

ANOMALOUS ORIGIN OF LEFT TESTICULAR ARTERY FROM AN ADDITIONAL RENAL ARTERY

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SUMMARY

Gonadal arteries arising from additional renal arteries present an important variation that should be noted in order to avoid inadvertent injury to these vessels in renal hilar dissection and retroperitoneal surgery. During routine dissection, we observed the unusual origin of the left testicular artery from an additional renal artery in a middle-aged male cadaver. The prevalence of variations in the origin and course of the testicular artery displays population differences. Though additional renal arteries have been reported in literature, cases of such vessels giving rise to gonadal vessels are scarce. The possible embryologic basis for this variation as well as its clinical significance are discussed.

Key words: Variations, renal arteries

INTRODUCTION

Testicular arteries usually arise from the anterolateral aspect of the abdominal aorta inferior to the origin of the renal arteries at the level of the second lumbar vertebra (Standring, 2008). This origin is however variable as these vessels have been reported to arise from the renal artery, middle suprarenal, one of the lumbar arteries, common or internal iliac artery or the superior epigastric artery

CASE REPORT

During routine dissection at the Department of Human Anatomy, University of Nairobi, we observed the presence of an additional renal artery in a middle-aged male formalin-fixed cadaver of indigenous Kenyan descent. The main left renal artery arose at the level of the first lumbar vertebra. The additional renal polar artery arose

(Notkovich, 1956; Bergman et al., 1988). Reports of their origin from an additional renal artery are scarce (Gurses et al., 2009). Testicular arteries with aberrant origins are at risk of injury during retroperitoneal surgery and renal hilar dissections and their injury results in testicular infarction (Siniluoto et al., 1988). As such, these variations should be noted to avoid injury to these vessels.

from the abdominal aorta at the level of the second lumbar vertebra and gave rise to the left testicular artery. The rest of the intra-abdominal course of the left testicular artery was normal. We also observed that the renal hilum was wide and there was pre-hilar quadrifurcation of the left renal artery and early post-hilar formation of the left renal vein (Fig 1).



Figure1: An image displaying the origin of the left testicular artery (**TA**), from the inferior polar renal artery (**R2**) supplying the inferior pole of the kidney (**K**). The main renal artery (**R1**) with its origin from the abdominal aorta (**A**) is shown. The left testicular vein (**TV**) and its drainage to the renal vein (**RV**) which drains into the inferior vena cava (**I**) is also shown.

DISCUSSION

In this case, there was an additional renal artery, which arose at a lower level than the main renal artery. The reported incidence of such variations of the renal arteries ranges from 8.7-75.7% (Satyapal et al., 2000; Mamatha and D'Souza, 2011). The incidence of origin of gonadal arteries from the renal arteries has been reported to lie between 4.7-14% (Notkovich, 1956; Asala et al., 2001; Cicekcibasi et al., 2002; Shoja et al., 2007). These variations were noted only on the right side. Moreover, case reports that document the origin of a gonadal artery from the renal artery are present in literature (Acar et al., 2007; Gurses et al., 2009; Mamatha and D'Souza, 2011). Of these, the origin of the gonadal artery from an additional renal artery has only been reported by Gurses et al., (2009) who reported the origin of the left testicular artery from a lower hilar renal artery. The pre-hilar quadrifurcation of the renal artery, which is rare in this population (Ogeng'o et al., 2010), together with early post hilar formation of the renal vein

as well as the wide renal hilum compound the uniqueness of this case.

Variations of renal and gonadal vessels have an embryological basis (Kocabayik et al., 2004; Shoja et al., 2007). The developing mesonephros, metanephros, suprarenal glands and gonads are supplied by nine pairs of lateral mesonephric arteries arising from the dorsal aorta. These arteries are divided into three groups viz: the first and second arteries, the third to fifth and the sixth to ninth arteries constitute the cranial, middle and caudal group respectively (Kocabayik et al., 2004; Shoja et al., 2007). The middle group gives rise to the renal arteries. Persistence of more than one artery of the middle group results in multiple renal arteries (Kocabayik et al., 2004; Shoja et al., 2007). The additional renal artery in our case could therefore be a result of a persistent lateral mesonephric artery from the middle group. Gonadal arteries can arise from any of these nine mesonephric arteries though they usually arise from the caudal group (Shoja et al., 2007). In the present case, the origin of the left testicular artery from the inferior

renal polar artery suggests the embryologic origin of this vessel from the middle group.

Variations of the renal and testicular artery should also be considered in order to prevent acute hemorrhage due to their injury in renal hilar dissections and retroperitoneal surgical explorations (Ravery et al., 1994). Due to the increased demand for living donor graft in renal transplants, the knowledge of such variant anatomy of the renal and gonadal arteries is an important prerequisite to successful renal transplantation (Kadotani et al., 2005) and as such comprehensive arteriography of these vessels before surgery is recommended. The origin of the testicular artery from

the renal artery should be noted as injury to this vessel may result in testicular infarction (Siniluoto et al., 1988).

In conclusion, the testicular artery can arise from an additional renal artery. This variation can be associated with pre-hilar quadrification of the renal artery, early post-hilar formation of the renal vein and a wide renal hilum. These are noteworthy variations that should be kept in mind during renal and retroperitoneal surgery to avoid injury to the testicular artery that may result in testicular infarction.

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