



ACCESSORY RENAL ARTERIES AND ITS CLINICAL IMPLICATIONS

Anatomy

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ABSTRACT

Introduction: Accessory renal arteries are the most common renovascular anomaly, present in 20-30% of the population. They originate from the aorta, main renal artery, common iliac artery, internal iliac, superior mesenteric, inferior mesenteric arteries

Material and methods: Routine dissection of the abdomen in the cadavers in the department of anatomy constituted the study material.

Results: During regular dissection for medical undergraduates, a structural variation of the renal arteries was noted.

In the present cadaver the left kidney had an accessory renal artery arising from the abdominal aorta below the main renal artery. The right kidney showed an accessory renal artery arising from the main renal artery.

Conclusion: Clinical awareness of variations of renal artery is necessary for surgeons during renal transplantation, nephrectomy, surgical resection of kidney and also in repair of abdominal aorta aneurysm.

KEYWORDS

Accessory, Renal Artery, Abdominal Aorta, Renal Transplant

INTRODUCTION:

The renal arteries are a pair of lateral branches arising from the abdominal aorta below the level of superior mesenteric artery at the level of L1, L2¹. The right renal artery is longer than the left corresponding to the position of aorta. After its origin, the right renal artery passes posterior to inferior vena cava, right renal vein, head of the pancreas and descending part of the duodenum. The left renal artery passes behind the left renal vein. Any artery supplying in addition to the main renal artery is called accessory renal artery. Accessory renal arteries may be unilateral or bilateral. They vary in origin, calibre, relations. They originate from the aorta, main renal artery, common iliac artery, internal iliac, superior mesenteric, inferior mesenteric arteries. They may follow the main renal artery to the hilum of the kidney. They may enter the kidneys directly usually into the superior or inferior poles called as polar arteries

The persistence of lateral splanchnic arteries during development (ascent of the kidney) forms the embryological basis of these variations. Accessory renal arteries occur in 30% of the cases. Detection of these accessory arteries are clinically significant as they affect several operative procedures like renal transplantation, surgical reconstruction of abdominal aorta, renal vascular surgeries. It is of great importance in performing operations like segmental resections, partial nephrectomies. They may also lead to different pathologies like altered hemodynamics, hyperreninism, hydronephrosis. So, the knowledge of these variations is important in medical, surgical and radiological interventions.

MATERIALS AND METHODS.:

Routine dissection of the abdomen in the cadavers in the department of anatomy, constituted the study material.

The abdominal cavity was opened, the small and large intestines were removed and the structures close to the posterior abdominal wall were dissected. The kidneys along with their arteries were exposed and the morphological variation in the renal vascular supply was observed.

RESULTS:

Bilateral accessory renal arteries were noted in an approximately 60 year old male cadaver. Two accessory renal arteries originated from the main renal artery on the right side. One accessory artery reaching the upper pole of the right kidney and the other on to the lower pole of the right kidney crossing the structures at the hilum was observed.

On the left side the accessory renal artery is originating from the abdominal aorta below the main renal artery and supplying the lower pole of the kidney.

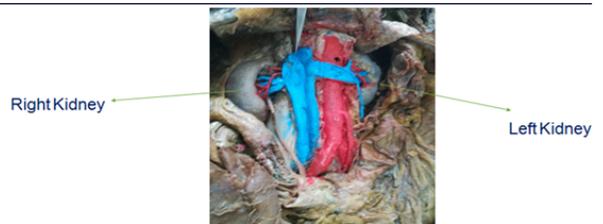


Fig-1 showing the accessory renal arteries

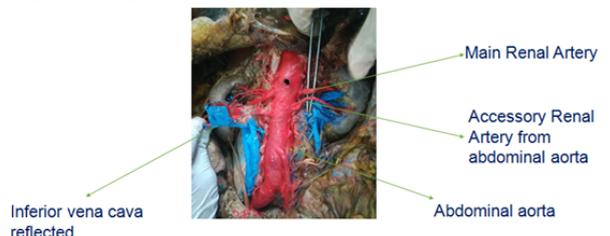


Fig-2 showing the origin of accessory renal arteries

On the left side the accessory renal artery is originating from the abdominal aorta below the main renal artery and supplying the lower pole of the kidney.

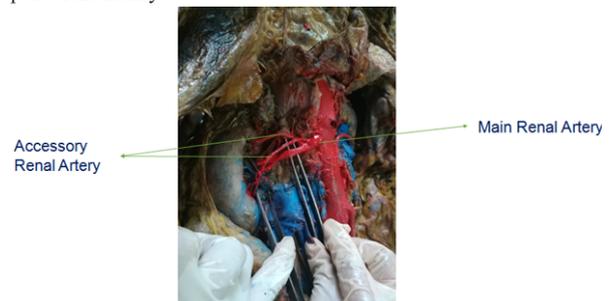


Fig-3 Accessory Renal Artery On Right Side Arising From The Main Renal Artery

Embryological basis: The abnormalities in renal vasculature are due to changing position of the kidney during its development (ascent of

kidney)².Metanephric kidney appears first in the pelvic cavity in the fifth week of gestation, where it is supplied by internal iliac artery.As it ascends into the iliac fossa, it is supplied by common iliac arteries.As the kidneys ascend further to its final position in the lumbar region, the arterial supply changes to the lateral splanchnic arteries of the abdominal aorta.The lateral splanchnic arteries are in the form of a network of mesonephric arteries supplying kidneys and suprarenal glands from C6 to L3 segments.It is known as rete arteriosum urogenitale³.Over time the cranial and caudal group of arteries degenerate.The middle group persists to supply metanephric kidney and suprarenal glands.

DISCUSSION

Knowledge of these variations in renal artery is important because they may be damaged during renal surgery and their presence must be considered in evaluating a donor kidney for possible renal transplantation⁴.Accessory renal arteries are end arteries, therefore the part of the kidney supplied by it is likely to become ischaemic if they are damaged. Accessory renal arteries resulted in a higher incidence of renal failure, graft rejection and reduced graft function in renal transplantation procedures.There are cases reported when accessory renal arteries lead to focal ischaemia and hence increased plasma renin activity with uncontrolled hypertension in relatively younger patients.It alerts the physicians regarding the possible role of accessory renal arteries in unsolved cases of hypertension

Kinking of aorta or pseudocoarctation is another vascular anomaly seen when they arise from the anterior aspect of the abdominal aorta and the pressure is exerted by the weight of the kidney⁵. Accessory renal arteries supplying the lower pole of the kidney may compress the ureter leading to hydronephrosis.

CONCLUSION

Considering the implications of accessory renal arteries in renal transplantation, nephrectomies, surgical resection ,radiological interventions, laparoscope surgeries the knowledge of these variations is useful.

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