



Variant origin of right testicular artery — a rare case

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ABSTRACT

Testicular arterial anatomy is important for testicular and renal surgeries. It may vary at the origin and arise from renal artery, suprarenal artery or lumbar artery. During routine dissection of 52-year-old male cadaver; the right testicular artery arising from right aberrant renal artery was found. Anatomical variation of testicular arteries is reported to be 4.7%. Presence of aberrant renal artery is seen in 13–16% of cases only. The origin of right testicular artery from right aberrant renal artery is very rare. Thus knowledge of this type of variation is very important in avoiding complications during operative surgeries. © IJAV. 2010; 3: 22–24.

Key words [testicular artery] [renal artery] [aberrant renal artery] [anatomical variation]

Introduction

The testicular artery usually arises from the anterolateral aspect of the abdominal aorta at the level of the second lumbar vertebra, 2.5 to 5 cm caudal to renal artery. It may originate from the renal artery or as a branch from a suprarenal or lumbar artery. The testicular artery courses obliquely downwards and laterally behind the peritoneum into pelvic cavity [1,2].

The lateral splanchnic arteries which are branches of the dorsal aorta at embryonic stage persists bilaterally as testicular and three suprarenal arteries. 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 [1,2].

According to Notkovich, the gonadal arteries have been classified into three types based on their anatomical relationship to the renal vein: type I – gonadal arteries arising from the renal aorta behind or below the renal vein and passing downwards and laterally into inguinal canal, type II – gonadal arteries arising from the aorta at the level of the renal vein and crossing in front of it, type III – gonadal arteries arising from the aorta behind or below the renal vein and course upwards to arch over the renal vein [3].

In 4.7 % of cases anatomical variation of testicular arteries has been reported and their origin was either from unusually high level of aorta or from the renal artery [4]. Aberrant renal arteries on both sides are found in 13–16 % of cases [5]. Origin of right testicular artery from right aberrant renal artery is very rare. To the clinician any unusual course or location of the testicular artery may be of importance in pursuing a course of specific surgical procedures or in diagnostic pathology associated with testicular anatomy.

Case Report

During routine dissection of 52-year-old male cadaver for academic session 2008-2009 at Narayana Medical College, Nellore; the right testicular artery arising from right aberrant renal artery was found (Figures 1,2). This 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. Right aberrant renal artery for lower pole originated from front of the abdominal aorta at the level of L2. Right testicular artery arose from right aberrant renal artery for lower pole about 0.5 cm from its origin. Right aberrant renal artery for upper pole arose from right renal artery about 1cm away from medial border of the kidney. Right renal artery arose from abdominal aorta just below the origin of coeliac trunk probably at the level of upper border of L1 vertebra.

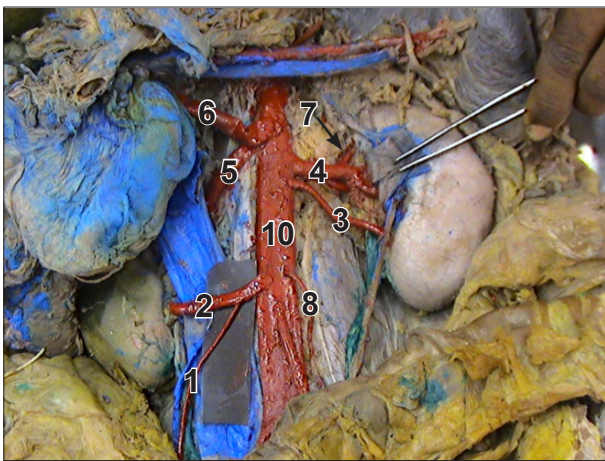


Figure 1. Photograph taken during dissection shows right and left renal, testicular and aberrant renal arteries. (1: right testicular artery; 2: right aberrant renal artery for lower pole; 3: left aberrant renal artery for lower pole; 4: left renal artery; 5: right renal artery; 6: coeliac trunk; 7: left aberrant renal artery for upper pole; 8: left testicular artery; 10: abdominal aorta)

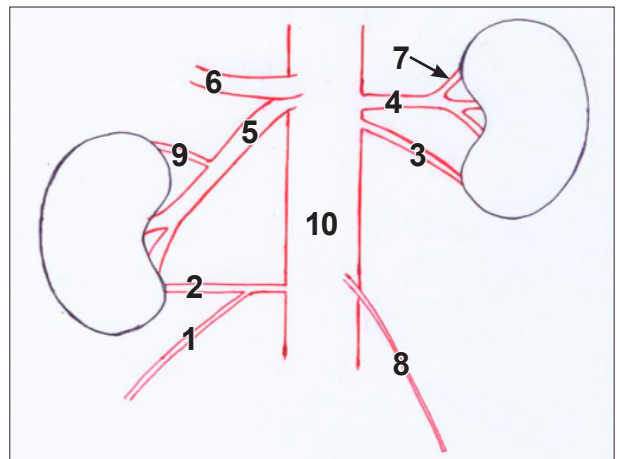


Figure 2. Schematic diagram showing variations found in present case. (1: right testicular artery; 2: right aberrant renal artery for lower pole; 3: left aberrant renal artery for lower pole; 4: left renal artery; 5: right renal artery; 6: coeliac trunk; 7: left aberrant renal artery for upper pole; 8: left testicular artery; 9: right aberrant renal artery for upper pole; 10: abdominal aorta)

Left aberrant renal artery for lower pole originated from front of the abdominal aorta at the level of L1 just below the origin of the left renal artery. Left testicular artery arose from abdominal aorta. Left aberrant renal arteries arose from left renal artery about 1cm away from medial border of the kidney. Left renal artery arose from abdominal aorta at the level of L1.

Discussion

Cases have been reported previously of accessory testicular arteries, bilateral accessory renal and testicular arteries, doubling of renal and testicular arteries and variations in the origin of testicular vasculature. The present case is unique for variation of origin of right testicular artery branch of right aberrant renal artery for lower pole. This variation also associated with presence of bilateral aberrant renal arteries for lower pole direct branches from abdominal aorta and presence of bilateral aberrant renal arteries for upper pole branches of renal arteries.

Pai et al. studied 34 adult male cadavers for the variations in the origin, number and course of the testicular artery. They found the testicular artery was normal in the origin, number and course in 85.3 % of the cases. In the 14.7 % of the cases variations in the origin, number and course were found. In 5 (3 right, 2 left) sides (7.4 %) the testicular artery was a branch of the inferior polar artery. On one right side the testicular artery was branch of the renal artery. On three left side the testicular artery arose from the higher origin than usual. Double testicular artery (medial & lateral) were found on one right side. The lateral testicular artery arose from the upper prehilum right renal artery. The medial testicular artery emerged on the anterior surface of the abdominal aorta [6].

Soja et al. studied 98 kidneys of 50 healthy potential renal transplant donors by conventional angiography. One accessory renal artery present in 39 % (n=9) of kidneys. In 14 sides (14 %) the gonadal artery (11 right, 3 left)

originated from the renal artery. Ten out of 14 kidneys with an aberrant gonadal artery had an associated renal artery. In 9 cases, the gonadal artery originated from accessory renal artery. In one cases it originated from main renal artery. They hypothesized that aberrancies of gonadal artery are a part of a common embryologic error resulting in the persistence of the future renal arteries [7].

Gurses et al. found bilateral variation of renal and testicular arteries. On the right side two renal (upper and lower hilar arteries) and testicular arteries present. The upper hilar renal artery originated from the abdominal aorta just inferior to superior mesenteric artery. The lower hilar renal artery originated from the abdominal aorta distally and before entering the inferior end of hilum it gave a superior testicular branch from its superior aspect. The inferior testicular artery originated proximal to the inferior mesenteric artery on the anterolateral aspect of the aorta [8].

Ozkan et al. studied 855 patients by angiography in the Cukurova region of Turkey. A single renal artery was present in both kidneys in 76 % of patients. Renal artery variations included multiple arteries in 24%, bilateral multiple arteries in 5%, and early division in 8% of cases. Additional renal arteries on the right side were found in 16% and on the left side in 13% of cases. Aberrant renal arteries were found in 39% of cases [5].

The developmental origins of testicular blood vessels are very complex. Nine lateral mesonephric arteries are divided into the cranial, middle and caudal group. One of the caudal arteries usually persists and differentiates into the definitive gonadal artery. The persistence of cranial lateral mesonephric artery results in a high origin of the gonadal artery, probably from supra renal or from a more superior aortic level. Persistence of more than one lateral mesonephric arteries result in doubled, tripled or quadrupled gonadal arteries. If the kidney ascends much

higher carrying its renal vein to a higher level than the origin of gonadal artery, the latter will be forced to follow an arched course around the vein [3,6,9].

This variation in our case is important, not only from a developmental standpoint, but also from a physiological

prospective. Accessory arterial vasculature and an unusual origin and path of the testicular and renal arteries is worth reporting in efforts to educate clinicians involved in abdominal and urogenital surgical procedures.

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