

Rare termination of the right gonadic vein

Abstract

Variations of the gonadal vein involve especial interest in general, vascular and kidney transplant surgery. We report a cadaveric case of abnormal drainage of the right testicular vein. During the dissection of a formalin-fixed adult male cadaver, an abnormal drainage pattern of the right testicular vein was found. Its morphology, length, caliber and angle of termination were registered and photographed. Finally a bibliographic research was made in databases PubMed and Scielo. The abnormal drainage of the testicular right vein was into the left renal vein. From the bibliographic research, only those articles considered of interest by the authors were taken into account. Even though it usually remains asymptomatic, its presence is associated with a higher risk of right varicocele although this pathology is more frequent at the left side. Also, this variant must be taken into account during retroperitoneal surgery or cadaveric dissection in the anatomy laboratory.

Keywords: anatomy, gonadic vein right, congenital, abnormality

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Introduction

Variations of the gonadal vein involve especial interest in general, vascular, and renal transplant surgery.¹ The testicular drainage originates at the upper pole of the testis, through the pampiniform plexus, which travels alongside the spermatic cord. The origin of the testicular vein, on both sides, lies at the deep inguinal ring, following a cephalic retroperitoneal path along the Psoas Mayor against posterior abdominal wall.^{2,3} The veins drainage patterns are anatomically asymmetric. The left testicular vein drains in the left renal vein, whereas the right testicular vein (RTV) drains directly in the inferior vena cava.³ This anatomical asymmetry is believed to be in part responsible for hemodynamic differences with clinical implications, mainly considered to be a frequent cause of left varicocele.³ The testicular veins show variations regarding number, drainage and termination angle. This are associated to an anomaly in embryological development. Variations are found more frequently in the left side, about 30% of cases.⁴ From a clinical point of view, variations in drainage pattern of testicular veins are thought to be associated with varicocele and pelvic congestion syndrome which may lead to infertility.⁵ In addition, their utility for renal vessel reconstruction has been suggested.⁵ For the above mention, precise knowledge of normal and variant anatomy of the testicular veins is crucial for both clinicians and surgeons. We report in this paper a case of an abnormal drainage pattern of the RT.⁶

Case presentation

During routine dissection of formalin fixed adult male cadaver, an abnormal drainage pattern of the RTV into the left renal vein was found. The dissection was performed in the Anatomy Department, Facultad de Medicina, Universidad de la República, and Montevideo, Uruguay by the authors. The specimen had no previous record of abdominal surgery of any kind. It consisted of a single RTV that originated from the right pampiniform plexus at the deep inguinal ring, and ran upwards from lateral to medial through the retroperitoneum. Latter, it crossed the anterior aspect of the inferior vena cava reaching the inferior margin of the left renal vein. The junction between the RTV and the left renal vein was immediately related to the termination of the left renal vein in the inferior vena cava (Figure 1). The total

length of the RVT was 26.4cm and its caliber 5mm. The termination angle (registered between the inferior edge of the left renal vein and the medial edge of the testicular right vein) was 115°. A single Left Testicular Vein was present; it followed the normal path and drained in the left renal vein at a straight angle. Also both testicles lied within their respective scrotal sac, and showed no variations. Complete inspection of the abdominal cavity showed no other associated anomalies. For purposes of reviewing the literature, the PubMed and Scielo databases were queried using the key term “right gonadic vein” or “vena gonádica derecha”, and limiting the search to references published in English and Spanish. Additional reports were identified from the bibliography of selected articles.



Figure 1 Dissection of retroperitoneum;

- 1) RVT;
- 2) Left renal vein;
- 3) Inferior vena cava;
- 4) Aorta The arrow head indicates the termination of RVT on the inferior margin of the left renal vein.

Discussion

The asymmetrical drainage of the testicular veins is explained by the embryologic development of the inferior vena cava system. Three venous channels confirm the latter: posterior cardinal, sub-cardinal and supracardinal veins. Bilateral Anastomosis between the Sub cardinal and supracardinal Veins form the Renal Segment of Inferior Vena Cava.⁷ Gonadal veins develop from caudal part of sub-cardinal vein and drain into supra sub cardinal anastomosis. However, on the Right Side supra-sub cardinal anastomosis are incorporated into the formation of inferior vena cava, which explains why right gonadal vein usually drain into inferior vena cava.⁸ When the above process fails, it leads to abnormal drainage of the right testicular vein⁷ as in the case presented here. According to Gupta R et al.⁴ variations on testicular veins appear in 45% of the cases. They were more frequent on left side, 30% of the cases than on the right one 5% of the cases, being bilaterally on 10% of the cases. Variations include number, locale drainage variations and termination angle. Regarding number, the RTV was found to be unique at 95% of the cases. Regarding drainage variations, it terminated into IVC in 85% cases and into right renal vein in 10%. In one case, where it was found double RTV, it drainage was made at both inferior vena cava and right renal vein. The biggest case series to our knowledge is the one of Favorito L et al.,⁹ they studied one hundred adult cadavers and 24 fetuses and did not find in any case the type of termination presented here. As a matter of fact, we did not find in the literature another case of RTV draining in the left renal vein as reported in this paper. From a clinical stand point, the presence of unusual drainage of the RTV is usually asymptomatic. It is sometimes associated with higher incidence of varicocele, due to a raise in the hydrostatic pressure of left testicular vein which is transmitted to the pampiniform plexus leading to its abnormal dilation.¹⁰ Complications of Varicocele can lead to Testis Atrophy and/or Infertility.¹⁰

Conclusion

We present a cadaveric case of a rare termination of the RTV in the left renal vein, with no previous reports of this type of drainage. We consider that the proper knowledge of this and every variant of the gonadic veins is crucial when attempting any type of procedure in the

retroperitoneum. In addition these variants play an important role in the genesis of varicocele.

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Conflict of interest

Author declares that there is no conflict of interest.

References

1. Pushpa Dhar, Kumud Lal. Main and accessory renal arteries—A morphological study. *Ital J Anat Embryol.* 2005;110(2):101–110.
2. Moore KL, Persaud TVN. *The Developing Human: Clinically Oriented Embryology.* 7th ed. Philadelphia, Pennsylvania: WB Saunders; 2002.
3. Standring S. *Gray's Anatomy: The Anatomical Basis of Clinical Practice.* 40th ed. London: Churchill Livingstone; 2008.
4. Gupta R, Gupta A, Aggarwal N. Variations of Gonadal Veins: Embryological Prospective and Clinical Significance. *J Clin Diagn Res.* 2015;9(2):AC08–AC10.
5. Veeramani M, Jain V, Ganpule A, et al. Donor gonadal vein reconstruction for extension of the transected renal vessels in living renal transplantation. *Indian J Urol.* 2010;26(2):314–316.
6. Asala S, Chaudhary SC, Masumbuko Kahamba N, et al. Anatomical Variations in the Human Testicular Blood Vessels. *Annals of Anatomy.* 2001;183(6):545–549.
7. Sadler TW. *Langman's Medical Embryology.* 10th ed. Development of Cardiovascular System. 2006. p. 186–189.
8. Phalgunan V, Mugunthan N, Rani DJ, et al. A study of renal and gonadal vein variations. *NJCA.* 2012;1(3):125–128.
9. Favorito L, Costa W, Sampaio F. Applied Anatomic Study of Testicular Veins in Adult Cadavers and in Human Fetuses. *International Braz J Urol.* 2007;33(2):176–180.
10. Nagler HM, Luntz RK, Martinis FG. Varicocele. *Infertility in the Male.* 3rd ed. St. Louis, Missouri: Mosby; 1997. p. 336–359.