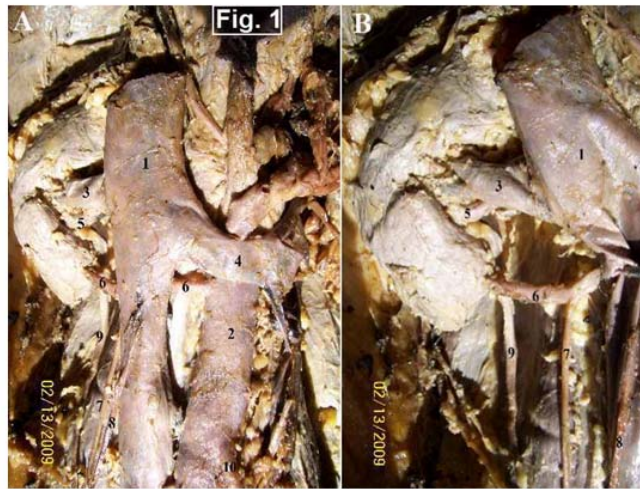


Fig. 2 – Right side of the pelvis showing the origin of right obturator artery (arrow) from the posterior division of internal iliac artery (1-Internal iliac artery; 2-anterior division; 3-Posterior division; 4-External iliac artery; 5-Obturator Artery; 6-Obturator nerve).



Discussion

Most of the abnormalities in the renal arteries are due to the various developmental positions of kidney (7). The kidneys begin their development in the pelvic cavity. During further development they ascend to their final position in the lumbar region. When the kidneys are located in the pelvis, they are supplied by branch of internal iliac artery or common iliac arteries. While the kidneys ascend to lumbar region, their arterial supply also shifts from common iliac artery to abdominal aorta. It is important to be aware that accessory renal arteries are end arteries; therefore, if an accessory renal artery is ligated, the part of kidney supplied by it is likely to become ischemic (3). In a study conducted by Dhar and Lal accessory renal arteries were observed in 20%

of specimens. The anomaly was unilateral in 15% cases and bilateral on 5% of cases (8).

The developmental origins of testicular blood vessels are very complex. Nine lateral mesonephric arteries are divided into the cranial, middle and caudal group. The testicular arteries represent persistent lateral splanchnic aortic branches which enter the mesonephros and cross ventral to the supracardinal but dorsal to the subcardinal vein. Normally lateral splanchnic artery which persists as the right testicular artery passes caudal to the suprasubcardinal anastomosis forming part of the inferior vena cava. When it passes cranial to this, the right testicular artery is behind the inferior vena cava (1,9).

Certain vascular and developmental anomalies of kidneys can be associated with variations in the course of the gonadal arteries. These anomalies are explained by the embryological development of both of these organs from the intermediate mesoderm of the mesonephric crest. Further the vasculature of kidneys and gonads derived from the lateral mesonephric branches of dorsal aorta (9).

Salve et al. has reported a variation in which the right testicular artery was arising from right aberrant artery, both coursing anterior to inferior vena cava. The variation was associated with the presence of bilateral aberrant renal arteries for lower pole arising from abdominal aorta and aberrant renal arteries for upper pole arising from the renal artery. In our case, both the accessory renal artery and right testicular artery were coursing posterior to inferior vena cava.

Vascular variations have always been subject of controversy, as well as curiosity because of their clinical significance. There is, perhaps no artery of proportionate size having a variable an organ as that of the obturator artery nor has any similar artery attracted greater attention among pelvic surgeons, anatomists (10). Anson's group has reported the occurrence of a variation of obturator artery, it is documented that in 41.4% of cases it may arise from the common iliac or anterior division of internal iliac, in 25% from inferior epigastric, in 10% from superior gluteal and 1.1% from external iliac artery (11).

These variations reported in our case in different regions of abdomen and pelvis are important not only in the view of development but also important for the surgeons dealing with kidney transplantation, obturator hernias and urogenital surgical procedures.

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