Bilateral variant testicular arteries with double renal arteries

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Abstract

Background: The testicular arteries normally arise from the abdominal aorta. There are reports about the variant origin of these arteries. Accessory renal arteries are also a common finding but their providing origin to testicular arteries is an important observation. The variations described here are unique and provide significant information to surgeons dissecting the abdominal cavity.

Case presentation: During routine dissection classes of abdominal region of a 60-year-old male cadaver, we observed bilateral variant testicular arteries and double renal arteries.

Conclusion: Awareness of variations of the testicular arteries such as those presented here becomes important during surgical procedures like varicocele and undescended testes.

Background

The testicular arteries are paired vessels that usually arise from the abdominal aorta at the second lumbar vertebral level. Each artery passes obliquely downwards and posterior to the peritoneum. Descending on the posterior abdominal wall, it reaches the deep inguinal ring where it enters the spermatic cord [1,2]. There are reports about the variant origin of these arteries. Awareness of variations of the testicular arteries such as those presented here becomes important during surgical procedures like varicocele and undescended testes.

Renal arteries are a pair of lateral branches from the abdominal aorta. Normally, each kidney receives one renal artery. Variations in number, source and course of the renal arteries are common. The renal artery may give rise to branches normally derived from other vessels, such as the inferior phrenic, hepatic, suprarenal, gonadal, pancreatic and lumbar arteries [3]. Familiarity about the possible variations in the renal arterial pattern is especially important for the personnel dealing with kidney retrieval and transplantation, various endourologic procedures and innumerable interventional techniques. In most of those situations, it is the comprehensive knowledge of the renal arterial pattern which remains the key issue in determining the technical feasibility of surgical interventions as well as the post operative management [4].

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Case presentation
The study involved the abdominal dissection of a 60-year-old male cadaver. The present report is about the occurrence of bilateral variant testicular arteries and double renal arteries (Figure 1). The right upper renal artery after its origin from the abdominal aorta crossed anterior to the inferior vena cava and reached the hilum of the right kidney. Near to the hilum, it provided origin to the right testicular artery (Figure 2). The right lower renal artery was coming from the lateral aspect of the abdominal aorta just above its bifurcation and crossed the inferior vena cava to reach the hilum. On the left side the left upper renal artery after its origin from the abdominal aorta passed deep to the left suprarenal vein and entered the hilum of left kidney. The left lower renal artery took origin from the abdominal aorta and passed laterally to enter the hilum of the left kidney. Before entering the hilum, it gave origin to the left testicular artery (Figure 3).

The rest of the course of the testicular arteries and termination of the testicular veins was normal.

Discussion
The anatomy of the gonadal arteries has assumed importance because of the development of new operative techniques within the abdominal cavity for operations such as varicocele and undescended testes [5]. During laparoscopic surgery of the male abdomen and pelvis many complications are due to unfamiliar anatomy in the operative field [6]. Awareness of variations of the testicular arteries, such as those shown in this case report, becomes important during such surgical procedures.

This vascular variation shows a major significance in renal surgery, in partial or total nephrectomy and in renal transplant. The presence of such variations may become a major risk when this type of gonadal artery represents the single blood supply of the gonad, without a second supply from the aorta or other arterial sources. Thus it becomes imperative to carefully preserve the gonadal artery in order to prevent any vascular troubles of the gonad, the genital artery being its unique source of blood supply. All these indicate the importance of the arteriogra-
especially during radiological examination and/or surgical procedure. This variation will help to avoid clinical complications. Knowledge of the variation of testicular arteries arising from the accessory renal arteries is rare [12].

Although there are reports about unilateral variant origins of the testicular arteries branched from the renal artery. Onderoglu et al. (1993) reported the right testicular artery giving rise to the inferior phrenic and the superior suprarenal arteries in 5.5% of their series [12]. Cicekcibasi et al. (2002) found a gonadal artery originating from the renal artery. Anatomical variations in the human testicular blood vessels. Ann Anat 2001, 183:545-549.

Lippert and Pabst (1985) pointed out that the right testicular artery originated from the right renal artery in 6% of the cases [9]. In their study, Asala et al. (2001) found testicular arterial variations only on the right side in 4.7% (n = 150) of the cadavers [10]. In 4 (2.6%) of these cases, testicular arteries branched from the renal artery. Onderoglu et al. (1993) reported the right testicular artery giving rise to the inferior phrenic and the superior suprarenal arteries [11]. Cicekcibasi et al. (2002) found a gonadal artery originating from the renal artery in 5.5% of their series [12]. Although there are reports about unilateral variant origins of testicular arteries from the renal arteries [13-16], bilateral variant origin of testicular arteries from additional renal arteries is rare [12].

Even though presence of accessory renal arteries is not rare globally, the testicular arteries arising from the accessory renal arteries on both sides is not common. Knowledge of this variation will help to avoid clinical complications especially during radiological examination and/or surgical approaches in abdominal region.

Figure 3
Closure view of variant structures. RK: right kidney, LK: left kidney, AA: abdominal aorta, RURA: right upper renal artery, RLRA: right lower renal artery, LLRA: left upper renal artery, LLRA: left lower renal artery, LRV: left renal vein, IVC: inferior vena cava, 1: right testicular vein, 2: right testicular artery, 3: left testicular vein, 4: left testicular artery, 5: left suprarenal vein.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
VRV did the literature search and wrote the case report and also obtained written consent. MR and BKP conceived the study and helped to draft the manuscript. SRB, SVK, RJ, SS and NP helped in the literature search. All authors had gone through the final manuscript and approved it.

Consent
Written informed consent was obtained from the subject’s relative for publication of this case report.

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