

## LATE UNION OF THE RENAL VEINS WITH THE INTERPOSED LEFT RENAL ARTERY

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### ABSTRACT

The complicated embryological development of the renal vein shows extensive variability in its anatomy. In this study, the rare bilateral late union of the renal veins with the interposed renal artery was observed during dissection for educational purposes. Its significance in different clinical conditions has been discussed.

**Key Words:** Renal vein, Renal artery, Communicating branch.

### INTRODUCTION

Variations of the renal vein described in the literature are not rare (1-5). Anomalies of the left renal vein have been classified together with inferior vena cava anomalies into four different groups: retroaortic left renal vein, transposition of the inferior vena cava, duplication of the inferior vena cava and circumaortic left renal vein (6, 7). Anomalies of the right renal vein are rare because the left vein is longer and has a more complex embryogenesis (8).

Knowledge of the location and anatomy of the renovascular pedicle may be of particular interest for surgical procedures such as aortic surgery and nephrectomy.

In this study we present a case with bilateral renal vein variation.

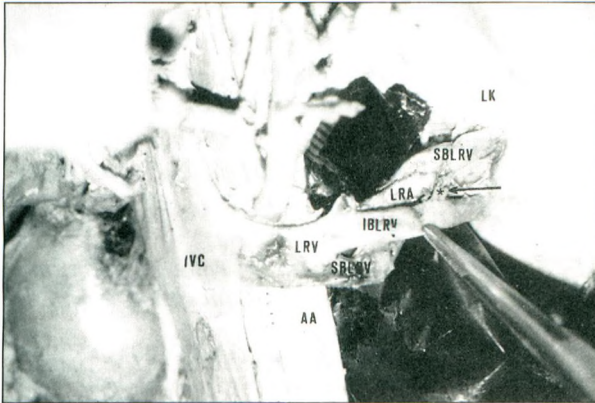
### CASE REPORT

Anatomical observation of the retroperitoneal region of a 54-year-old male cadaver revealed a bilateral preaortic late union of the renal veins. The two tributaries of the left renal vein arose from the hilum of the kidney. The lengths of the superior and inferior branches were 5.8 cm and 7.9 cm, respectively and united 2.5 cm before draining into the inferior vena cava (IVC). The connecting vein, 1.1 cm in length, existed between the two branches. The left suprarenal vein drained into the inferior branch of the left renal vein, 2.9 cm from the IVC. The left testicular vein drained into the superior branch of the left renal vein, 3.3 cm from the IVC (Fig.1).

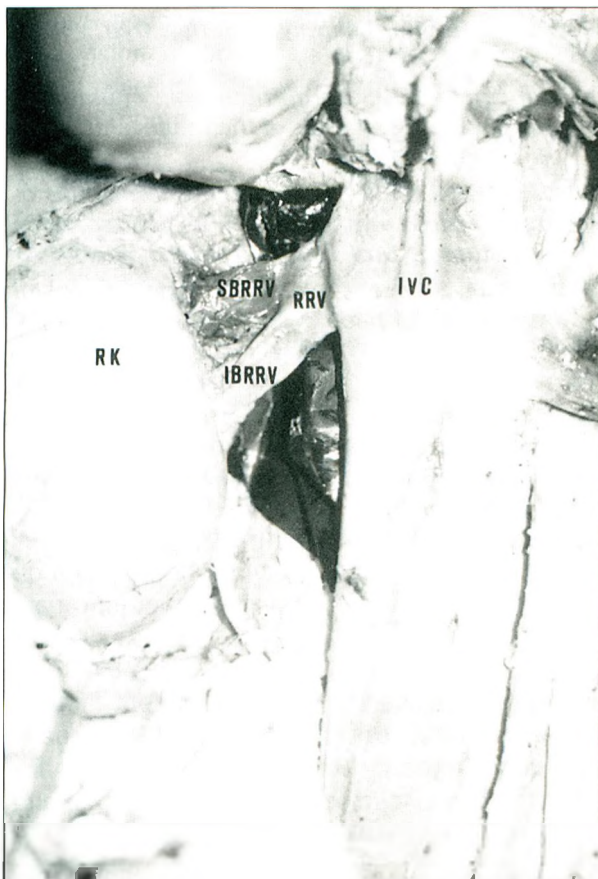
The superior and inferior branches of the right renal vein were 2.3 cm and 2.9 cm in length, respectively

and united 1.8 cm before joining the IVC. The right renal vein received no tributaries (Fig.2).

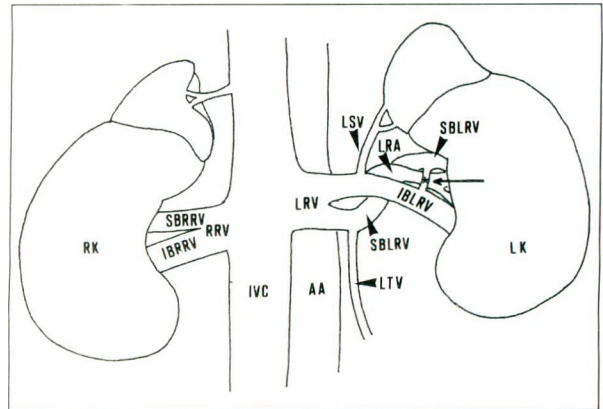
The left and right renal arteries showed ramification into lobar arteries, outside the hilum. The left renal artery was interposed between the two branches of the left renal vein (Figs. 1,2,3).



**Fig. 1:** The left renal vein and its two branches connected by a communicating branch and interposed left renal artery.



**Fig. 2:** The superior and inferior branches of the right renal vein united before joining the IVC.



**Fig. 3:** Schematic drawing of the encountered variations of the presented case.

Abbreviations:

- IVC - inferior vena cava
- LK - left kidney
- LRV - left renal vein
- SBLRV - superior branch of the left renal vein
- IBLRV - inferior branch of the left renal vein
- \* - communicating branch
- LRA - left renal artery
- LSV - left suprarenal vein
- LTV - left testicular vein
- RK - right kidney
- RRV - right renal vein
- SBRRV - superior branch of the right renal vein
- IBRRV - inferior branch of the right renal vein
- AA - abdominal aorta

**DISCUSSION**

The renal venous pattern is very complex and its variations have been frequently reported in the literature such as polar veins, double left renal veins, collar and posterior renal vein (1-5).

According to the definition of Satyapal et al. (9) a varying number of primary tributaries emerging from the kidney, terminating separately into the IVC should be considered as an additional renal vein. Therefore, our case is a report of the bilateral late union of the renal vein.

The renal half of the left and the entire right renal vein develop from the complicated venous system of the posterior abdominal wall (10). Therefore, multiple renal veins show significant right-sided preponderance. They may present an alternate route for venous drainage if the IVC or one of the renal veins has been interrupted (1,10-12). Due to the longer length of the left renal vein,

its clinical importance in kidney transplantation is significant and its variant form could complicate the procedure (12-14).

In cases with hematuria that do not respond to treatment, congestion in the renal venous system due to irregular renal veins should be remembered (13).

The left renal artery interposed between the branches of the left renal vein could lead to renal arterial hypertension (15). Also, its position between the branches of the renal vein could increase arterial injury risk.

Renal variations should be distinguished from pathological entities in the retroperitoneum in order to avoid confusion and complications during different diagnostic and surgical procedures in the region.

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