

Bilateral variant testicular arteries with double renal arteries

Sarita Sylvia¹, Sridhar Varma Kakarlapudi¹, Venkata Ramana Vollala*²,
Bhagath Kumar Potu³, Raghu Jetti², Srinivasa Rao Bolla⁴, Mohandas Rao⁵
and Narendra Pamidi²

Address: ¹Department of Anatomy, Mahadevappa Rampure Medical College, Gulbarga, India, ²Melaka Manipal Medical College, Manipal, India, ³Kasturba Medical College, Manipal, India, ⁴Mamata Medical College, Khammam, India and ⁵Asian Institute of Medicine, Science and Technology, Sungai Petani, Kedah, Malaysia

Email: Sarita Sylvia - venkie123@rediffmail.com; Sridhar Varma Kakarlapudi - sridharvarmaanatomy@gmail.com; Venkata Ramana Vollala* - ramana.anat@gmail.com; Bhagath Kumar Potu - potubidda@gmail.com; Raghu Jetti - raghujetti@yahoo.co.in; Srinivasa Rao Bolla - bolla.srinivas@gmail.com; Mohandas Rao - mohandaskg@gmail.com; Narendra Pamidi - pommidi_narendra@yahoo.co.in

* Corresponding author

Published: 2 February 2009

Received: 16 December 2008

Cases Journal 2009, 2:114 doi:10.1186/1757-1626-2-114

Accepted: 2 February 2009

This article is available from: <http://www.casesjournal.com/content/2/1/114>

© 2009 Sylvia et al; licensee BioMed Central Ltd.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

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].

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).

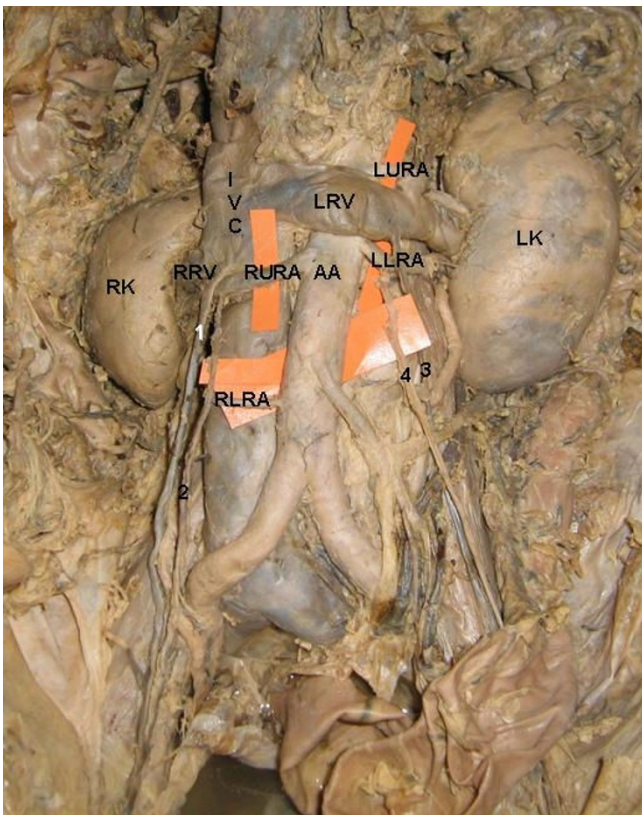


Figure 1
Photograph showing variant renal and testicular arteries. RK: right kidney, LK: left kidney, AA: abdominal aorta, RURA: right upper renal artery, RLRA: right lower renal artery, LURA: left upper renal artery, LLRA: left lower renal artery, RRV: right renal vein, LRV: left renal vein, IVC: inferior vena cava, 1: right testicular vein, 2: right testicular artery, 3: left testicular vein, 4: left testicular artery.



Figure 2
Photograph showing double renal arteries and right testicular artery taking origin from the right upper renal artery. RK: right kidney, AA: abdominal aorta, RURA: right upper renal artery, RLRA: right lower renal artery, RRV: right renal vein, IVC: inferior vena cava, 1: right testicular vein, 2: right testicular artery.

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-

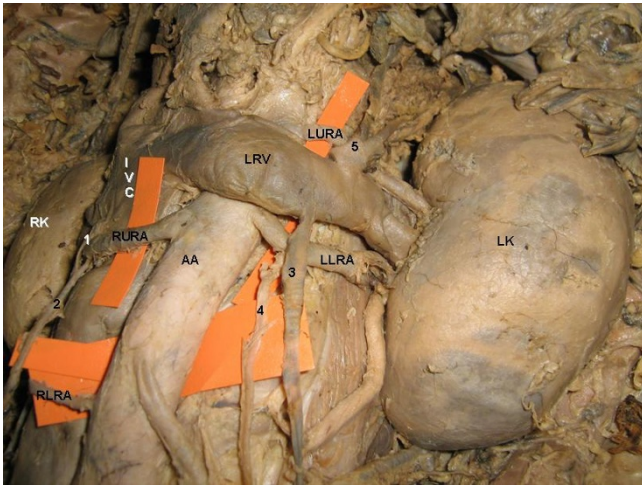


Figure 3
Closure view of variant structures. RK: right kidney, LK: left kidney, AA: abdominal aorta, RURA: right upper renal artery, RLRA: right lower renal artery, LURA: left upper renal artery, LLRA: left lower renal artery, LRV: left renal vein, IVC: inferior vena cava, 1: right testicular vein, 2: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

phy or Doppler ultrasound examination of the renal hilum, prior to any surgical procedure within the region [7]. A case of infarction of the left testis secondary to transcatheter embolization of a malignant left renal tumor with absolute ethanol was observed by Siniluoto et al., (1988). This is probably due to the testicular artery arising from renal artery and its branches [8].

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 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.

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.

Acknowledgements

We thank Dr. Surekha Bhat, Melaka Manipal Medical College for her help during preparation of the manuscript.

References

- Hollinshead WH: **Anatomy for Surgeons.** Volume 2. New York: Harper and Row; 1971:579-580.
- Moore KL, Dalley AF: **Clinically oriented anatomy.** 4th edition. Philadelphia: Lippincott Williams and Wilkins; 1999:292.
- Bergman RA, Thompson SA, Afifi AK: **Compendium of Human Anatomic Variations.** Munich: Urban and Schwarzenberg; 1988:81.
- Pushpa Dhar, Kumud Lal: **Main and accessory renal arteries – A morphological study.** *It j anat embryol* 2005, **110**:101-110.
- Brohi RA, Sargon MF, Yener N: **High origin and unusual suprarenal branch of a testicular artery.** *Surg Radiol Anat* 2001, **23**:207-208.
- Cussnot O, Desgrandehamps F, Bassi S, Teillae P, Lassau JP, Le Due A: **Anatomic basis of laproscopic surgery in the male pelvis.** *Surg Radiol Anat* 1993, **15**:265-269.
- Bordei Petru, Sapte Elena, Iliescu Dan, Dina Constantin: **The morphology and the surgical importance of the gonadal arteries originating from the renal artery.** *Surg Radiol Anat* 2007, **29**:367-371.
- Siniluoto TM, Hellstrom PA, Paivansalo MJ, Leinonen AS: **Testicular infarction following ethanol embolization of a renal neoplasm.** *Cardiovasc Intervent Radiol* 1988, **11**(3):162-164.
- Lippert H, Pabst R: **Arterial Variations in Man, Classification and Frequency.** Edited by: Bergman JF. Verlag, Munchen; 1985:25-29.
- Asala S, Chaudhary SC, Masumbuko-Kahamba N, Bidmos M: **Anatomical variations in the human testicular blood vessels.** *Ann Anat* 2001, **183**:545-549.
- Onderoglu S, Yuksel M, Arik Z: **Unusual branching and course of the testicular artery.** *Anat Anz* 1993, **175**:541-544.
- Cicekcibasi AE, Salbacak A, Seker M, Ziylan T, Buyukmumcu M, Uysal I: **The origin of gonadal arteries in human fetuses: anatomical variations.** *Ann Anat* 2002, **184**(3):275-279.
- Deepthinath R, Sathesha Nayak B, Mehta RB, Bhat S, Rodrigues V, Samuel VP, Venkataramana V, Prasad AM: **Multiple variations in the paired arteries of the abdominal aorta.** *Clin Anat* 2006, **19**(6):566-568.
- Okamoto K, Kodama K, Kawai K, Wakebe T, Saiki K, Nagashima S: **The inferior supernumerary renal arteries: a classification into three types.** *Ann Anat* 2006, **188**(1):49-53.
- Bergman RA, Cassell MD, Sahinoglu K, Heidger PM Jr: **Human doubled renal and testicular arteries.** *Ann Anat* 1992, **174**(4):313-315.
- Notkovich H: **Variations of the testicular and ovarian arteries in relation to the renal pedicle.** *Surg Gynecol Obstet* 1956, **103**(4):487-495.