

# A retroaortic left renal vein associated with a partially bifid left ureter - case report

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## SUMMARY

During routine dissection of the retroperitoneal region in our Department, we observed rare variation as a retro-aortic left renal vein associated with a partially bifid left ureter in a 56 year old female. The left renal vein, after receiving its tributaries, the left ovarian and the left suprarenal veins, acquired an oblique course to the level of the intervertebral disc between L3-L4, and then, instead of passing anterior, the left renal vein traversed posterior to the aorta to finally drain into the inferior vena cava. On the same side, the ureter was partially bifid, uniting one cm above the pelvic brim to drain normally into the bladder.

**Key words:** Retroaortic left renal vein – Inferior vena cava – Bifid ureter

## INTRODUCTION

In the present era of renal transplant and conservative renal surgery, a thorough knowledge of the anatomy and variational patterns of the renal veins is mandatory for planning of retroperitoneal surgeries and venographic procedures. The retro-aortic left renal vein (RLRV) is a rare anatomical variant characterized by the presence of a vessel that drains the left renal blood up to the inferior vena cava crossing posterior to the aortic artery.

Its relatively uncommon incidence ranges from 0.5 to 3.7% (Anupama et al. 2011; Satyapal, 2003; Skandalakes, 2004; Arslan et al., 2005; Karazincir et al., 2007; Hemalatha et al., 2008).

Normally, the left renal vein is three times longer than the right (7.5 cm and 2.5 cm respectively), and drains into the inferior vena cava almost at right angles. It runs from its origin at the renal hilum, posterior to the splenic vein and the body of the pancreas. It receives the blood from the left supra-renal gland, the left gonad, and the body wall, including diaphragm. After traversing a distance to the right, the renal vein crosses the anterior aspect of aorta, just below the origin of the superior mesenteric artery; it finally drains into the inferior vena cava (Standring, 2008; Satyapal, 2003). Bifid ureter is the anatomical variant that results from premature division of the mesonephric diverticulum (ureteric bud), the primordium of the renal pelvis and ureter. According to Standring (2008), the incidence of bifid ureter is as common as one in 125 individuals. Two ureters drain the renal pelvis on one side. They are contained in a single sheath of fascia, and may fuse at any point along their course. These variations can lead to clinical manifestations in day-to-day practice.

## CASE REPORT

We are reporting a rare case of retro-aortic left renal vein associated with partially bifid left ureter. These anatomical variations were observed in a 56-year-old female cadaver during routine dissection in the Department of Anatomy, Rural

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**Fig. 1.** Retro-aortic left renal vein after receiving its tributaries, traversing obliquely to drain into the inferior vena cava and partially bifid left ureter which joins 1.5 cm above the pelvic brim (indicated by red arrow).

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The trunk of the left renal vein was single over the initial 4 cm from the hilum and received, as normal, a dilated left suprarenal vein on its superior margin. Along the inferior margin, renal vein received, as normal, the left ovarian vein. The left renal vein was positioned anterior to the renal arteries at the renal hilum. It was in the posterior relation of the splenic vein and the body of the pancreas. RLRV descended obliquely retroperitoneally for a distance of 2.5 cm. Instead of traversing anterior to the abdominal aorta, it acquired a course posterior to the aorta to finally drain into the inferior vena cava at the level of L3-L4 intervertebral disc. The opening of this variant vein was with the left side of the inferior vena cava. The left ureter was observed partially bifid, and was uniting 1cm above the pelvic brim into a single ureter. The rest of the course of the ureter and its opening into the bladder was as usual. The right and left kidneys were normal in size and shape, and were located at normal vertebral levels. Other abdominal organs were found normal.

## DISCUSSION

Gérard (1920) applied the term “anastomose veineuse renocave retro-aortique” to this vessel, which Seib (1934), taken from the reference Satyapal KS(2003), modified and called the retro-aortic renocaval arch, as cited by Satyapal, (2003). The incidence of RLRV is found to be 0.5% to 3.5% in normal population. Arslan et al. (2005) reported that the incidence rates of the

RLRV were 1.7% & 1.6% in men and women respectively, by evaluating 1125 contrast-enhanced abdominal computed tomographic scans. They also emphasized the fact that RLRV was one of the main possible reasons for varicocele. Among an extensive study on renal veins, Satyapal (2003) reported that retroaortic left renal vein was seen in only 0.5% of 1008 kidneys. Anupama et al. (2011) studied on thirty cadavers and stated that RLRV is present in 6.6% of cases. Karazincir et al. (2007) in turn found a significantly higher incidence (9.3%) of RLRV in patients with varicoceles compared with age matched control patients. Varicocele occurs more frequently on the left side and is the most common identifiable cause of infertility in man. Nam et al. (2010) classified the anomalies of the left renal vein into four types, and our case is considered under Type II. They carefully studied retrospectively nine patients who were having RLRV with multidetector-computed tomography, and concluded that hematuria and inguinal or flank pain seem to be common in these patients due to increased pressure in left renal vein.

The aim of reporting this unique case is to familiarize urologists, nephrologists and radiologists with this anatomical variation, thereby increasing safety during surgical intervention in this region.

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