

Case Report

UNILATERAL TRIPLE RENAL VEINS AND BILATERAL DOUBLE RENAL ARTERIES- AN UNIQUE CASE REPORT

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ABSTRACT

A precise knowledge of the vascular variations of human kidney is essential for the surgeon and radiologist to avoid complication during interventional radiological procedure, renal transplantation, renal trauma and other urological procedures. The present case report is regarding unilateral variation of renal vein and bilateral variation of renal artery. During routine cadaveric dissection of abdominal region, we observed three renal veins in right kidney. All right renal veins were emerging from hilum of kidney and drained in inferior vena cava where as in left Kidney venous drainage is normal.

In right Kidney both main and accessory renal artery arose from abdominal aorta. Left main renal artery arose from abdominal aorta with left accessory renal artery arising from left middle suprarenal artery which is branch of coeliac trunk. In this case right ureteropelvic junction is seen to be compressed in between right accessory renal artery and right lower renal vein which crossed anteriorly with right middle renal vein crossing posteriorly this condition may cause hydronephrosis. The above finding to be reported in a single case is rarely seen. This is a valuable contribution from anatomical knowledge to operative procedures.

KEYWORDS: Renal artery; Accessory renal artery; Renal vein; Kidney; Ureteropelvic junction.

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INTRODUCTION

Normally each kidney supplied by single renal vessels. Variations in the renal vessels are frequently seen but presence of accessory renal arteries is most common variation. They develop from persistent embryonic lateral splanchnic arteries and usually arise from aorta. Rarely accessory renal arteries arise from the coeliac or superior mesenteric arteries or from the common iliac arteries [1] variations in renal venous pattern is less common as compared to arterial pattern. Second additional renal veins occur infrequently on the right side (5%) [2]. In the present case we found three renal veins on right Kidney with bilateral single accessory renal artery. These anatomical variations are

important to know before performing any invasive diagnostic and interventional procedures in renal diseases.

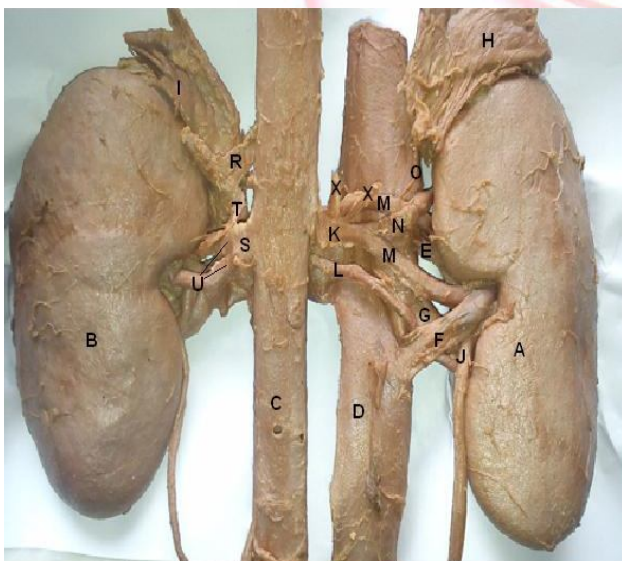
CASE REPORT

The renal vasculature variations were found in adult male cadaver during the routine dissection of abdomen in Department of Anatomy Career Institute of Medical Sciences and Hospital, Lucknow. In right kidney three renal veins were seen, namely upper, middle and lower right renal vein. Upper right renal vein was emerging from upper part of hilum at level of L1 vertebra, passed superomedially and drained into the inferior vena cava. Middle right renal vein was

emerging from middle part of hilum at level of intervertebral disc between L1 and L2, passed superomedially and drained into the inferior vena cava. Lower right renal vein was emerging from lower part of hilum at level of L2 vertebra, passed inferomedially and drained into the inferior vena cava. Lower right renal vein was crossing anterior to right ureteropelvic junction and middle right vein was crossing posterior to it.

In both right and left kidney two renal arteries were observed showing bilateral variation in renal artery. Right main renal artery arose from anterolateral surface of abdominal aorta just below the superior mesenteric artery. The right main renal artery immediately after its origin gave a branch named right hilar artery further running inferolaterally gave another branch named right superior polar artery in its further course the main renal artery reached the central portion of hilum. Right hilar artery gave a branch to right suprarenal gland (Lower suprarenal artery) and entered the upper end of the hilum. Right superior polar artery was running superolaterally and reaching the superior pole

Fig.1: Posterior View Showing Triple Right Renal Veins And Bilateral Double Renal Arteries.



A-Right kidney, B- Left Kidney, C- Abdominal Aorta, D- Inferior Vena Cava, E- Right Upper Renal Vein, F- Right Middle Renal Vein, G- Right Lower Renal Vein , H- Right Suprarenal Gland, I- Left Suprarenal Gland, J- Right Ureteropelvic Junction, K- Right Main Renal Artery, L- Right Accessory Renal Artery, M- Right Hilar Artery, N- Right Polar Artery, O- Right Lower Suprarenal Artery, R- Left Middle Suprarenal Artery, S- Left Main Renal Artery, T- Left Accessory Renal Artery, U- Left Hilar Artery, X-Suprarenal Artery.

of right kidney. Right accessory renal artery originated from anterior surface of abdominal aorta 15mm below the superior mesenteric artery and ran inferolaterally after crossing the right ureteropelvic junction anteriorly reached the lower end of hilum. Left main renal artery took origin from posterolateral surface of abdominal aorta 12mm below the superior mesenteric artery. Left main renal artery on its course running laterally gave a branch named left hilar artery and reached the hilum of left kidney. Left hilar artery was reaching the upper end of hilum. Left accessory renal artery arose from left middle suprarenal artery which was branch of coeliac trunk. Left accessory renal artery was running inferolaterally and entering in hilum of left kidney.

DISCUSSION

On the basis of many studies it has been accepted that the high frequency of variations are present in renal vessels. Variation in renal arterial pattern is more common as compared to venous pattern. Second additional renal veins occurred infrequently on the right side (5%) [2]. Variations of right renal veins are more common than the left [3]. The incidents of addition renal

Fig.2: Anterior View of Right and Left Kidney Showing Renal Vascular Variations.



A- Right kidney, B- Left Kidney, C- Abdominal Aorta, D- Inferior Vena Cava, E- Right Upper Renal Vein, F- Right Middle Renal Vein, G- Right Lower Renal Vein , H- Right Suprarenal Gland, I- Left Suprarenal Gland, J- Right Ureteropelvic Junction, L- Right Accessory Renal Artery, P- Coeliac Trunk, Q- Superior Mesenteric Artery, R- Middle Suprarenal Artery, V- Left Renal Vein, W- Left Suprarenal vein.

veins reported to be 3.3% on right side and 2.6% on left [4]. Presence of multiple right renal vein (more than 2 veins) was found in about 8.0% to 9.7% of cases [5]. A rare case of venous drainage anomalous, was found three renal veins draining the right kidney [6]. This finding is similar to our finding for right renal veins. Renal venous variations are rare compared to arteries [7]. Accessory renal arteries were observed unilateral in 15% cases and bilateral on 5% of cases [8]. In the study of 170 cases, found that 36 of 170 subjects (21.2%) had multiple arterial origins on the left or right side, and 8 subjects (4.7%) had bilateral multiple arterial origins. [9]. Bilateral frequency of first additional renal artery as 10.2% [10]. 54 double renal arteries originating from the aorta in 272 kidneys (20%) and 6 of them were bilateral (2.2%)[11]. In our study we found bilateral double renal artery. All the additional vessels were located posterior to the ureter with a close relationship to the ureteropelvic junction on the right side [12]. The incidence of additional renal arteries has a wide range (from 8.7% to 75.7%) and they too, can cause hydronephrosis by obstruction [13]. In our study right ureteropelvic junction is seen to be compressed in between right accessory renal artery and right lower renal vein which crossed anteriorly with right middle renal vein crossing posteriorly this condition may cause hydronephrosis.

CONCLUSION

In this case report the variations of renal vascular pattern included triple right renal vein and bilateral double renal artery with the point to be emphasized is the emerging of additional right renal vein and origin of bilateral single accessory renal artery.

One of the main finding is that right ureteropelvic junction is seen to be compressed in between right accessory renal artery and right lower renal vein which crossed anteriorly with right middle renal vein crossing posteriorly this condition may cause hydronephrosis. The main aim of this case report is to recognize presence of variations in renal vessels which must be kept in mind by surgeon and other related experts before performing any operative procedure such as renal transplants, vascular reconstructions, nephrectomies and trauma management to

avoid pre and post operative complications.

Conflicts of Interests: None

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