

Variation in the Drainage of Gonadal Vein

Pratibha Shakya*, Bismay Das**, Neelesh Kumar Shakya***, C. Mohanty*, B. K. Das****

*Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, Varanasi, **Department of Pathology, Father Mullar Medical College, Mangalore, ***Department of Forensic Medicine and Toxicology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, ****Department of Pediatrics, Institute of Medical Sciences, Banaras Hindu University, Varanasi

(Received: October, 2015)

(Accepted: December, 2015)

ABSTRACT

The drainage of gonadal veins has significant role in causing varicocele, a known factor for male infertility. Present study was conducted in the Department of Anatomy, Institute of Medical Sciences, Banaras Hindu University, Varanasi. The drainage of gonadal vein was observed in 12 adult cadavers (10 male and 2 female). The gonadal vein on right side normally drains into inferior vena cava. In one case, right testicular vein drained into right renal vein. In remaining 11 cadavers, no variation was found in drainage of gonadal vein. Incidence of variation in drainage of gonadal vein was found to be 8.3%.

KEY WORDS: Drainage, Gonadal vein, Inferior vena cava, Renal vein, Variation

INTRODUCTION:

Variation of gonadal vein is very important for the purpose of invasive interventions such as renal transplantation, gonadal surgeries and gonadal colour doppler imaging. Surgeons should have broad knowledge of vascular anomalies of testicular vein to avoid injury of testicular vein and subsequent development of infertility. Hence, various cases of negligence and subsequent/ legal issues can also be omitted.

The drainage of gonadal veins is anatomically asymmetric on both side. The testis is drained by about 15-20 veins which unite to form pampiniform plexus. At superficial inguinal ring the plexus condenses to form four veins and at deep inguinal ring they further join to form two veins. Finally, single testicular vein is formed in both side at lumbar region. The right testicular vein drains into inferior vena cava at an acute angle just inferior to the level of renal veins and the left testicular vein drains into the left renal vein at right angle (Figure 2a).

Corresponding Author: Dr. Pratibha Shakya,
Junior Resident, Department of Anatomy,
Institute of Medical Sciences, Banaras Hindu
University, Varanasi - 221005 (U.P.) India
Phone No.: +91 8533869264
E-mail: shakya_pratibha@rediffmail.com



Varicocele formation is more common on left side. It may be due to drainage of testicular vein into left renal vein at right angle. Graif et al^[1] hypothesized that flow of blood in the left testicular vein is impaired because it has to make a 'double 90 degree turn', before reaching the inferior vena cava, whereas on the right side there is direct flow into the inferior vena cava. The almost abolished suction effect of right atrium on proximal part of left renal vein has been suggested as an aggravating factor for the stasis of blood in the left pampiniform plexus leading to varicocele.

In present case report, right gonadal vein is draining into right renal vein at right angle, which may lead to increased probability of occurrence of varicocele on the right side also. It is a causal factor for male infertility in about 25-35% cases.^[8]

The ovarian veins emerge from ovary as a pampiniform plexus. Two veins emerge from plexus and ascend with the ovarian artery. They finally merge into a single vein. The right ovarian vein drains into inferior vena cava and the left ovarian vein drains into the left renal vein.

CASE REPORT:

Present study was conducted in the Department of Anatomy, Institute of Medical Sciences

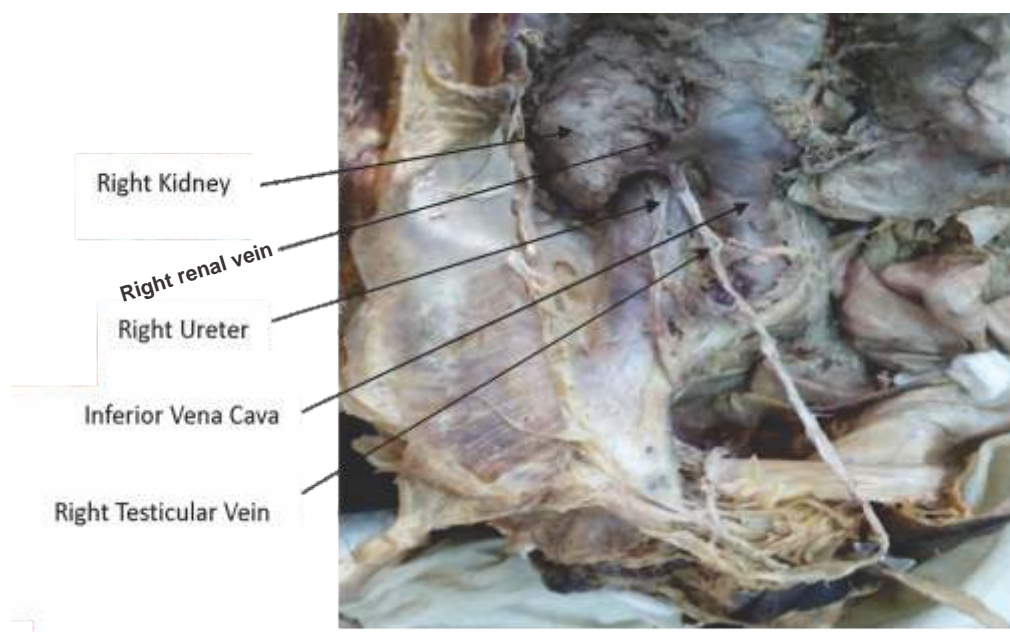


Figure 1- Dissection of abdomen showing abnormal drainage of right testicular vein into right renal vein.

Banaras Hindu University, Varanasi from September 2013 to July 2015 in 12 adult cadavers (10 male and 2 female). Renal and gonadal veins on both sides were dissected during routine dissection and drainage pattern were also observed.

Out of 12 cadavers dissected, in one cadaver right testicular vein drained in to right renal vein instead of inferior vena cava. Right testicular vein was crossing upper part of ureter which may lead to stasis of urine and may cause hydronephrosis (Figure 1,

Figure 2b). In remaining 11 cadavers, no variation was found in drainage of gonadal vein. In present study the incidence of variation of drainage of gonadal vein was 8.3%.

DISCUSSION:

Knowledge of variation of gonadal vessels has assumed importance if surgeons are dealing with urogenital operations such as varicocele, renal transplantation and undescended testis.

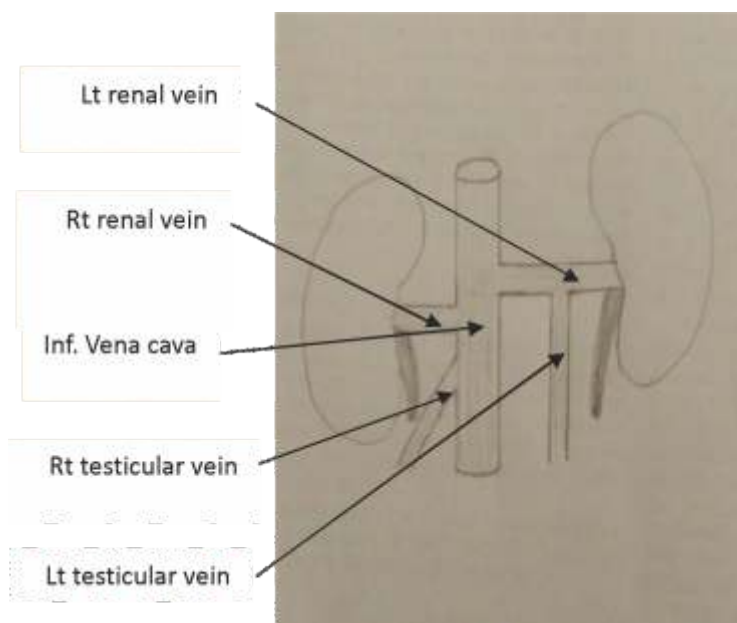


Figure 2a: Schematic diagram of normal venous drainage of testis

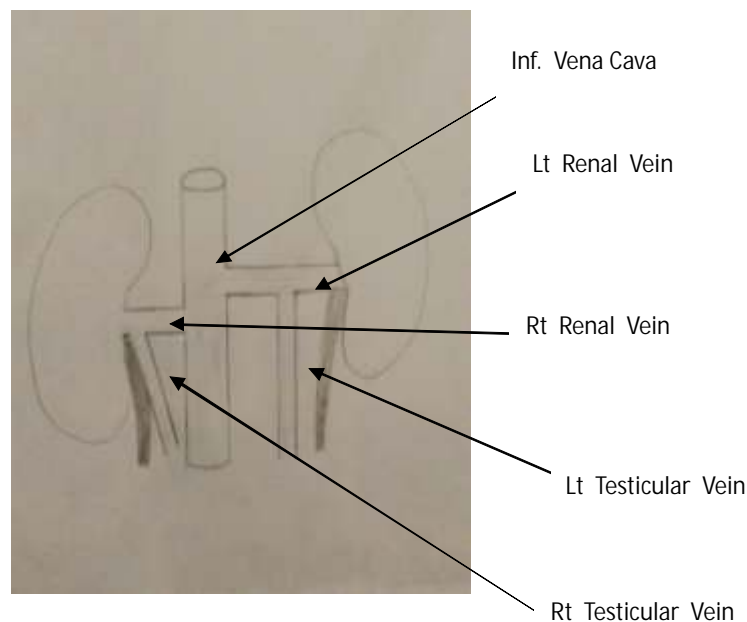


Figure 2b: Schematic diagram of present case report

Variations of right testicular vein are very rare. Duplication of right testicular vein was reported to be 8.8% by Duques et al.^[2] Incidence of abnormal drainage of right testicular vein into right renal vein was found to be 1.33% by Asala et al,^[3] 4.16% by Sharmistha et al,^[4] 6.6% by Gupta et al^[5] and 10% by Phalgunan et al.^[6] In one case, duplication of testicular vein on left side and drainage of both testicular vein into left renal vein was reported by Diwan et al.^[7] In present study, abnormal drainage of right testicular vein into right renal vein was found with incidence of 8.3%.

The variation of gonadal vein in present study can be understood on embryological basis. Development of gonadal vein occurs from caudal part of subcardinal vein. Gonadal vein drains into supracardinal and subcardinal anastomosis. The portion of inferior vena cava which receives the right gonadal vein, is developed from anastomosis between right supracardinal vein and right subcardinal vein. The anastomosis of supracardinal vein and subcardinal vein on left side incorporates in the development of left renal vein. This explains the asymmetric termination of both gonadal veins. In the present case right renal vein is formed by anastomosis between right supracardinal vein and right subcardinal vein hence received the right testicular vein.

CONCLUSION:

Updating surgeons about observed variation of gonadal vein prevents iatrogenic injury of gonadal vein and therefore ensures safety of patient and avoidance of medicolegal issue including negligence. This type of variation can also lead to varicocele which may subsequently cause infertility in males. Hence, it may also be included in differential diagnoses of male infertility.

REFERENCES:

1. Graif M, Hauser R, Hirshebein A, Botchan A, Kessler A, Yabetz H. Varicocele and the testicular–renal venous route: hemodynamic doppler sonographic Investigation. J Ultrasound Med 2000;19:627-31.
2. Duques P, Rodrigues JR, Silva Neto FB, Neto EMVS, Toledo ES. Anatomical study of the left renal vein of human Brazilians cadavers. Medicina Ribeirão Preto 2002;35:184-91.
3. Asala S, Chaudhary SC, Masumbuko KN, Bidmos M. Anatomical variations in the human testicular blood vessels. Ann Anat 2001;183(6):545-49.
4. Sharmistha B, Chattopadhyay JC, Panicker H, Anabalgan J, Ghosh SK. Variations in renal and testicular veins- a case report. J Anat Soc India 2006;55:69-71.
5. Gupta R, Gupta A, Aggarwal N. Variations of gonadal veins. embryological prospective and clinical

- significance. J Clin Diagn Res, 2015;9:8-10.
6. Phalgunan V, Mugunthan N, Rani DJ, Anabalagan J. A study of renal and gonadal vein variations. NJCA 2012;1:125-128.
 7. Diwan Y, Singal R, Diwan D, Goyal S, Singal S, Kapil M. Bilateral variations of testicular vessels: embryological background and clinical implications. JBCRS, 2013;2:60-62.
 8. Susan Standring. Gray's Anatomy The Anatomical Basis of Clinical Practice- 40th Edn.;1264.

Cite this article as: Shakya P, Das B, Shakya NK, Mohanty C, Das BK: Variation in the Drainage of Gonadal Vein. PJSR. 2016;9(1):57-60.

Source of Support: Nil, **Conflict of Interest:** None declared.