

## CASE REPORT

**Bilateral Duplication of Testicular Veins: A Case Report***B. Prakash Babu<sup>1\*</sup>, Lydia S Andrade<sup>1</sup>**<sup>1</sup>Department of Anatomy, Kasturba Medical College, Manipal, Manipal Academy of Higher Education, Manipal-576104 (Karnataka) India***Abstract:**

The right testicular vein drains into inferior vena cava and left testicular vein drains into the left renal vein. Testicular veins show several variations in number, course and termination. Testicular veins were studied in 40 adult cadavers. Two anatomical aspects were considered: Number of testicular veins and their site of termination. In the present study duplication of testicular veins were observed on both right and left sides. Two testicular veins occurred and their termination was normal into Inferior venacava on right side and on left side to left renal vein. The presence of such variations can increase risk of occurrence of varicocele and infertility in patients. Variations of the testicular veins are due to alterations in the embryological origin of the veins. The knowledge of anatomic variations of testicular veins will help surgeons and radiologists to avoid potential complications during surgical procedures.

**Keywords:** Duplication, Testicular Veins, Anatomic Variations, Inferior Vena Cava, Left Renal Vein

**Introduction:**

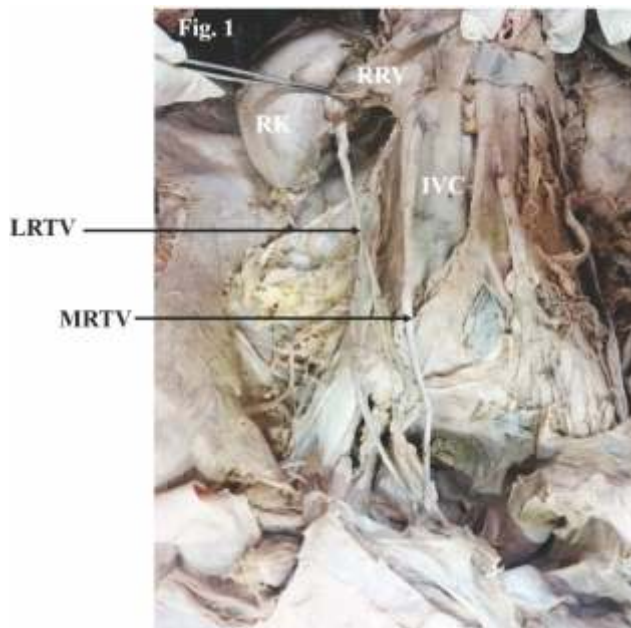
Testis is drained by large venous network, the pampiniform plexus. Veins arise from posterior aspect of testis draining also the epididymis. The plexus ascends in the spermatic cord and coalesce to form four veins at the superficial inguinal ring, which after running in the inguinal canal enter the abdomen through internal abdominal ring (deep inguinal ring) where they unite to form two veins that run in front of ureter, psoas major retroperitoneally on either side of testicular artery and further

join to form a single vein at variable levels in abdomen [1]. The right testicular vein usually drains into Inferior Vena Cava (IVC) at an acute angle, whereas the left testicular vein opens into left renal vein at a right angle [2]. Therefore, this anatomical variance may be the cause for relatively frail hemodynamic nature in left testicular vein and the case of common varicocele, pelvic congestions syndrome etc. Testicular veins show several variations in their number, course and termination. Variations of testicular veins are a result of faulty development in venous shift and alteration of anastomotic network of post-cardinal, supra-cardinal and sub-cardinal veins [3]. The knowledge of anatomical variations of testicular veins will help surgeons as well as radiologists to prevent complications during surgery in retroperitoneal area and also pathological conditions such as surgery of varicocele.

**Case Report:**

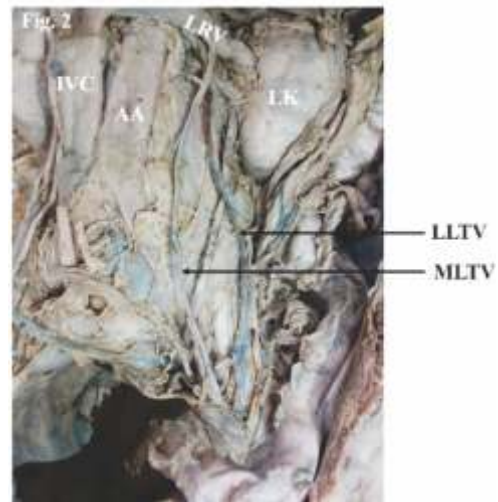
The present study was carried in the Department of Anatomy of Kasturba Medical College, Manipal, on 40 formalin fixed adult human cadavers. The age of the cadavers ranged from 40 to 65 years. No specimen with any pathology and abnormality of abdomen was included. Abdomen region was opened as per the instructions of Cunningham's Manual of Anatomy. Finer dissection of the posterior abdominal wall was done. The testicular

veins were traced from the testis to their termination into the inferior vena cava and left renal vein. Variation of the right and left testicular veins were observed and studied. In one specimen out of 40 cadavers there was a bilateral duplication of testicular veins commencing from the deep inguinal ring. On the right side there were two veins medial and lateral. Medial vein opened into IVC and lateral one into IVC close to right renal vein (Fig.1). On the left side there were two veins; medial one was opening into anterior tributary and lateral ones into posterior tributary of left renal vein (Fig.2).



**Fig.1: Photograph showing Two Right Testicular Veins Draining into Inferior Vena Cava**

IVC: Inferior Vena Cava; RRV: Right renal vein; RK: Right Kidney; MRTV: Medial right testicular vein; LRTV: Lateral right testicular vein



**Fig.2: Photograph showing Two Left Testicular Veins Draining into the Left Renal Vein**

LK: Left kidney; MLTV: Medial left testicular vein; LLTV: Lateral left testicular vein; LRV: Left renal vein; AA: Abdominal aorta; IVC: Inferior Vena Cava

**Discussion:**

The testis is drained through the large venous network, the pampiniform plexus of veins which coalesce to form four veins at the superficial inguinal ring, two veins at the internal abdominal ring and one testicular vein at variable levels in the abdomen [1]. The right testicular vein drains into IVC, and on left testicular vein into left renal vein [2]. Bergman *et al.*, found right gonadal vein draining in the right renal vein in 1.5% of cases (4 out of 220) [4]. During radiological and surgical procedures in the abdomen such variations of gonadal vein are important to avoid diagnostic errors, and during ligation, if unnoticed may cause recurrence of varicocele [5].

According to a study by Gay *et al.*, 40% of patients showed multiple gonadal veins [6]. Study by Gupta *et al.*, reported more variations of left gonadal veins side in males [7]. In a study by Asala

*et al.*, 21.3% of cadavers had variations of gonadal veins, and in 18.8% of cases, variations were bilateral. It was also noted that variations were more frequent on left side [1]. Juliana *et al.* reported in their study termination of two gonadal veins into left renal vein [8]. A study by Diwan *et al.*, reported two testicular veins on left side, medial and lateral, the left medial testicular vein was twice the width of the left lateral testicular vein [9]. Right testicular vein was draining into right renal vein rather than IVC in 2 out of 150 cadaveric dissections done by Asala *et al.* [1].

Left renal vein is formed by the anastomosis between right and left subcardial veins. After that left sub cardinal vein disappears and distal part persists as left renal vein as cited by Sadler [10]. A small part of IVC by the incorporation of a part of sub cardinal vein and anatomized supra-sub cardinal veins of right side and hence gonadal vein drains into IVC on right side as reported by Sharma *et al.*, [11].

In the study by Paraskevas *et al.*, left testicular vein divided into 2 trunks, medial and lateral. Lateral trunk drained into ipsilateral left renal vein, and medial trunk into inferior vena cava [12]. Kyuchukov noted 3 divisions of right testicular veins—lateral, middle and medial. The right lateral testicular vein draining into right renal vein and the combined middle and medial testicular veins drained at an angle between IVC and right renal vein [13]. In the present study, left testicular vein was duplicated and was composed of medial and lateral venous trunks which drained into regions of left renal vein. In a study by Duques *et al.*, 85.2% cases showed single testicular vein, and 8.8% of cases had double gonadal veins [14]. In a study by Lecheter *et al.*, a total of 5% of cases had double testicular veins on right side, and 15% on left side [15]. Nayak *et al.*, has found terminal bifurcation of

the single right testicular vein into two, each opening into IVC [16]. In another study by Sharma *et al.*, right testicular vein showed an abnormal termination into right renal vein instead of inferior vena cava [11]. Another similar study done by Juliana *et al.*, also showed duplication of gonadal veins on both sides and were draining into inferior vena cava [8]. The variations of testicular vessels are of utmost important during surgical procedures. As per available literature right testicular vein develops from lower part of right sub cardinal vein. The bifurcation of the right sub cardinal vein, during its development leads to the terminal bifurcation of the right testicular vein as in present case.

The variations of testicular vein are a result of altered anatomy of venous trunks during the developmental phase of the embryonic veins which later develops as congenital vascular malformation. In the process of development of these veins there is a regression, anastomosis and replacement of three pairs of venous channels; posterior cardinal, sub cardinal, and supra-cardinal. Testicular vein develops from caudal part of sub-cardinal vein and it drains into the supra-sub cardinal anastomosis. On the right side, the supra-sub cardinal anastomosis and a small part of sub-cardinal vein persists as post renal segment of inferior vena cava and on the left side the anastomoses form a part of the left renal vein [11]. Duplication of right testicular veins were noticed in 5% of specimens in the study done by Favorito *et al.* [17]. Radiologists should be aware of this variation to avoid diagnostic errors. Knowledge of duplication of testicular veins is of immense importance to the surgeons as the anomalous vein that ought to be ligated, may go unnoticed during surgery for varicocele and result in its recurrence may be the cause of male infertility [5]. In the

present study, although there was bilateral duplication of testicular veins but their termination into IVC on the right side and into left renal vein on left side were normal. These variations may cause confusion in assessing the radiological findings or during retroperitoneal surgeries [7].

### Conclusion:

Variations of site of termination and duplication of testicular veins were observed in the present

study. These variations are important surgically and radiologically. Variations noticed above have to be kept in mind during surgical procedures in the posterior abdominal wall. Such variations are discovered incidentally during surgeries or autopsies and may remain silent clinically. These variations of gonadal vein can increase the risk of possible varicocele and infertility in patients.

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#### \*Author for Correspondence:

B. Prakash Babu, Department of Anatomy, Kasturba Medical College, Manipal, Manipal Academy of Higher Education, Manipal-576104, Karnataka  
Email: billakantibabu@yahoo.co.in Cell: 9880780271

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