

SUPERNUMERARY RIGHT RENAL VEIN DRAINING INFERIOR TO THE MAIN RENAL VEIN: A CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

With recent increase in renal transplantations, renovascular reconstructions and imaging advances, meticulous knowledge of the normal and variant anatomy of the renal vasculature is important to avoid potential pitfalls. We report a case of an accessory renal vein arising from the right kidney, and draining into the inferior vena cava about 3.5 cm inferior to the right renal vein. It was a large vein, coursing at an acute angle from the renal hilum in the same direction as the ureter, and emptying into the inferior vena cava just proximal to its formation by the common iliac veins. The importance of this occurrence in surgery and therapeutics, as well as the embryological basis is reviewed.

Key words: Renal veins, multiple

INTRODUCTION

The right kidney is commonly drained by one renal vein which lies in front of the renal artery and passes medially to drain into the inferior vena cava. The right renal vein is approximately 2.5 cm long, being a third the length of the left renal vein, which courses anterior to the aorta to empty into the inferior vena cava. It does not receive tributaries, while the left renal vein receives gonadal and suprarenal veins (William et al., 1995). Unusual vessels are the commonest form of renal morphological variations (Chavan et al., 2010).

Variations in the renal veins are rarely reported, as opposed to arteries (Misiani et al., 2012). In a study of 50 cadavers,

Vaghela et al (2013) did not encounter any variations in the renal venous system. The incidence of variations is 0.8-6%, with most occurring on the right side (Sykes, 1963, Williams et al., 1995). Three categories of variations have been observed in the renal venous system. Supernumerary veins are accessory renal veins that may occur on the right or left kidneys. The left renal vein may be retroaortic or circumaortic in some cases (Gupta et al., 2011).

Familiarity with such venous variations is a crucial step in avoiding vascular injury during retroperitoneal procedures. As such, their documentation is important.

Case report

During routine dissection of a 50 year old male by second year MBChB (Bachelor of Medicine and Bachelor of Surgery) students at the Kenya Methodist University, variations on the right renal vessels were observed.

The area was dissected clearly to visualize the anatomy. There was a supernumerary or accessory right renal vein arising from the lower end of the hilum of the right kidney, anterior to the renal pelvis. It

originated posterior to the right renal vein, in the same plane with the ureter. It coursed inferiorly and joined the inferior vena cava at an acute angle 2 cm below the right renal vein, proximal to the union of common iliac veins. It was a large vein approximately half the size to the renal vein and was 4cm in length. This variant vein did not receive the gonadal veins. Figures 1-3 illustrate the anatomy of this vein.

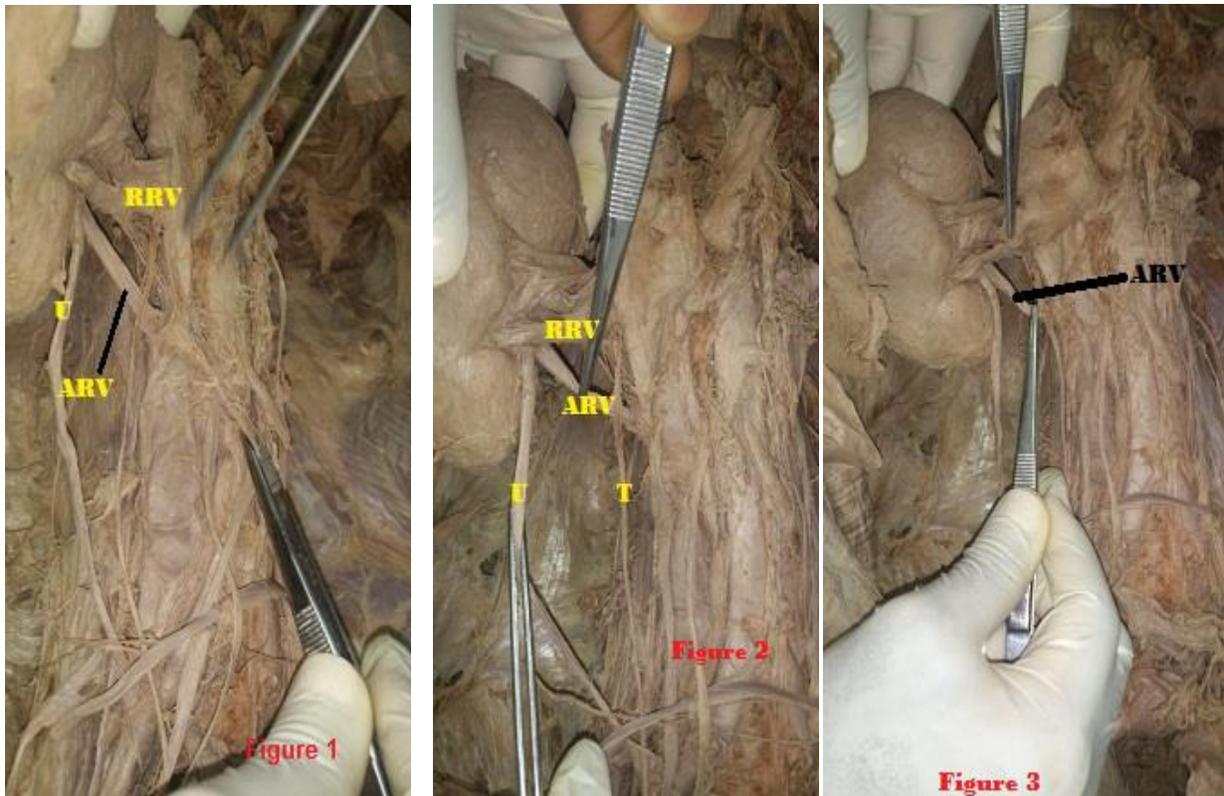


Figure 1 Showing the accessory renal vein (ARV), the ureter (U), and right renal vein (RRV). **Figure 2** shows the testicular vein (T) coursing anterior to accessory renal vein to join the inferior vena cava. **Figure 3** shows the accessory renal vein (ARV) joining the inferior vena cava at an acute angle.

Discussion

Reports of supernumerary renal veins in black populations are very rare in the literature (Ongeti et al., 2011). To the best of our knowledge, this is the first report of a supernumerary right renal vein coursing inferiorly to drain below into the initial segment of the inferior vena cava, without other anomalies. Renal venous variations are rare compared to arteries (Sykes, 1963), and may be attributable to various developmental positions of the kidneys.

Variations of the right renal veins are more common than the left (Nayak, 2008). A supernumerary renal vein has been defined as any additional vein arising from the hilum and draining into the inferior vena cava (Gupta et al., 2011). In our literature search, previous authors have reported supernumerary right renal veins coursing superiorly to empty into the inferior vena cava. (Gupta et al., 2011).

Embryological development of abdominal venous structures, which starts around the 8th week of development, explains the preponderance of venous variations on the right side. On the 8th week of intrauterine development, the bilaterally symmetrical cardinal venous system converts into unilateral right-sided inferior vena cava. Two renal veins are present on each side, one on ventral plane and another dorsal. Confluence of the two tributaries occurs with further development producing a single vessel. In case of persistence of these two veins, an additional right renal vein results. The shifting of the venous arrangement to the right side may explain why right-sided anatomical variations are more common (Mankhause and Khalique, 1986).

Anatomical variations of the renal veins constitute a perpetual threat during various retroperitoneal surgical and interventional procedures. Further, knowledge of these

variations may be important in interpretation of venographic and other radiological procedures. As such, surgeons, urologists and radiological interventionists should be wary of the potential variations that are likely to be encountered in this region (Dhar and Ajmani, 2004).

In conclusion, a detailed knowledge of the variant anatomy of the renal veins is

important as it provides safety guidelines for endovascular procedures. Sound knowledge and understanding is also essential in making diagnosis of retroperitoneal masses and renal vascular complications, as well as impeding complications during surgery.

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