

# Retroaortic left renal vein (RLRV) draining into the left common iliac vein: a rare variant and its clinical implication

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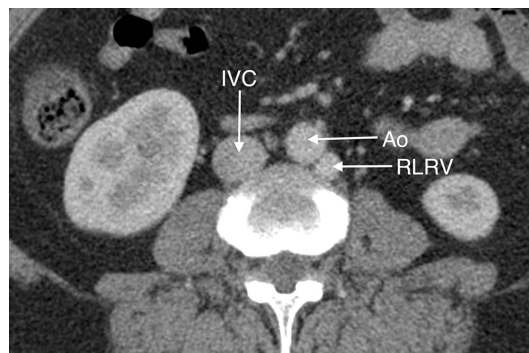
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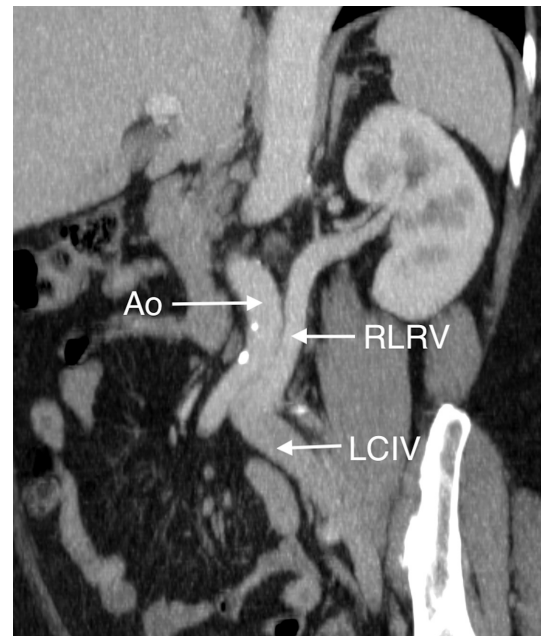
## DESCRIPTION

A 55-year-old known hypertensive woman with a family history of breast cancer and pancreatic cancer in first-degree relatives was referred by her general practitioner for an intravenous contrast-enhanced multidetector CT (MDCT) scan of her abdomen and pelvis. There was no MDCT evidence of malignancy; however, there was an incidentally detected retroaortic left renal vein (RLRV), coursing obliquely and posterior to the abdominal aorta, draining into the left common iliac vein just prior to the origin of the inferior vena cava (IVC) (figures 1 and 2). The patient gave no history of prior urological symptoms that may be associated with this anomaly.

The RLRV is a rare variant, with an incidence of 0.5%–3.1%.<sup>1</sup> There are four subtypes of the RLRV which include: (1) type 1, where the RLRV joins the IVC in the orthotopic position; (2) type 2, where the RLRV joins the gonadal and ascending lumbar veins prior to joining the IVC at the level of the fourth to fifth lumbar vertebral bodies; (3) type 3 is a RLRV which consists of both anterior and retroaortic left renal veins (circumaortic) prior to joining the IVC and (4) type 4, where the ventral preaortic limb of the left renal vein is obliterated and the dorsal limb persists as a RLRV, coursing obliquely and caudal behind the aorta to join the left common iliac vein.<sup>2</sup> The patient in this case had the latter, which appears to be the rarest of the four subtypes, with an incidence of 0.16%, and only a few cases documented.<sup>2</sup>



**Figure 1** Axial postintravenous contrast CT Image (mixed arterial/venous phased) showing the RLRV coursing left and postero-lateral to the Ao, prior to crossing the midline and draining into the IVC. Ao, abdominal aorta; IVC, inferior vena cava; RLRV, retroaortic left renal vein.



**Figure 2** Oblique, coronal, curved multiplanar reformatted, intravenous contrast enhanced, MIP CT image (mixed arterial/venous phase), showing the RLRV located oblique and posterior to the Ao and draining into the LCIV. Ao, abdominal aorta; LCIV, left common iliac vein; MIP, maximum intensity projection; RLRV, retroaortic left renal vein.

The RLRV is usually asymptomatic, as seen in our case; however these patients can present with haematuria, flank pain, scrotal varicocele and pelvic congestion due to the nutcracker syndrome.<sup>3 4</sup> Nutcracker syndrome occurs as a result of compression of the RLRV which leads to venous congestion of the left kidney. This results in rupturing of the thin-walled septum between the vessels and the renal pelvis causing microscopic and gross haematuria. Moreover, with passage of small blood clots, flank pain can occur.<sup>1 3 5 6</sup> Consequently, congested kidneys and renal infarcts secondary to the vascular compromise may lead to bacterial colonisation and abscess formation. In addition, scrotal varicocele can result from reflux into the left gonadal vein due to the compression of the RLRV with pelvic congestion syndrome occurring in women.<sup>4</sup>

Furthermore, preoperative knowledge of this variant is important to avoid complications associated with vascular injury to the RLRV such as severe haemorrhage, renal injury, nephrectomy



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and even death during retroperitoneal surgery or interventional procedures.<sup>7</sup>

The diagnosis of RLRV and its variant subtypes were previously determined by postmortem analysis. Today, variant anatomy of the left renal vein can be seen on renal venography, colour doppler ultrasonography, MDCT and MRI.<sup>6</sup> Presently, MDCT is the imaging modality of choice for evaluation of the

kidneys and the retroperitoneal structures, with MDCT angiography/venography being used for the diagnosis of vascular variations.<sup>6</sup> Furthermore, MDCT has replaced invasive conventional angiography and venography as it is non-invasive, reliable and easily applicable.<sup>8</sup>

In conclusion, the availability of MDCT can aid the diagnosis of left renal vein anomalies detected incidentally, as noted in our case, and also to help delineate and further categorise left renal vein anomalies, hence, reducing the risk of complications associated with injury to this anomalous vessel. Additionally, the presence of left renal vein anomalies may result in symptoms, and the referring physician and radiologist should be aware of them.

### Patient's perspective

My family has a history of cancer. My sister had breast cancer, her breast was removed, and she was good for a few years until she fell sick at the age of 61. She was then diagnosed with a recurrence of breast cancer and died a few months later. My brother was diagnosed with pancreatic cancer but was treated and is now cured. Following the death of my sister, I was worried that I may be at risk for cancer. I visited my doctor who sent me a for a series of blood tests, mammogram and CT scan. I was told that the mammogram, CT scan and all the other blood tests came back normal but was then informed that I had a variant in my left kidney vein. The doctor explained to me that this was a rare finding and I must inform my doctors on this variant in the event of surgery or if symptoms occur. My main concern was if this was dangerous to my health however the doctor reassured me. I am quite happy, and I like to be aware of what is going on with my body.

### Learning points

- ▶ A retroaortic left renal vein is usually asymptomatic; however, patients can present with haematuria, flank pain, scrotal varicocele and pelvic congestion due to the nutcracker syndrome.
- ▶ Cross-sectional imaging has replaced invasive conventional angiography and venography as the imaging modality of choice for the diagnosis of vascular variations of the retroperitoneum.
- ▶ Preoperative detection of a left renal vein variant can decrease morbidity and mortality associated with injury to this anomalous vessel.

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