

Accessory Right Renal Vein and Variation in the Drainage of Right Testicular Vein Associated with Right Bubonocele

Bavishi Devi A.¹, Saraf Neha², Rajgopal Lakshmi³, Bhuiyan Pritha S.⁴

Abstract

Introduction: Variations in the number, the course and the termination of renal veins are less common than those involving renal arteries. Of these, variations involving right renal vein are more common than those of the left renal vein. But variations involving both renal vein and gonadal vein on the same side are quite rare. *Case Report:* Herein, we present a case report of accessory right renal vein which was receiving the right testicular vein observed during routine dissection. The cadaver also had a right sided incomplete inguinal hernia (Bubonocele). *Conclusion:* These variations are clinically relevant in the context of the harvest of the kidneys for renal transplant, renal angiography, portocaval shunting procedures, laparoscopic procedures involving the retroperitoneum and management of the abdominal trauma by Trans-Abdominal Retro-Peritoneal (TARP) approach.

Keywords: Accessory Right Renal Vein; Right Testicular Vein; Incomplete Inguinal Hernia; Bubonocele.

Introduction

Normally each kidney is drained by a single renal vein which is formed by the union of segmental veins. Though both the renal veins drain into inferior vena cava (IVC) directly, the level of their opening may be at a slightly different level because of different levels of the hila. Normally, testicular vein on the right side opens directly into IVC and on the left side, it opens into the left renal vein. Variant anatomy involving these veins has a great clinical significance in cases of surgeries involving kidneys and testes.

Case Report

During routine dissection of a formalin-fixed male cadaver, whose age at the time of death was

19 years, it was observed that there was an accessory right renal vein draining the lower pole of the kidney (right inferior renal vein) and terminated into the Inferior Vena Cava (IVC) 0.6 cm below the main renal vein. This accessory right renal vein was anterior to the right renal artery and renal pelvis. The main renal vein was of normal calibre and had normal relations at the hilum. The right testicular vein, in this cadaver, was found to be coursing up normally but draining into right inferior renal vein at right angles instead of directly into IVC (Figure 1 and Figure 2). The opening of the right renal vein into IVC was located 1.2 cm below the opening of left renal vein into IVC. Left renal vein and left testicular vein showed normal anatomy. Right and left ureters were normal. The pampiniform plexus on the right side and the right testis were normal. Dissection of the right inguinal canal, in this cadaver, showed an incomplete indirect inguinal hernia i.e. bubonocele.

Discussion

Variations in renal veins are not much reported as compared to variations in renal arteries. Presence of variations in renal venous drainage is quite uncommon according to Bergman et al. However there are incidences of more than one renal

Author's Affiliation: ¹Student, Third Minor MBBS ²Additional Professor ³Professor and Head, Dept. of Anatomy, Seth G.S. Medical College and King Edward Memorial Hospital, Mumbai, Maharashtra 400012, India. ⁴Assistant Professor, Dept. of Anatomy, Shri Bhausaheb Hire Government Medical College, Dhule, Maharashtra 424001, India.

Corresponding Author: Devi Ashish Bavishi, Student, Dept. of Anatomy, Seth G.S. Medical College and King Edward Memorial Hospital, Mumbai, Maharashtra 400012, India.
E-mail: devi_bavishi@yahoo.co.in

Received | 21.09.2017, Accepted | 13.10.2017

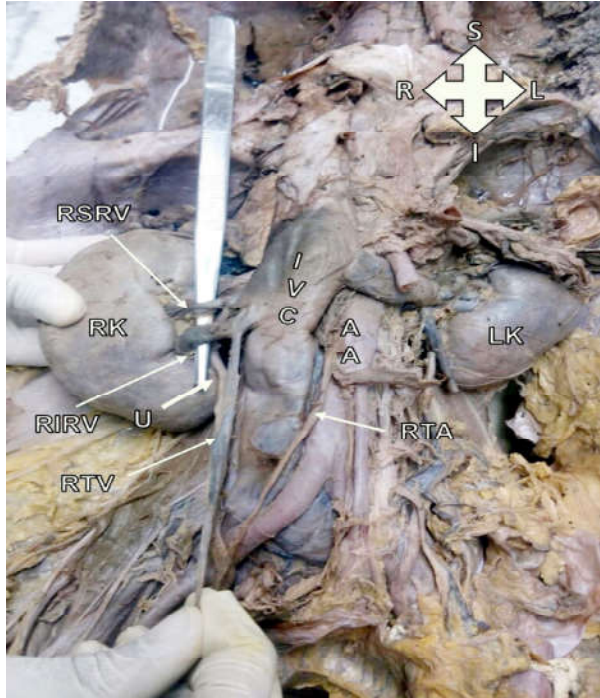


Fig. 1: Dissection photograph showing Right Testicular Vein draining into Right Inferior Renal Vein

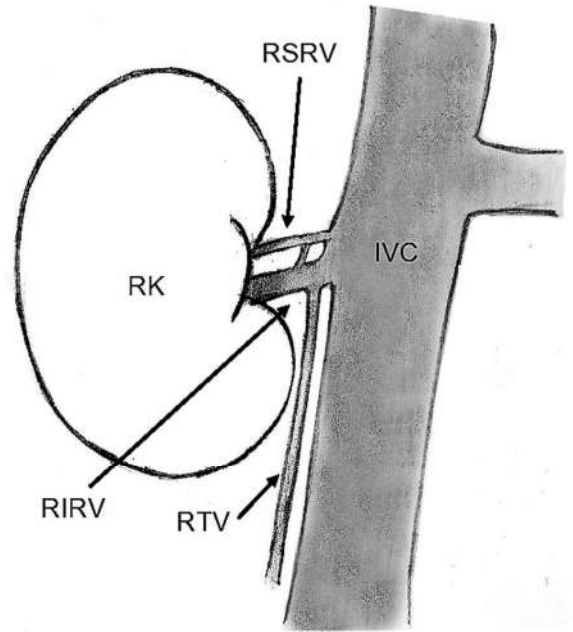


Fig. 2: A Schematic Diagram showing the variations depicted in Figure 1

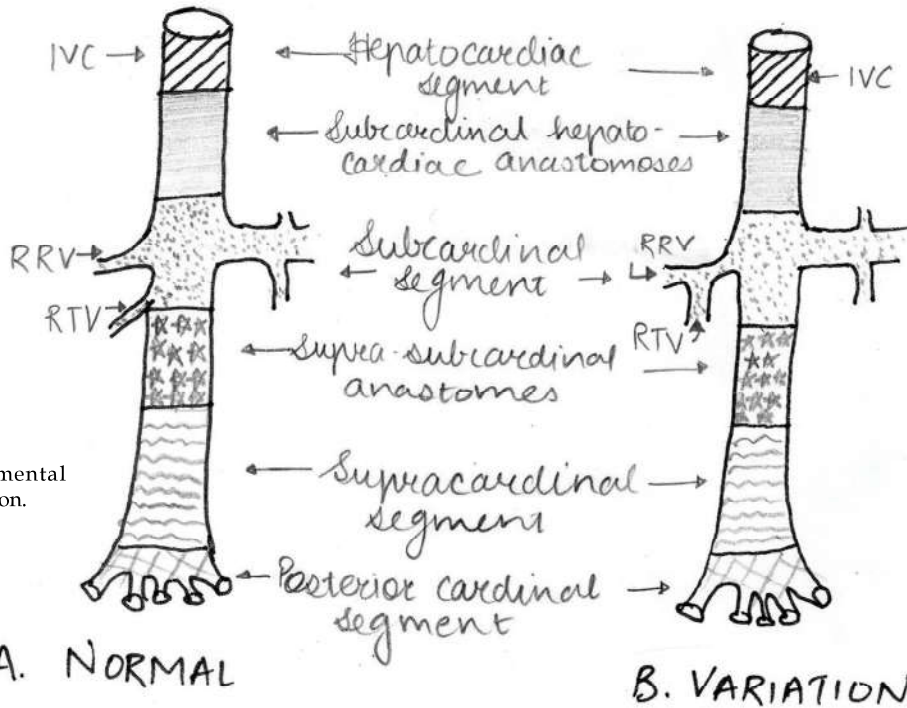


Fig. 3: Developmental basis of the variation.

Abbreviations

- Right Kidney (RK)
- Left Kidney (LK)
- Inferior Vena Cava (IVC)
- Right Superior Renal Vein (RSRV)
- Right Inferior Renal Vein (RIRV)
- Right Testicular Vein (RTV)
- Right Testicular Artery (RTA)
- Abdominal Aorta (AA)
- Ureters (U)

veindraining the right kidney. Multiple renal veins occur in only 1% cases on left side while 28% on the right side [1]. Fernandes RMP et al have reported three renal veins draining the right kidney in an elderly male cadaver – superior right renal vein (SRRV), middle right renal vein (MRRV) and inferior right renal vein (IRRV). In that cadaver, they also found that the right testicular vein was draining into IRRV at 0.3 cm from its drainage into IVC [2]. Greweldinger et al mentioned that additional renal vein may act as an alternate collateral route if the inferior vena cava has been interrupted between these veins [3]. Some other renal vein variations reported are the retro aortic left renal vein opening into the left common iliac vein, a circumaortic venous ring and a retro aortic bifid left renal vein [4].

Favorito LA et al had dissected 24 male fetuses and found that in 4.2% of cases the right testicular vein was draining into the right renal vein. They also found that in 12.5% of cases the right testicular vein was draining at the junction of the right renal vein into IVC [5].

Gupta R et al found variations in gonadal veins in a series of 60 cadavers, of which 40 were male and 20 were female. Out of 40 male cadavers, in 4 cases (10%), they found the right testicular vein draining into the right renal vein and in 2 cases (5%) they found the right testicular vein to be bifurcating and draining into both the right renal vein and IVC [6].

Asala et al found 2 out of 150 (1.3%) cases in which the right testicular vein was draining into the renal vein. These authors noticed that the variations were found in 21.3% of the specimens [7]. Paraskevas et al found, during routine dissection of a male cadaver, the right testicular vein to be draining into the right renal vein at right angles [8].

Most of these variations in renal veins may be asymptomatic and may be reported only in CT scans or on autopsy or found during dissection of a cadaver as happened in the present case. The level of opening of renal veins into IVC is important for interventional radiologists to place the catheter and to create a shunt in porto-renal shunt procedures.

Embryological basis of the Variation

Anastomosis between the supra-cardinal and the sub-cardinal veins, which occur bilaterally, forms the renal segment of IVC. Testicular vein develops from caudal part of sub-cardinal vein and drains into the supra-sub cardinal anastomosis. On the right side, this supra- sub cardinal anastomosis and also a small portion of sub-cardinal vein are

incorporated into the formation of IVC, so the right testicular vein usually drains into the IVC. On the left side, this supra-sub cardinal anastomosis forms part of left renal vein into which the left testicular vein drains [9]. Variations of the testicular veins are caused by dysplasia of the sub cardinal venous system in the seventh to eighth week of embryogenesis. In the present case, the drainage of the right testicular vein into the right renal vein may be because the caudal portion of the right sub cardinal vein has migrated to the right renal vein portion of sub cardinal sinus [8] or a part of right renal vein could have been formed by right supra-sub cardinal anastomosis and hence received the right testicular vein (Figure 3).

Clinical Significance of the Variation

Variations of the testicular vein may influence blood flow, temperature and spermatogenesis in the testis and result in some pathological conditions such as varicocele which are regarded as the causes of male infertility [10]. Drainage of right testicular vein at right angles into right renal vein may cause varicocele on the right side because of increased hydrostatic pressure. It is important for the surgeon to bear in mind the likely presence of testicular vein variations regarding its number, site of termination and accessory anastomotic channels or collateral branches that should be ligated to exclude any recurrence of varicocele. Such a recurrence hazard has been estimated as high as 5–20% in patients suffering from varicocele. Knowledge of variations such as these should be kept in mind by radiologists during endovascular procedures like therapeutic remobilization and angioplasties. Multiple vascular variations near the hilum of the kidney are present in seemingly normal patients and a sound knowledge of such variations is very important for urologists and surgeons operating in the retroperitoneal region for harvesting kidneys and for portocaval shunts.

This case report is presented for its rarity and for increasing awareness about variations of right renal vein and right testicular vein during pre-operative evaluation.

Key Messages

1. Presence of accessory renal veins should be looked for while harvesting kidneys from donors for transplantation surgery and during portocaval shunts.
2. Presence of abnormal drainage of testicular vein should be kept in mind while investigating and treating varicocele and male infertility.

References

1. Bergman RA, Afifi AK, Miyauchi R. Illustrated encyclopedia of human anatomic variation. Available from [http://www.anatomyatlases.org/AnatomicVariants/Cardiovascular/Text/Veins/Renal Splenic Testicular.shtml](http://www.anatomyatlases.org/AnatomicVariants/Cardiovascular/Text/Veins/RenalSplenicTesticular.shtml) (Accessed 09 September 2015).
 2. Fernandes R.M.P., Conte F.H.P., Favorito L.A., Abidu - Figueiredo M - & Babinski M.A. Triple right renal vein: An uncommon variation : Int .J. Morphol 2005;23(3):231-233.
 3. Greweldinger, J, Coomaraswamy R, Luftchin S, Bosnaik MA. Collateral circulation through kidney after inferior vena cava ligation. N. England. J.Med. 1969;258:541-542.
 4. Singla RK, Sharma T, Gupta R. Retro-aortic left renal vein with left suprarenal vein draining into inferior vena cava. IJAV, 2010;3:134-137.
 5. Favorito LA, Costa WS, Sampaio FJB, Applied anatomic study of testicular veins in adult cadavers and in human fetuses, Int Braz J Urol, 2007;33(2): 176-180.
 6. Gupta R, Gupta A, Aggarwal N. Variations of Gonadal Veins: Embryological Perspective and Clinical Significance. J Clin Diagn Res. 2015;9(2): AC08-AC10.
 7. Asala S, Chaudhary SC, Masumbuko-Kahamba N, Bidmos M. Anatomical variations in the human testicular blood vessels. Ann Anat, 2001;183(6): 545-549.
 8. Paraskevas GK, Ioannidis O, Natsis K, Martoglou S. Abnormal bilateral drainage of testicular veins: embryological aspects and surgical application. Rom J Morphol Embryol. 2012;53(3):635-8.
 9. Sharma P, Salwan SK. Anomalous Right Testicular Artery and Vein. J Clin Diagn Res. 2011;5(8): 1631-33.
 10. Yang CY, Xue HG, Tanuma K, Ozawa H. Variations of the bilateral testicular veins: embryological and clinical considerations. Surg Radiol Anat 2008; 30:53-55.
-