



## VARIATIONS IN RENAL VASCULATURE IN A CADAVER – A CASE REPORT

**Dr Sakshi P Waghmare**

Assistant Professor, Dept Of Rachana Sharir, CSMSS Ayurved College, Aurangabad.

**Dr Nimesh P Sangode\***

Assistant Professor, Dept Of Rachana Sharir, CSMSS Ayurved College, Aurangabad.  
\*Corresponding Author

**Dr Sandip L Aute**

Assistant Professor, Dept Of Rachana Sharir, Yashvantrao Chavan Ayurved College, Aurangabad.

### ABSTRACT

In this article we are representing the variation in origin of renal arteries. During dissection of healthy cadaver in dissection hall, we found - Each kidney was supplied by two renal arteries instead of one renal artery and they are the direct lateral branches of the abdominal aorta.

Knowledge of this type of variation is very important in avoiding complications during operative surgeries.

**KEYWORDS :** Accessory renal artery, Abdominal Aorta, Kidneys.

### INTRODUCTION:

The renal artery is the branch of abdominal aorta which supplies the kidney. Generally right and left kidney supplied by one renal artery on each side in 70% of individuals.<sup>1</sup> It arises from the Abdominal Aorta at the L1- L2 vertebral body level, inferior to the origin of the Superior Mesenteric artery. Renal arteries are about 4-6 cm in length and 5-6 mm in diameter. Accessory renal arteries are common. They originate from the lateral aspect of the abdominal aorta, either above or below the primary renal arteries, enter the hilum with the primary arteries or pass directly into the kidney at some other level, and are commonly called extrahilar arteries.<sup>2</sup>

#### Accessory Renal arteries

- occurs in 30% of the population
- Aberrant Renal arteries: enter via the renal capsule rather than the hilum
- Early / Prehilar branching occurs in 10% of the population. It occurs within 1.5-2.0 cm of origin in the left Renal Artery or in the retrocaval segment of the right Renal artery. It is important to recognize in renal transplant for successful anastomoses.<sup>3</sup>

Their proper identification is of great importance for surgical planning prior to live donor transplantation and renal artery embolization for various reasons.

The variation in the renal artery is very rare. Knowledge of the wide variation in the renal vasculature of the kidney is of the surgical importance and other interventional procedures. Practical knowledge of Variation in renal vasculature impact on renal transplantation surgery, vascular operations, Reno vascular hypertension, renal trauma and Uro radiological procedures.

### METHODOLOGY:

During a routine dissection at the Department of Anatomy at the CSMSS Ayurved Mahavidyalaya, Aurangabad, an anatomical variation in the renal arteries was observed. The cadaver donated to the Department of Anatomy, was that of a middle aged Indian man.

After dissection of anterior wall of abdomen, after cutting the root of mesentery removed the abdominal organ within the peritoneal cavity and stripped posterior wall of peritoneum, removed all the fat and fascia from the anterior surface of both the kidney and traced the two renal arteries to each kidney, renal veins.

### OBSERVATION:

#### RENALARTERY

#### ORIGIN:

It arises from the abdominal aorta at the L1-L2 vertebral body level, inferior to the origin of the superior mesenteric artery.

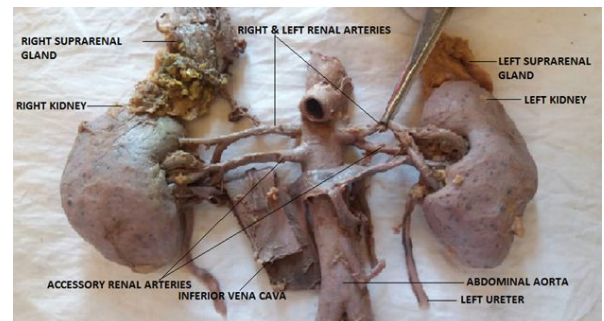
#### COURSE:

The right Renal Artery courses inferiorly and passes posterior to the

Inferior Vena Cava and the right Renal Vein to reach the renal hilum. The left Renal Artery is much shorter and arises slightly more inferior to the right Renal Artery. Left Renal Artery courses more horizontally, posterior to the left Renal Vein to enter the renal hilum. Renal arteries are about 4-6 cm in length and 5-6 mm in diameter.<sup>3</sup>

### OBSERVED VARIATION

Cadaver showed the Accessory Renal Arteries on both sides of kidney. On the both right and left side Accessory renal arteries arise from the Abdominal Aorta and enter at the lower pole of the kidney.



### DISSCUSSION:

A single renal artery to each kidney is present in approximately 70% of individuals.<sup>1</sup> The arteries vary in their level of origin and in their calibre, obliquity and precise relations. In its external course each renal artery gives off one or more inferior suprarenal arteries, a branch to the ureter and branches which supply perinephric tissue, the renal capsule, and the pelvis. Near the renal hilum, each artery divides into an anterior and a posterior division, and these divide into segmental arteries supplying the renal vascular segments.

Accessory renal arteries are common renovascular anomaly (30% of individuals), and usually arise from the aorta above or below (most commonly below) the main renal artery and Instead of entering the kidney at the hilum, they usually pierce the upper or lower part of the organ.<sup>4</sup> They are regarded as persistent embryonic lateral splanchnic branch of the aorta at the level of second lumbar segment.<sup>5</sup>

In an 18 mm fetus, the developing mesonephros, metanephros, suprarenal glands, and gonads are supplied by nine pairs of lateral mesonephric arteries arising from the dorsal aorta. Felix divided these arteries into three groups as follows: the 1st and 2nd arteries as the cranial, the 3rd to 5th arteries as the middle, and the 6th to 9th arteries as the caudal group. The middle group gives rise to the renal arteries. Persistence of more than one artery of the middle group results in multiple renal arteries. Thus, the multiple renal arteries are a result of persisting lateral mesonephric arteries from the middle group. Clinically, the supernumerary renal arteries are very important. They

can also be injured during mobilization and other surgical procedures. Lower polar supernumerary renal arteries of aortic or renal origin can be a cause of ureteropelvic junction obstruction.<sup>6</sup>

Accessory renal arteries occur bilaterally in 10-15% of cases:

- Single renal artery arising from the abdominal aorta: 70%
- Double renal arteries - 20% (range 14-23%)
- Triple renal arteries - 2.5% (range 1-4%)
- Quadruple renal arteries <1%
- Most commonly accessory renal arteries arise from the abdominal aorta and supply the inferior pole of the kidney, although rarely they can arise from coeliac trunk, superior and inferior mesenteric arteries or middle colic artery.<sup>7</sup>

#### CONCLUSION:

- Different origins of renal arteries and frequent variations are explained by the development of mesonephric arteries. Deficiency in the development of mesonephric arteries results in more than one renal artery.
- The anatomical knowledge of supernumerary renal arteries is essential before performing any transplantation surgeries where micro vascular techniques are employed to reconstruct the renal arteries. One has to keep in mind that transplanting a kidney with accessory renal arteries has several theoretical disadvantages: acute tubular necrosis and rejection episodes and decreased graft function.<sup>8</sup>
- Most anomalous renal vessels are without clinical significance, but may be of importance when renal or retroperitoneal surgery is undertaken. Optimal techniques for preoperative identification of these aberrant vessels are being explored, Evaluation before surgery with CT angiography or MR angiography can be useful.
- Awareness of variations of renal artery is necessary for surgical management during renal transplantation, repair of abdominal aorta aneurysm, and urological procedures and for angiographic interventions.

#### REFERENCES:

1. Susan Standring. Kidney and ureter. In: Susan Standring, Neil R. Borley, (eds.) Grays anatomy. 40th ed. London, UK: Churchill Livingstone Elsevier; 2008. p.2258
2. Richard L. Drake. Grays anatomy for student. 2nd ed. London, UK. Churchill Livingstone Elsevier; 2009
3. <https://radiopaedia.org/articles/renal-artery>.
4. B. D. Chaurasia. Kidney and ureter. In: Krishna Garg (eds.) Human Anatomy. 8th ed. New Delhi, Bangalore: CBS; 2007. p.299
5. Inderbir Singh, G. P. Pal. Urogenital system. In: Inderbir Singh (eds.) Human embryology. 8th ed. New Delhi, Bangalore: Macmillan publishers India ltd; 2007. p.244
6. W. Felix, "Mesonephric arteries (aa. mesonephrica)," in Manual of Human Embryology, F. Keibel and F. P. Mall, Eds., vol. 22, pp. 820-825, Lippincott, Philadelphia, Pa, USA, 1912.
7. <https://radiopaedia.org/articles/accessory-renal-artery>.
8. F. J. B. Sampaio and M. A. R. F. Passos, "Renal arteries: anatomic study for surgical and radiological practice," Surgical and Radiologic Anatomy, vol. 14, no. 2, pp. 113-117, 1992.