

Bilateral Double Renal Arteries: A Rare Variation

Dr Yogesh S Ganorkar Md¹, Dr Ashish Radke Md², Dr Rakeshkumar Jha³

Indira Gandhi Govt. Medical College, Nagpur (India)

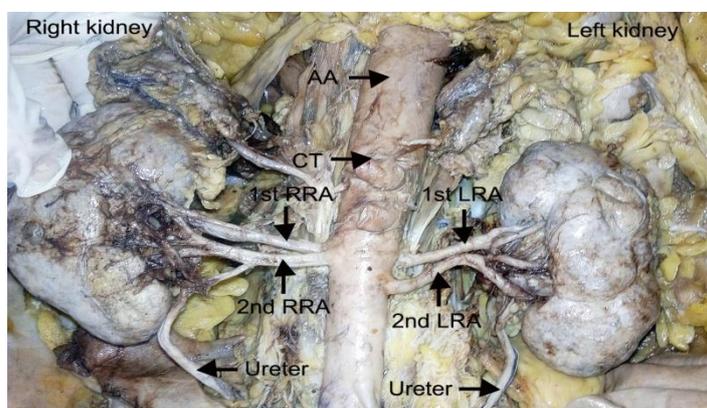
Abstract : A knowledge of variation of blood vessel is important during operative, diagnostic and vascular procedure. Renal arteries are usually arise from abdominal aorta at the level of L1. Sometimes accessory renal arteries arise from aorta, below or above the normal renal artery. Sometimes these are unilateral or bilateral. In the present case study, bilateral double renal arteries are found during routine dissection. Knowledge of such variation in the renal arteries is important for urologist, radiologist and surgeon for reducing the chances of intraoperative and postoperative complication.

Keywords: - Kidney, Abdominal aorta, Renal artery, Bilateral renal artery, Double

I. Introduction

Renal artery supplies each kidney. The right and left renal artery usually arise from lateral side of abdominal aorta. The point of origin at the level of L1, below the origin of superior mesenteric artery. Normally each kidney receive one renal artery. The renal artery of right side is longer and slightly higher than left renal artery. Renal artery enters the kidney near the hilum, then it divided into anterior and posterior branches, which is further divided into number of segmental arteries. Anterior division of renal artery supplied to apical, upper, middle and lower segments. Posterior division supplied to posterior segment of kidney. Any artery arising from aorta in addition to main renal artery supplying to kidney is term as accessory renal artery or additional or double renal artery.

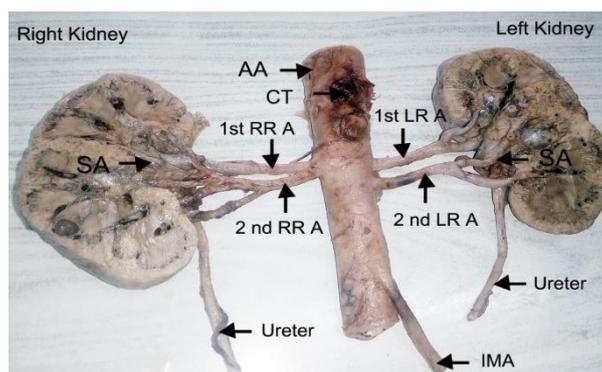
Among the renal variation, the most common variation are about renal artery. Variation regarding renal arteries have been related to embryological development of vessel. Knowledge of these variation can be great help to surgeon in exploration and treatment of renal trauma, renal transplantation, renal artery embolization, reconstructive surgery in congenital lesion. Objective of this case report is to bring awareness about the variation in blood supply of kidney.



CT-coeliac trunk, RRA- right renal artery, LRA –left renal artery

II. Case Report

During the routine abdominal dissection of 65yr old female cadaver in department of anatomy, IGGMC Nagpur, unusual origin and branching pattern of renal artery was observed. There were additional renal artery supplying to right and left kidney in addition to normal renal artery. These are term as bilateral double renal artery. The 1st and 2nd right renal artery arise from right side of the abdominal aorta at the level of L1. Origin of two right arteries are very close to each other. 1st left renal artery and 2nd left renal artery arise from left side of the abdominal aorta at the level of L1 and L2. These two left renal arteries are separated from each other by about 0.4 cm. 1st and 2nd renal arteries of right and left side enters into the hilum at the anterior aspect. Existence of additional renal arteries supplied to kidney is a rare finding.



AA -abdominal aorta,CT- coeliac trunk,RRA -right renal artery,LRA -left renal artery,IMA -inferior mesenteric artery

III. Discussion

Normally each kidney receive one renal artery. Renal arteries are branches of abdominal aorta, arise from lateral side at the level of L1. Several variation of origin of renal arteries have been reported earlier.

In the present case, we report that, additional renal artery arise from abdominal aorta on both lateral side. These renal arteries enters the kidney through the hilum. They named as double renal artery. In this study, double renal arteries present bilaterally and supply to respective kidney. Origin of right double renal artery are very close to each other and origin of left double renal artery are separated by 0.4 cm. The right and left double renal artery enters the kidney through the hilum and divided into segmental branches. Diameter of renal arteries are same.

When the kidneys are located in pelvis, they are supplied by branches of common iliac or internal iliac arteries. When they ascend in lumbar region, it is supplied by abdominal aorta. Additional renal artery originate from abdominal aorta either above or below the main renal artery and reach the hilum. Now a days presence of double renal arteries involve in higher percentage of transplant failure than the kidney showing no variation.

Bergman et al (1992) observed double renal arteries on right side in less than 1% of variation. Bulic et al (1996) reported the double renal artery on right side having same diameter which corresponds to finding observed in study.

K S Satyapal et al (2001) studied 130 angiogram and 32 cadaver, where he found 23% Of double renal artery on right side, 32% on left side and 10% cases bilaterally. So double renal artery is a rare variation.

Rusu et al (2006) also reported bilateral double renal artery in 6% cases.

Bordei et al (2004) studied about 272 kidneys and found bilateral double renal artery in only 2.2%.

Virendra Budhiraja et al (2010) studied about 100 kidney and he found only 11.6% of bilateral double renal artery. He also stated that duplicated renal arteries is result of persisting lateral mesonephric arteries from middle group.

Albohassan in 2007, while studying in angiography in renal transplant donor stated incident of bilateral double renal artery is less than 1 %

Ali Gurses (2009) reports occurrence of double renal arteries.

Hemant et al (2012) studied about 182 kidneys and found bilateral double renal arteries in 10.9 % cadavers.

Due to increase awareness about kidney transplantation, living donor graft has become major source of organs and successful allograft with double arteries has become necessity. Bilateral double renal artery originating from abdominal aorta and was found to be branching into respective branches. This was found rare in the literature. And the present case is reporting it.

IV. Conclusion

The present case provide information of rare occurrence of bilateral origin of double renal artery. To avoid any vascular complication, angiography should be performed prior to nephrectomy. The use of kidney with the multiple renal arteries from live donors has been discouraged because of increased risk to donor while obtaining common aortic cuff. Knowledge of the variation of renal arteries help to safe approach to the kidney in trauma management. Knowledge of the origin and branching pattern is essentially enhancing precision and decreasing morbidity related to surgical and interventional procedures so iatrogenic injuries can be avoided with the knowledge of anatomical variation.

References

- [1]. Bergman RA, Cassell MD et al, Human double renal and testicular arteries. *Ann Anat* 1992;174:313-315.
- [2]. Bulic K, Lukic G et al; A case of duplicated right renal artery and triplicated left renal artery. *Ann Anat*; 1996;178:281-283.
- [3]. Satyapal KS, Haffjee AA et al, Additional renal arteries; incident and morphometry, *Surgradiol Anat* 2001;23:33-38

- [4]. Rusu MC et al, Human bilateral doubled renal and testicular arteries with left testicular arterial arch around left renal vein, *Rom J of moroho embryo* 2006;47;197-200.
- [5]. Bordei P, Sapte E et al, Double renal arteries originating from aorta, *Surg Radiol Anat* 2004;26;474-479.
- [6]. Virendra Budhiraja et al, Renal artery variation: embryological basis and surgical correlation, *Romanian journal of morphology and embryology*, 2010, 51(3);533-536.
- [7]. Alboo Hssan, Shakeri et al, Bipolar supernumerary renal artery: surgical and radiological anatomy, *Anatomic variation*, 2007; Vol 29, 89-92.