

Double Right Renal Vein– Clinical and Surgical Implications

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Abstract: Variations in renal vascular morphology are common and involve renal arteries and veins. Knowledge of such findings is valuable for urologists with regard to kidney transplantation, nephrectomy and many other surgical procedures on the kidneys. A case of duplication of right renal vein observed in a male cadaver during routine dissection of abdomen is reported in this present study. The understanding of these types of variations in the posterior abdominal wall is of clinical importance to surgeons in renal transplants.

Key words: Anatomical Variations, Renal veins, Venous anomalies.

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I. Introduction

Renal veins are large veins that lie anterior to the renal arteries and open into the inferior vena cava almost at right angles. The left renal vein is longer (7.5cm) than the right (2.5 cm) [1]. The right renal vein passes posterior to the descending part of the duodenum and may be overlapped by the right margin of the head of the pancreas [1]. Kidney lies in the retroperitoneal space, deriving its blood supply from the aorta via the renal arteries, and its venous drainage entering directly into the inferior vena cava on each side through the renal veins.

Vascular Anatomy may vary, usually the renal artery is single, but may be multiple in approximately 15% of cases. Collateral venous anastomosis occurs within the renal substance, between the main renal vein and accessory veins. During kidney transplantation accessory veins may be ligated and the venous drainage established by anastomosing the main renal vein to the recipient venous system [1].

One of the techniques used in the transplantation of kidney is the venous anastomosis, the biggest donor vein is chosen to join the recipient vein and other branches may be sacrificed safely on account of the intrarenal venous anastomosis. If a suitable length of donor vein is available, the renal vein may be joined safely to the external iliac vein [1]. Fernandes et al (2005) reported a case of Triple right renal vein- an uncommon variation [2]. Sudeshna Majumdar et al (2015) reported a case of bilateral double renal veins [3]. Concurrent anomaly of right renal vein and testicular vein [4] and double right renal vein [5] and many other variants of the renal veins have been documented. Variations in the origin and termination of renal veins result mainly from errors of embryonic development [6, 7]. Knowledge of these variations is clinically important for the surgeons to make better preoperative evaluations and thus minimise the risk of surgical complications [8].

II. Case Report

During routine dissection of a 65 year old male cadaver in the Department of Anatomy of Government Ayurveda Medical College, Tripunithura, a variation in the right renal vein was noted. While performing the dissection of the retroperitoneal region, two tributaries of the right renal vein were found to drain the right kidney. The two tributaries of the right renal vein on emerging from the hilum, joined together to form a single vein (Fig.1) in their course up to the inferior vena cava. It entered the Inferior vena cava as a common right renal vein (CRRV).

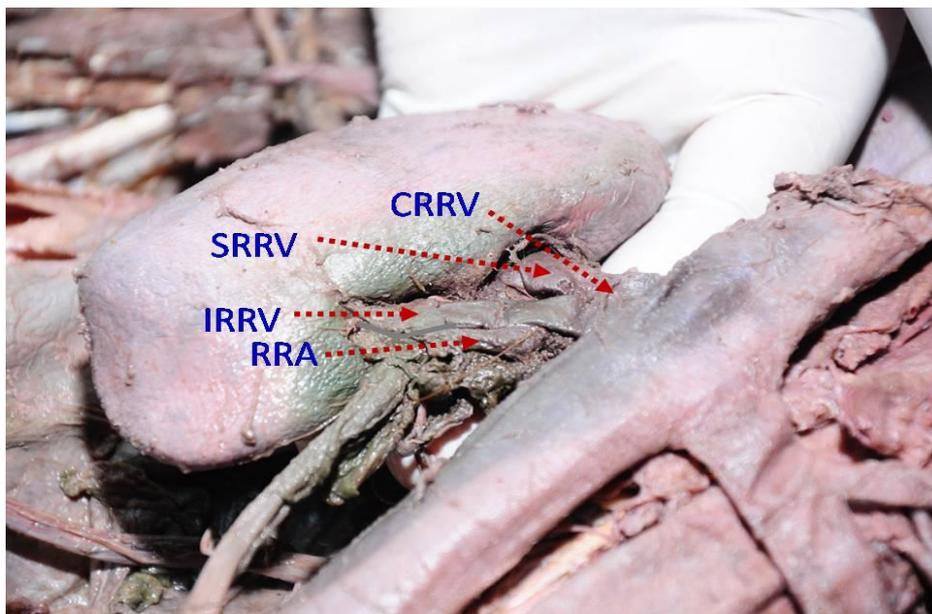


Fig.1 Abnormal pattern of right renal vein

CRRV - Common Right Renal Vein, SRRV- Superior Right Renal Vein, IRRV- Inferior Right Renal Vein, RRA- Right Renal Artery.

The superior right renal vein (SRRV) emerging from the upper part of the hilum join the inferior right renal vein (IRRV). The inferior right renal vein (IRRV) emerging from the lower part of hilum join the SRRV at an acute angle. The SRRV was shorter, broader and more horizontal in direction compared to the longer, narrower and more obliquely placed IRRV (Fig.1). The common right renal vein (CRRV) formed by the joining of the two veins was approximately 1 cm in length and joined the Inferior venacava (IVC) at right angles on its right lateral aspect.

The level of joining of the right common renal vein to IVC is slightly superior to the level left renal vein (Fig.2). The right renal artery lies posterior to the IRRV and was visible in the angular interval formed by joining of the two tributaries. The right renal pelvis was posterior to the proximal part of the IRRV. There is no anomaly seen in the left renal vein (LRV).

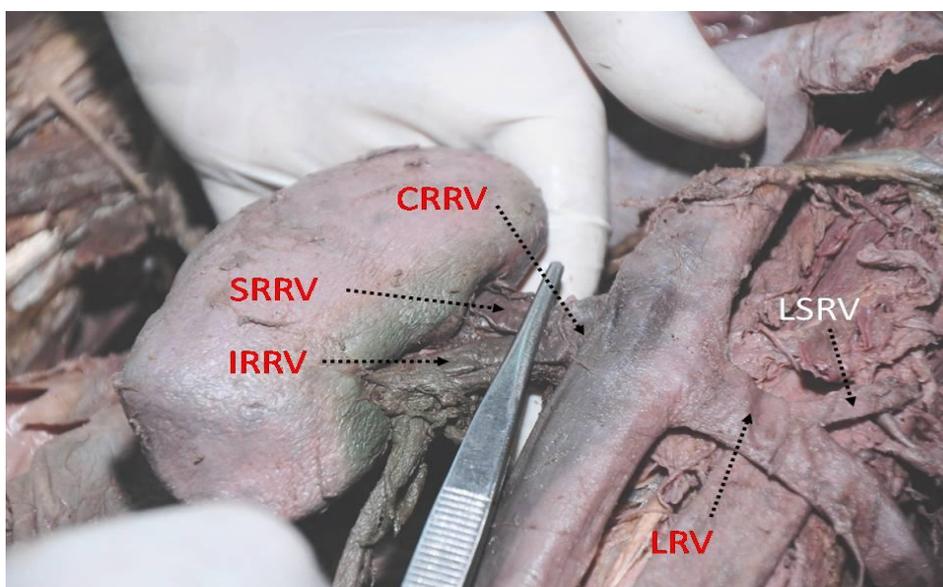


Fig2: Abnormal pattern of Right renal vein

CRRV- Common Right renal vein, SRRV- Superior Right renal Vein IRRV- Inferior Right Renal Vein, LSRV- Left suprarenal vein, LRV- Left Renal Vein.

III. Discussion

Anatomical variations and congenital anomalies of the left renal vein were described by Gillot [7] and Bergman et al [10] reported the variants renal venous drainage. Baptista-Silva et al (9) reported the prevalence of anatomical variations on the left renal vein (about 92%) and the presence of multiple right renal veins (more than 2 vessels) in about 8 to 9.7% of cases [9]. Bergman et al reported the renal veins showing less variation than the renal arteries and rare multiple renal veins are on the left side (1%) and common on the right side (28%) [10].

Occurrence of multiple renal veins is relatively common and large numbers of venous variations resulting from embryonic developmental errors have been reported (2, 9, 11, 12, 13). According to Kaneko et al [14] the renal veins present fewer variations than the arteries. Multiple renal veins are more common on the right than on the left side [15]. Some anatomic variations in the renal veins may be correlated with clinical symptoms as in the case of pain in the pelvic varicocele. Descriptions of the anatomic variations of the renal vein are necessary in cases of surgical interventions in the retroperitoneal region [16]. CT Angiography of renal vasculature is very necessary before a surgical procedure involving the retroperitoneal region [17]. The present variation in the right renal vein substantiating the views of the previous studies quoting the importance of CT angiography of the renal vasculature and invites the attention of the surgeons.

IV. Conclusion

The anatomical knowledge of double and triple right/left renal veins and their main anomalies is important for urologists, vascular surgeons and radiologists since it provides guidance that will serve to prevent complications that might occur in surgery, given the increasing frequency of kidney transplantation surgery.

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