

## Case Report

# ACCESSORY RENAL ARTERY: A CASE REPORT

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## ABSTRACT

Variations in the origin of the branches from abdominal aorta are seen frequently. During a routine cadaveric dissection it was seen kidney is receiving an accessory artery which originated from the lateral side of aorta below the inferior mesenteric artery. It is accompanied by the renal vein. These variations are important during the Renal surgeries and any therapeutic procedures of the abdominal aorta.

**KEY WORDS:** Accessory renal artery, Renal vein, Anatomy

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## INTRODUCTION

Kidney is the excretory organ present in the lumbar region retroperitoneal. It is supplied by a single large renal artery, a lateral branch of the abdominal aorta [1]. These vessels usually arise just inferior to the origin of the superior mesenteric artery between vertebrae L1 and L2. The left renal artery usually arises a little higher than the right and the right renal artery is longer and passes posterior to the inferior vena cava. Accessory renal arteries are common. They originate from the lateral aspect of abdominal aorta either above or below the primary renal arteries. They enter the hilum with primary arteries or pass directly into the kidney at some other level and are commonly called extra hilar arteries. Multiple renal veins contribute to the formation of the left and right renal veins both of which are anterior to the renal arteries. Importantly the longer left renal vein crosses the midline anterior to the abdominal aorta and posterior to the superior mesenteric artery and

can be compressed by an aneurysm in either of these two vessels.

Knowledge of the variations of the renal artery has grown in importance with increasingly numbers of renal transplants, vascular reconstructions and various surgical and radiologic techniques being performed in recent years as well as during nephrectomy and segmental resection[2-7]. The variations of renal arteries are considered critical issues that surgeons should have thorough envision and appreciation of the condition [3].

## CASE REPORT

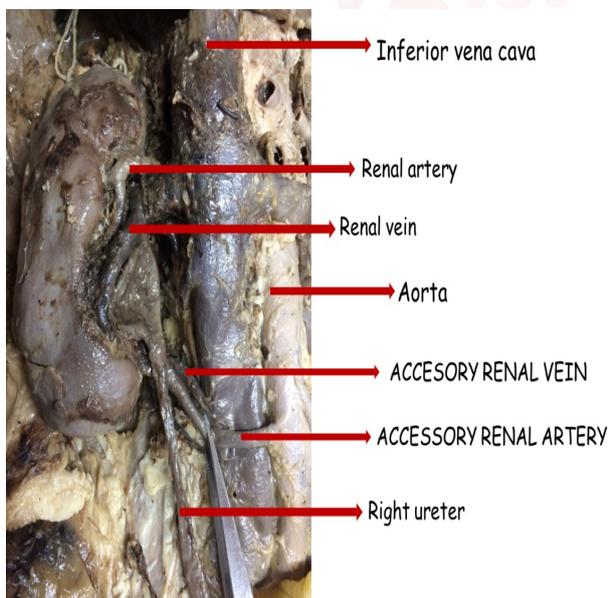
During a routine gross anatomy dissection of the abdomen of an elderly female cadaver at the Apollo Institute of Medical Science and Research, Hyderabad, multiple variations were observed, of which, presence of an accessory renal artery and vein, was one among them. Incision of anterior abdominal wall was done along the linea alba to open abdomen. The large

fold of peritoneum, mostly the mesentery covering the entire small intestine is cleared. After the removal of the small and large intestine, liver, stomach, pancreas and spleen, the fat and fascia from the anterior surface of the right and left kidneys and suprarenal glands is cleared and the blood vessels are been traced from hilum of kidney to aorta.

## OBSERVATIONS

The presence of the accessory renal vessels was present only on the right side. The accessory renal artery took its origin from the lateral aspect of the aorta at vertebral level L3 –L4 disc. It passed on the anterior surface of the inferior vena cava and entered the hilum of the right kidney on the lower aspect, passing posterior to the renal pelvis. The accessory renal vein emerged from the lower aspect of the hilum of right kidney, passed posterior to the accessory renal artery and the right ureter and finally drained into the inferior vena cava on the lateral side.

**Fig. 1:** Presence of an accessory renal artery and vein.



## DISCUSSION

The report on the presence of bilateral triple renal arteries was discovered on routine dissection of a male cadaver by the Department of Anatomy, Gaziantep University, Turkey[2]. On the right side, one additional renal artery originated from the abdominal aorta (distributed to superior pole of the kidney) and one other originated from the right common iliac artery (distributed

to lower pole of the kidney). On the left side, both additional renal arteries originated from the abdominal aorta.

In the Tabriz University of Medical Sciences, Iran, The University of Alabama, Birmingham, Harvard Medical School, Boston and Yale University School of Medicine, Waterbury, USA, a case of bilateral accessory renal artery with a striking pre-hilar branching pattern encountered upon digital subtraction angiography (DSA) for imaging of the renal arteries of a healthy 30-year-old man, renal transplant donor[3]. The right kidney received two renal arteries from the aorta including a main hilar and one lower polar. However, the left accessory artery while originated from the aorta, simultaneously, supplied both upper and lower renal poles following its pre-hilar division that replaced upper/apical and lower segmental arteries of the single main renal artery, respectively. The left main renal artery divided into two anterior and posterior segmental arteries.

Variation in renal supply was observed during dissection of a 68-year-old male cadaver at Medical College, Kolkata [4]. On right side in addition to normal renal artery, an additional renal artery originated from the abdominal aorta and entered into the kidney through the lower part of its hilum. The additional renal vein emerged from the lower most point of the hilum, passed medially to end in the posterior part of inferior vena cava below the opening of normal right renal vein.

In the Federal University of Sergipe and Tiradentes University, sixty kidneys from human fetuses (32 males and 28 females) were used [5]. The fetal age ranged from 20 to 37 weeks of gestation. Out of the 60 kidneys investigated, 78.33% had a single renal artery and 21.67% had multiple renal arteries. Most of the renal arteries emerged from the lateral wall of the aorta between the levels of the lower third of the twelfth thoracic vertebra and the upper third of the first lumbar vertebra. The length ranged from 0.15 to 1.5 cm and was slightly greater in females. Working in Harvard Medical School, Tostesan Medical Education Centre (Boston, Massachusetts) and at the American University of Caribbean, the dissection of a male cadaver revealed several vascular abnormalities in the

abdominal cavity, notably of the renal circulation[6]. In particular, three renal arteries were observed on the right side and two on the left. On the right side, one accessory renal artery originated as a common trunk with the inferior mesenteric artery.

During a gross anatomy dissection of the abdomen of a 55-yearold male cadaver, at (faculty of Medicine and Health sciences, University of Dongola); there were multiple variations included the right renal vessels[7]. The right kidney received two (superior and inferior) renal arteries, of which took their origin from the lateral aspect the abdominal aorta just at the level, and below the origin of superior mesenteric artery respectively. Both arteries were equal in size, and reach the kidney through the hilum, the superior lied anteriorly with the renal veins while the inferior behind them; both arteries gave arise to hilar branches. In addition the right kidney had two renal veins of almost equal size, both of which terminated into the inferior vena cava.

At the University of Witwatersrand, Johannesburg, South Africa, patent left and right accessory inferior polar renal arteries were found in a dissection room cadaver [8]. Both arteries originated from the left common iliac artery. This is an unusual form of origin of these arteries in the presence of an apparently normal ascent and position of the two kidneys.

At the Muhimbili University College of Health Sciences, Tanzania, the left kidney of a female cadaver, in addition to being supplied by the normal renal artery and vein it contained a left lower polar renal artery and vein [9]. The polar artery took origin from the inferior mesenteric artery to supply the lower pole and was drained by the left lower polar vein that opened into the left common iliac vein. The right kidney from a male cadaver showed accessory renal arteries and veins. The accessory upper and lower renal artery took origin from the aorta and passed to supply the lower pole of the right kidney. Therefore, the lower pole of the right kidney received two arteries, but was not associated with a polar vein. The right kidney in addition to the normal right renal vein contained an accessory right renal vein. The vein was seen at the hilum and was the most posterior structure; passing

behind the accessory lower renal artery to open into the posterior surface of the inferior vena cava.

At the University of Durban-Westville, South Africa, a retrospective study aimed at establishing the incidence of additional renal arteries [10]. The sex and race distribution was males 140, females 96 African 84, Indian 91, White 43 and "Colored" 18, respectively. Incidence of first and second additional arteries were respectively, 23.2% (R 18.6% L 27.6%) and 4.5% (R 4.7% L 4.4%). Additional arteries occurred more frequently on the left (L 32.0% R 23.3%). The incidence bilaterally was 10.2% (first additional arteries, only). The sex and race incidence (first and second additional) was males, 28.0%, 5.1% females, 16.4%, 3.8% and African 31.1%, 5.4% Indian 13.5%, 4.5% White 30.9%, 4.4% and "Colored" 18.5%, 0% respectively.

## CONCLUSION

The increasing number of surgical interventions, especially where laparoscopic methods are concerned, underlines the importance of knowledge of renal arteries especially to surgeons, interventional radiologists, nephrologists, and vascular surgeons.

**Conflicts of Interests: None**

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