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Case Report

Triple Right Renal Vein: An Uncommon Variation

Vena Renal Derecha Triple: Una Variación Rara

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SUMMARY: We report an unilateral three renal veins the right kidney in an elderly male cadaver. They were three calibrous veins having independent courses up to the inferior vena cava. No other vascular anomalies were noted in this specimen. This anatomical curiosity should be kept in mind by clinicians and academics that may manipulate this anatomical area.

KEY WORDS: Anatomy; Anomalies; Human; Kidney; Vein.

INTRODUCTION

A knowledge of the variations of renal vascular anatomy has importance in exploration and treatment of renal trauma, renal transplantation, renovascular hypertension, renal artery embolization, angioplasty or vascular reconstruction for congenital and acquired lesions, surgery for abdominal aortic aneurysm and conservative or radical renal surgery (Sampaio & Aragão, 1990).

According to Testut & Latarjet (1947) and Bergman *et al*. (1988), the renal veins show less variation than to the renal arteries and the right renal vein may be doubled, even though the left renal vein is usually single. Therefore, we reported a rare case of venous drainage anomalous, was found three renal veins draining the right kidney.

CASE REPORT

The work complies with the provisions of the declaration of Helsinki in 1995 (as revised in Edinburgh, 2000) for research in humans.

During dissection of the retroperitoneal region of an elderly male cadaver, a variant drainage pattern of the right renal vein was found. Three renal veins draining the right kidney were found. They were three calibrous veins having independent courses up to the inferior vena cava. The authors named the vessels superior right renal vein (SRRV), middle right renal vein (MRRV) and inferior right renal vein (IRRV), according to its location when draining into the inferior vena cava (IVC) (Fig.1a for a schematic drawing, see Fig.1b).

The SRRV emerges from the central portion of the hilum on the anterior surface of the renal pelvis, crosses anteriorly the MRRV, turning medial-superiorly toward the IVC. It is accompanied by the anterior-inferior segmental artery. The SRRV join the IVC on the same level as the left renal vein. It has 3,8 cm in length and a diameter of 0,8 cm. The MRRV arises from the renal hilum through its superior portion, crosses posteriorly the SRRV, draining into the IVC immediately below the SRRV. The MRRV is related superiorly with the anterior-superior segmental artery, and inferiorly it is related with a branch of the anterior-inferior segmental artery. It has 2,7 cm in lengh and a diameter of 0,8 cm.

The IRRV emerges from the lower extremity of the hilum, just behind the inferior segmental artery. It crosses the anterior surface of the renal pelvis and run medially, joining the IVC at a level 4,4 cm below the left renal vein, and at 3,2 cm from the MRRV. The right testicular vein enters the IRRV at 0,3 cm from its drainage on the IVC. It has 2,8 cm in lengh and a diameter of 0,5 cm.

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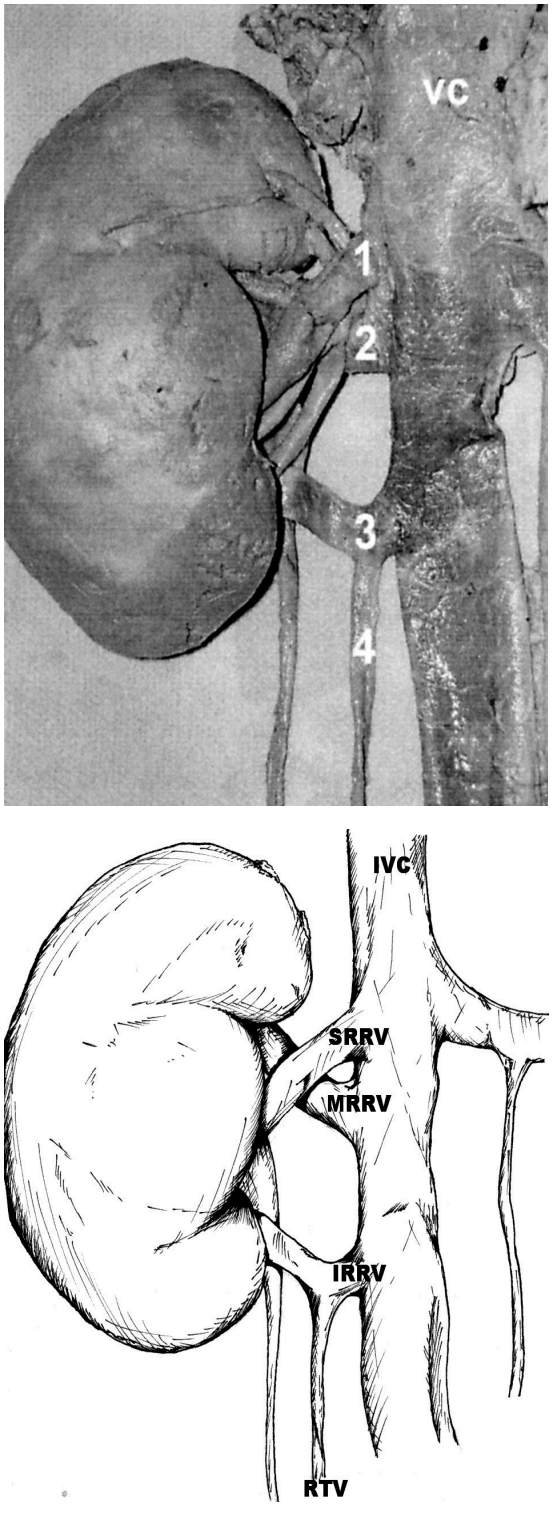

Fig.1.a) Ensemble anterior view of dissected right kidney with veins variations. IVC) inferior vena cava; 1) superior right renal vein; 2) middle right renal vein; 3) inferior right renal vein and 4) right testicular vein. b) Anterior view of anatomic drawing display the triple right renal vein. IVC= inferior vena cava; SRRV= superior right renal vein; MRRV= midle right renal vein; IRRV= inferior right renal vein and RTV= right testicular vein.

DISCUSSION

Anatomical variations and congenital anomalies of the left renal vein were well described by Gillot (1978) and Bergman *et al*. Sampaio & Aragão reported the variants renal venous drainage.

For Gillot and Arey (1941), the three pairs of temporary veins (postcardinals, subcardinals and supracardinals) that form the inferior vena cava and its main tributaries constitute masses of vessels of fleeting duration. There are numerous anastomoses among these three pairs of vessels, the main of which is called renal anastomosis (or renal collar) (Senecail *et al.*, 2003; Gillot).

The authors suggest the explanation for this varying pattern based on this step of the embryological development of the right renal vein: There was an error on the fusion of the branches to the dorsal mesonephros derived from the right postcardinal vein, the dorsal-medial branches of the right supracardinal vein and the ventral branches of the right subcardinal vein (the latter represented by the IRRV, marked by the presence of its gonadal tributary (Gillot).

The right renal vein is usually a single vessel, formed near the hilum in front of the renal artery (Testut & Latarjet). It describes a horizontal course toward the inferior vena cava, in which it drains. In literature, a significant prevalence of anatomical variations on the left renal vein (about 92%) was found (Baptista-Silva *et al.*, 1997), and the presence of multiple right renal veins (more than 2 vessels) was found in about 8,0 to 9,7% of cases (Baptista-Silva *et al.*). On the other hand, Bergman *et al*., pointed that, the renal veins show less variation than do the renal arteries and multiple renal veins to be rare on the left side (1%) and common on the right side (28%). The right renal vein may be doubled, even though the left renal vein is usually single. In our case, we reported a triple right renal vein.

Senecail *et al*., described that the left anomalies of the renal vein may represent real traps in the interpretation of abdominal imaging, particularly in CT scanning, where they are not always recognized, or in magnetic resonance. The abnormal imaging may be the source of technical difficulties in diagnostic or therapeutic angiography (Gillot) and may modify the values obtained by catheter sampling for suprarenal hormonal levels (Satyapal *et al*., 1999; Senecail *et al.*).

The anatomical knowledge of the renal veins and its variations are of extreme importance for the surgeon that approaches the retroperitoneal region, mainly in face of the current frequency of the renal transplant surgeries, as well as,

this anatomical curiosity should be kept in mind by clinicians and academics that may manipulate this anatomical area.

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RESUMEN:Presentamos una variación anatómica consistente en tres venas renales unilaterales presentes en el riñón derecho de un cadáver de un individuo adulto de sexo masculino. Las tres venas eran de calibre considerable, las cuales tenían cursos independientes hasta la vena cava inferior. No se observó ninguna otra variación vascular en este individuo. Tanto los clínicos como los académicos deben tener presente esta variación anatómica cuando se acceda a esta área anatómica.

PALABRAS CLAVE: Anatomía; Variación anatómica; Riñón; Vena renal.

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