

## Congenital Anomaly of Left Renal Vein

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### ABSTRACT

Double left renal vein is a rare venous anomaly. In 6.5% of cases double left renal vein, one in front (preaortic) and another behind the abdominal aorta (retroaortic) has been reported. The development of renal vessels is very complicated. There are extensive changes which occur in subcardinal, supracardinal and sacrocardinal veins during development that may lead to congenital venous anomalies. Here, we report a case of congenital venous anomaly of persisting retroaortic left renal vein.

**Key Words:** double left renal vein, inferior vena cava, preaortic left renal vein, retroaortic left renal vein

### INTRODUCTION

Renal veins develop from the persistent preaortic anastomotic plexus of subcardinal veins crossing anterior to abdominal aorta.<sup>1</sup> Double left renal vein, one in front (preaortic) and another behind the abdominal aorta (retroaortic) was reported in 6.5% cases.<sup>2</sup> In this case study we observed the presence of retroaortic left renal vein. This anomaly is relatively uncommon. Though, its clinical importance is unclear, it must be kept in mind by surgeons and clinicians during diagnostic and surgical procedures.

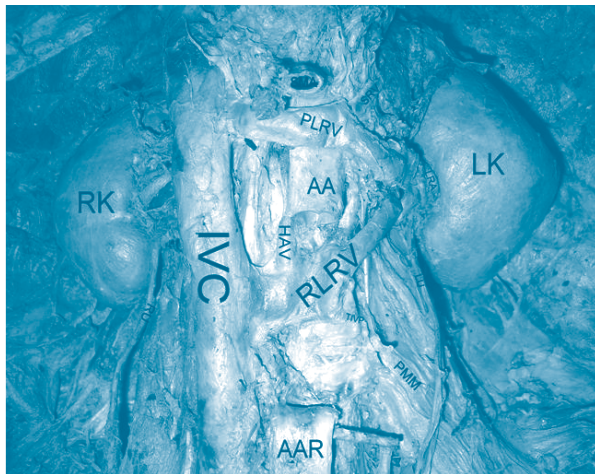
### CASE REPORT

While performing the dissection of approximately 48 year male cadaver, double left renal veins were found (Figure 1). One left renal vein normally passed across in front of the abdominal aorta i.e. preaortic and the other passed behind the aorta called retroaortic vein which was highly dilated. Retroaortic left renal vein also had communication with vertebral venous plexus through a tributary passing through the intervertebral foramen. The retroaortic left renal vein also had a tributary which passed through aortic opening of diaphragm and

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continuous with the hemiazygos vein which finally terminated into the azygos vein by crossing in front of thoracic vertebrae. The abdominal aorta was also slightly dilated. Left gonadal and left suprarenal vein were found draining into preaortic left renal vein.



**SMA:** superior mesenteric artery, **AA:** abdominal aorta, **PLRV:** pre aortic left renal vein, **RLRV:** retro aortic left renal vein, **RK:** right kidney, **LK:** left kidney, **RA:** left renal artery, **HAV:** hemiazygos vein, **TIVP:** tributary for internal vertebral venous plexus, **IVC:** inferior vena cava **SRV:** supra renal vein, **AAR:** abdominal aorta reflected part, **PMM:** psoas major muscle, **RU:** right ureter, **LU:** left ureter

**Figure 1. Double left renal vein.**

## DISCUSSION

Variations of arteries and veins are very important especially in the field of surgery. Variations of renal blood vessels are seen more than other blood vessels.<sup>1</sup> Some of these variations are differences in the branches of renal veins, existence of two left renal veins and connection of azygos and lumbar ascending veins to the left renal vein.

Developmentally there is communication between supracardinal vein, subcardinal and azygos vein with subcentral veins and preaortic intersubcardinal anastomosis. The most cranial of these connections, together with supracardinal anastomosis, complete a venous ring around the aorta below the origin of superior mesenteric artery termed as renal collar. The anastomosis between the supracardinal vein of either side and also with the subcentral vein behind the abdominal aorta usually regresses by late fetal period.<sup>1</sup> Here in our case study there was persistence of renal collar.

Double left renal vein, one in front (preaortic) and another behind the abdominal aorta (retroaortic) was observed in 6.5%.<sup>2</sup> Developments of renal vessels is very complicated process. Subcardinal, supracardinal and sacrocardinal veins undergo extensive changes during this process. Singular left renal vein behind aorta (retroaortic) has been proposed to cause varicocele.<sup>3,4</sup> Existence of left renal vein between the aorta and vertebral column is an important cause of vein being pressed. This condition will increase blood pressure in the left renal vein, and probably inducing varicocele in left side, which might produce difficulties in spermatogenesis.<sup>5,6</sup> Thus the singular retroaortic left renal vein as seen in this case can also be considered by clinicians as the possible cause of varicocele and sterility.

Lack of knowledge of persistence and missed preoperative computed tomographic scan may result into massive hemorrhage during encircling the tape around the abdominal aorta during surgery of abdominal aortic aneurysm (AAA).<sup>7</sup> Major venous anomalies (retroaortic left renal vein, left renal vein collar, left-sided inferior vena cava, and caval duplication) should thus be taken into consideration in abdominal aortic aneurysm operations.<sup>8</sup>

Double retroaortic left renal veins may be a contributing factor for the development of left pelvic congestion syndrome.<sup>9</sup> Detailed knowledge of the anatomy and anomalies of renal veins is necessary for retroperitoneal surgery and venographic procedures.<sup>10</sup> Abdominal aortic surgery is done with acceptable rates of morbidity and mortality. Major venous anomalies are rare, but these can seriously complicate aortic procedures and result into most unexpected intraoperative bleeding.<sup>11</sup> Retroaortic left renal vein is a relatively uncommon venous anomaly. Its clinical importance is unclear, but diagnostic and surgically hazardous implications make it a condition that must be kept in mind.<sup>12</sup>

The knowledge of anatomy of renal veins and its anatomic variations is very important in various clinical aspects. The renal vein can be catheterized via the femoral vein and blood taken to measure renin. This may be of value in assessing the haemodynamic significance of a renal artery stenosis. Venography will demonstrate renal vein thrombosis and invasion by tumour.<sup>13</sup> Renal vein should be ligated during nephrectomy. Thus renal surgeons should pay due attention for the presence of double renal vein otherwise one additional vein would be left unligated and massive hemorrhage could occur. Such variation in the left renal veins noticed in cadaveric dissections should be included in surgical training programs, even if they are not necessarily for inclusion in routine anatomy education in medical schools.

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