Eur. J. Anat. 17 (4): 262-264 (2013)

Variant left testicular artery from the superior polar artery and triple right renal arteries: a case report

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SUMMARY

Testicular arteries are the branches of the abdominal aorta below the level of origin of renal arteries. They may originate at a higher or a lower level from the aorta. However, when they originate from some other artery, they become surgically significant, since the ligature of the main artery giving rise to the testicular artery might lead to testicular atrophy. The present report is about the origin of the left testicular artery from the superior polar artery, which is a branch directly from the abdominal aorta above the renal artery. With the advent of novel surgical techniques, prior knowledge of rare variation in the testicular arteries becomes significantly important during surgery for renal transplant procedures, as well as for undescended testis or varicocele.

Key words: testicular artery – variations – superior polar artery – accessory renal artery – varicocele

INTRODUCTION

Testicular arteries are branches of abdominal aorta usually originating slightly below the renal artery. They are classified into three types based on their anatomical relationship to the renal vein (Notkovich, 1956). Bergman et al. (1988) recorded the origin of gonadal artery from the renal artery in 15% of cases. According to Shoja et al. (2007), the gonadal artery originated from the renal artery in 14% of cases they studied. Bilateral variation of renal and testicular arteries was reported by Gurses et al. (2009). Adachi (1928) reported that testicular and suprarenal arteries arose from a common trunk with a frequency of one in 26 suprarenal glands. Variations of the testicular vessel play a significant role during the surgery for undescended testis or varicocele. The uniqueness of the present case is that the left testicular artery originated from the superior polar artery.

CASE REPORT

During posterior abdominal wall dissection for undergraduates in the Department of Anatomy, Kasturba Medical College, Manipal University, a variant origin of left testicular artery and triple right renal arteries were observed (Fig. 1). Both the kidneys were lobulated and were situated at the same level. The right kidney was supplied by three arteries which were of the same caliber. All three were the branches of abdominal aorta (AA). The left kidney was supplied by a left renal artery (LRA) and a superior polar artery (SPA). Both of them were branches of AA. The SPA originated from AA at the level of origin of the superior mesenteric artery (SMA). The left testicular artery (LTA) branched from the SPA superior to the LRA. As it descended, near the hilum of the left kidney, the LTA gave a communicating branch (CA) to one of the branches of the LRA. The LRA was a branch from AA at the level of the third or lowermost right renal artery.

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Submitted: 4 January, 2013. *Accepted:* 11 June, 2013.

DISCUSSION

Bergman et al. (1992) reported about variations in the origin of testicular arteries, their presence or absence, their origin from other neighboring arteries like the renal artery, the suprarenal artery or the lumbar artery. Origin of testicular artery from the inferior polar artery of the kidney has been reported by Ravery et al. (1993). Our previous study in 38 adult cadavers showed left testicular arteries as the branches of the inferior polar artery in 7.4% cases (Pai et al., 2008). Three cases showed a high origin of the left testicular artery from the abdominal aorta in the same study. But the origin of the left testicular artery from the superior polar artery and a communication between it and the left renal artery have not been reported to the best of our knowledge, making it a rare occurrence. An accessory left testicular artery from the descending aorta has been reported by Loukas and Stewart (2004). Left testicular artery originating behind the left renal vein at the level of the left renal artery from the abdominal aorta, and getting entrapped between the two divisions of the left renal vein, has been reported by Satheesha (2007). Variations of the testicular arteries can be explained in relation to the development of the gonads and kidneys and their vascular supply (Anu et al., 2007). Gonadal arteries develop as lateral persistent splanchnic branches of the aorta that enter the mesonephros (Standring, 2005) in fetal life. These mesonephric arteries supply the developing gonads, the suprarenal gland, the diaphragm and the kidney (Bandopadhyay and Saha, 2009). They develop cranially and caudally in relation to the renal pedicle. Since developing gonads are placed cranially to the developing kidneys, the gonadal arteries are normally placed cranially. With the gradual descent of the gonads new lower branches arise and the higher branches disappear. The persistence of cranial lateral mesonephric artery results in a high origin of the gonadal artery, probably from suprarenal or from a more superior aortic level (Salve et al., 2010). The present variation can be attributed to the persistence of cranial arteries. With the advent of novel surgical techniques, prior knowledge of rare variation in the testicular arteries becomes significantly important during the surgery for undescended testis or varicocele. Accidental ligation of the testicular artery might lead to testicular atrophy (Chan et al., 2005) and the variant origin of testicular artery as in the present case (Fig. 1) makes it more susceptible of injury during immobilization of the kidney for transplant procedures or other surgical procedures.

Several studies have revealed variations of renal vessels quite frequently (Gurses et al., 2009; Ozkan et al., 2006; Lippert and Pabst, 1985; Pick and Anson, 1940). Budhiraja et al. (2011) describe a variant origin of superior polar arteries in 22.6% cases they studied. During their ascent to their final site, the embryonic kidneys receive their blood supply and venous drainage from successively more superior vessels (Moore and Persaud, 2008). Usually inferior vessels degenerate as superior ones take over. Failure of these vessels to degenerate results in accessory renal arteries and veins. The proximal origin of the segmental arteries of the kidney can also be attributed to the persistence of certain lateral mesonephric arteries from the aorta (Felix, 1912). Some accessory arteries enter the poles of the kidney as polar arteries. If an accessory renal artery is ligated or damaged during surgery, the part of the kidney supplied by it is likely to become ischemic, since the accessory renal arteries are end arteries (Moore and Persaud, 2008). In the present case, since the testicular artery is a branch of such an accessory artery, it becomes still more necessary to be aware of such a variation.

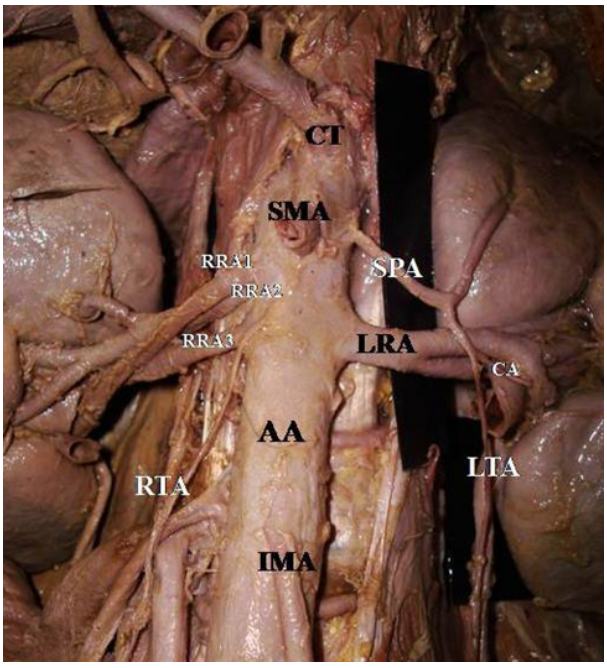

Fig. 1. Dissection of the posterior abdominal wall. Abbreviations: AA – abdominal aorta; CT – coeliac trunk; SMA – superior mesenteric artery; IMA – inferior mesenteric; LRA – left renal artery; SPA – superior polar artery; LTA – left testicular artery; RTA – right testicular artery; RRA 1 – first right renal artery; RRA 2 – second right renal artery; RRA 3 – third right renal artery; CA – communicating artery.

In conclusion, with the advent of novel surgical techniques, prior knowledge of rare variation in the testicular arteries becomes significantly important during the surgery for renal transplant procedures, as well as for undescended testis or varicocele.

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