

BILATERAL VARIATIONS OF RENAL VESSELS – A CASE STUDY

Kanthi Giridhar Aruna Harshita Anoop Visakh Vishnu

Department of Rachana Sharira, S. D. M. College of Ayurveda, Udupi, Karnataka, India

ABSTRACT

Knowledge of variations of renal vessels are important during operative, diagnostic and endovascular procedures of the abdomen and pelvic region and its importance have been greater than before because of the widespread development in the renal transplantation surgeries.

During routine dissection of a 60 year aged female cadaver we observed bilateral variations of renal vessels. There were two renal arteries superior and inferior accompanied by two renal veins one anterior and one posterior to the artery on the right side. On the left side we found two renal arteries superior and inferior accompanied by two renal veins superior and inferior with a communicating vein connecting the superior and inferior renal veins on left side. Left gonadal vein drained into the inferior renal vein, which in turn drained into the inferior vena cava. Left suprarenal vein drained into the superior renal vein which further drained into the inferior vena cava.

Such unusual and complex variations must be kept in mind during radiological and surgical procedures to prevent inadvertent injury to the related structures and also for their clinical implications.

Keywords: Renal artery, renal vein, bilateral variation

INTRODUCTION

Renal arteries are a pair of lateral branches of the abdominal aorta, arising at the level of L1 and L2 vertebra, just below the origin of the superior mesenteric artery. Renal arteries course anterior to the renal pelvis before entering into the hilum. Classically, a single renal artery supplies each kidney. The right renal artery is longer and often higher and pass posterior to the inferior vena cava, right renal vein, head of the pancreas and descending part of the duodenum whereas the left renal artery pass behind the left renal vein, the body of pancreas and the splenic vein. It may be crossed by the inferior mesenteric vein anteriorly.

Generally, each kidney is drained by a single renal vein; right renal vein is

shorter and drains into the inferior vena cava, whereas the left renal vein which is three times longer than the right renal vein drains into the inferior vena cava by coursing anterior to the aorta. In addition, left renal vein also receives tributaries of left gonadal vein from below and left suprarenal vein from above.¹

CASE REPORT

During the dissection of a female cadaver aged about 60 years, in Alva's Ayurvedic Medical College Moodabidri, Karnataka, we found variations in renal vessels bilaterally.

Variation on the right side

There were two renal arteries as superior and inferior. The superior renal artery again divided into 2 to 3 branches before entering into the hilum.

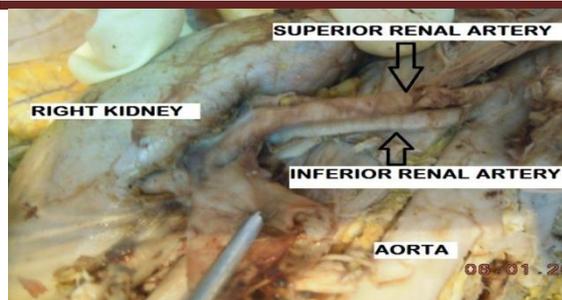


Fig. 1: Right kidney arteries variations

There were two renal veins one anterior to the renal artery (normal) and another one posterior to the artery and both were attached to the hilum of the kidney.

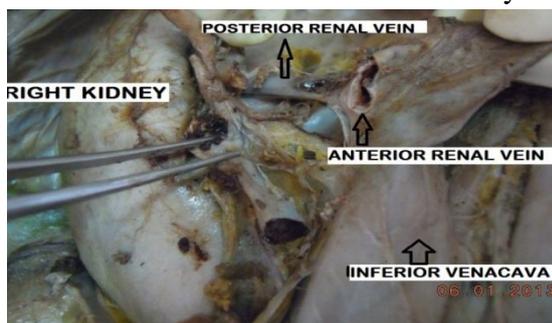


Fig. 2: Right kidney veins variations

Variation on the left side

In the left side also there were two renal arteries as superior and inferior along with two renal veins as superior and inferior. Superior vein was present between the two arteries. The superior renal vein received suprarenal vein and inferior renal vein received the gonadal vein. A number of tributaries joined inferior renal vein and also there was a communicating vein present in between the superior and inferior renal veins.

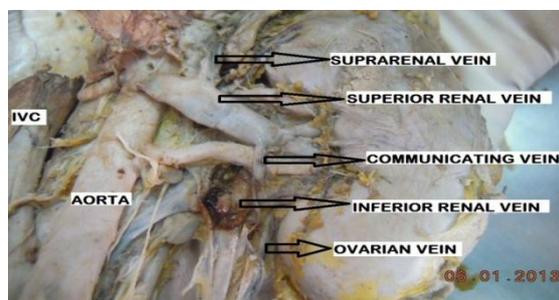


Fig.3: Left kidney veins variations

DISCUSSION

The variations in the renal vessels are mainly due to various developmental positions of the kidney.² Renal arteries ex-

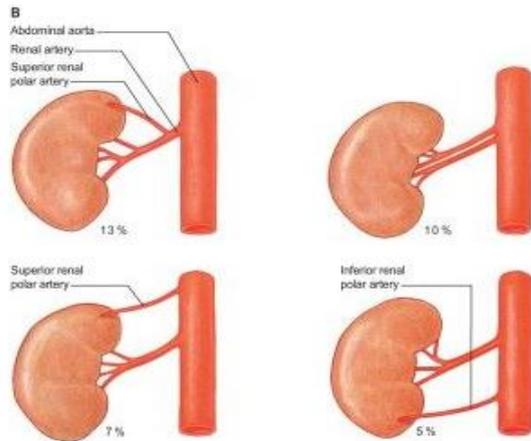
hibit a high degree of variations compared to the renal veins. A variation occurring in both arteries and veins together is rare; also, variations among the renal veins are not as common as arteries.³ In this case we observed bilateral variations in the renal arteries and renal veins.

A single main renal artery is seen in 70% of individuals, and accessory renal arteries are common in 30% and usually arise from the aorta above or below (most commonly below) the main renal artery and follow it to the renal hilum. Rarely, accessory renal arteries may arise from the coeliac trunk or superior mesenteric arteries near the aortic bifurcation or from the common iliac arteries. These accessory renal arteries are called as persistent embryonic lateral splanchnic arteries. Near the hilum, each renal artery divides into anterior and posterior divisions which further divide into segmental, lobar, inter lobar and arcuate arteries. These are end arteries with no anastomoses.¹ However renal artery variations are very common. Variations regarding their origin and number have been reported by many researchers. Renal vasculature variations are important for the angiographers and urologists.⁴ The knowledge of entry of renal veins into the inferior vena cava and their variations is equally important during catheterization and planning porto-renal shunt procedures.⁵

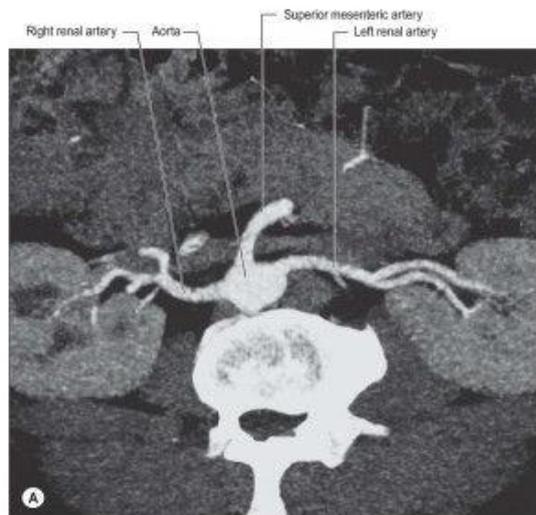
CONCLUSION

Bilateral variation in the renal artery and vein is a rare case of occurrence. As the invasive interventions such as renal transplantation, interventional radiologic procedures and urologic operations increase, awareness of the possible variations of the renal arteries is necessary for adequate surgical management in the aforementioned specialties.

Percentage of occurrence of variation in the renal artery¹



Radiological image showing the position of renal artery¹



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CORRESPONDING AUTHOR

Dr. Giridhar Kanthi
Professor of Rachana sharira
S. D. M. College of Ayurveda, Udupi
Karnataka, India
Email: girishakanthi@gmail.com

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