

*Case Report*

# ACCESSORY RENAL ARTERY – A CASE REPORT

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## ABSTRACT

In the majority of human subject each kidney is supplied by one renal artery arising from the abdominal aorta at the level of L1-L2 intervertebral disc space, below the origin of superior mesenteric artery. Some time there is accessory renal artery present, which usually arise from aorta or iliac artery at any level between T11 and L4 and as prehilum branching. During our routine dissection we found accessory renal artery on right side in one cadaver and on left side in another cadaver. Knowledge of renal vasculature has importance in exploration and treatment of renal trauma, renal transplantation, renovascular hypertension, renal embolization, angioplasty for acquired or congenital lesions and conservative or radical renal surgery.

Keywords : Vasulature, Renal artery, Variations, Clinical Significance

## INTRODUCTION:

The renal arteries are a pair of lateral branches arising from the abdominal aorta below the level of superior mesenteric artery at the upper lumbar level [L1-L3] The right renal artery is longer than left one, because abdominal aorta lies on the left side of vertebral column<sup>1</sup>. Each renal artery divides into anterior and posterior divisions at or very close to the hilum of the kidney. Further it divides into segmental arteries to supply the respective segments of kidney being themselves the end arteries.

Variation in the number, source, branching and course of the renal artery is very common. An accessory renal artery is the one that is accessory to the main artery accompanying the same towards the hilum and entering the kidney through the hilum to supply it. Accessory renal arteries are common, occurring in upto 30% of individuals.

A knowledge of the variation of renal vascular anatomy has importance in exploration and treatment of renal trauma, renal transplantation, renovascular hypertension, renal artery embolization, angioplasty or vascular reconstruction for congenital and acquired lesion, surgery for abdominal aortic aneurysm and conservative or radical renal surgery.

## CASE REPORT:

During routine dissection of posterior abdominal wall of two old male cadaver, in the

anatomy department of Subharti Medical College we found accessory renal artery.

In the first case we found accessory renal artery arising from the abdominal aorta on right side inferior to main renal artery. The length of accessory artery is 4.4 cm and its diameter is 3.0 mm (Fig.1).

In the second case we found an accessory renal artery arising from the abdominal aorta on left side just inferior to main renal artery. The length of this accessory renal artery is 4.5 cm and its diameter is 3.0 mm. Following the fine dissection, the accessory renal artery was photographed. However such variation were not found on the other side of the same cadaver (Fig.2).

## DISCUSSION:

Knowledge of the existence of accessory renal artery is important because they may be inadvertently damaged during renal surgery and their presence must be considered in evaluating a donor kidney for possible renal transplantation. Persistence of certain of the cephalic mesonephros vessels, however, may result in the arterial abnormalities<sup>2</sup>.

Presence of accessory renal artery can be explained in the light of embryogenic development and its molecular regulation. Each primitive dorsal aorta gives off ventral splanchnic arteries, lateral splanchnic arteries, somatic arteries and caudal continuation. The lateral splanchnic arteries, supply on each side, the mesonephros, metanephros, the testis or ovary and the suprarenal gland. All these structures develop, in whole

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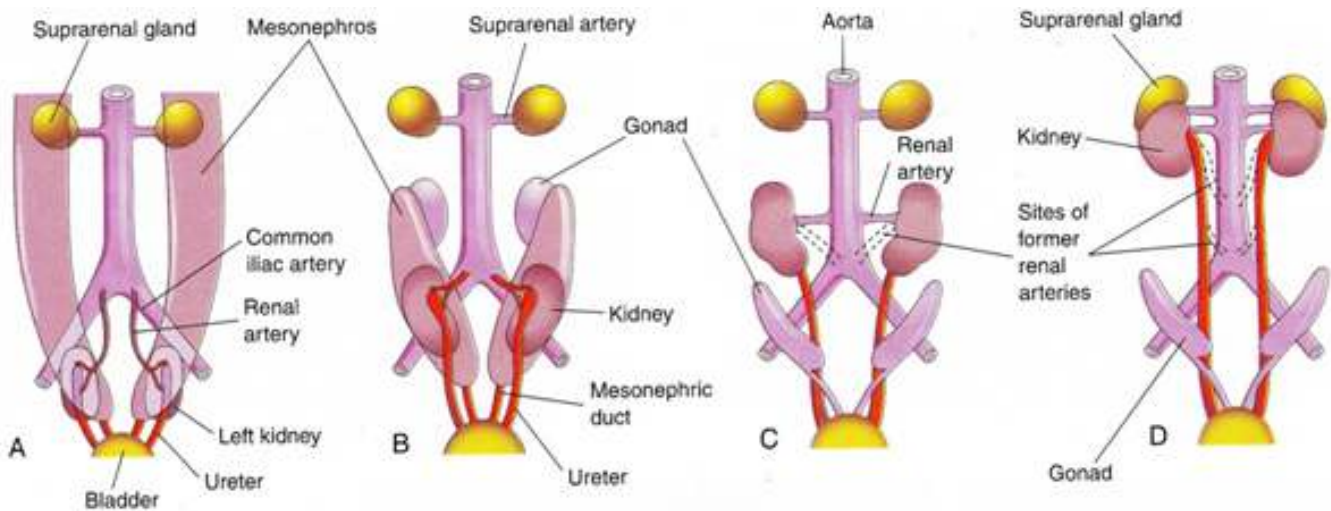
**Fig. 01.** Right kidney showing the presence of Accessory Renal Artery inferior to main Renal Artery.

RK=Right Kidney  
RA=Renal Artery  
ARA=Accessory Renal Artery



**Fig. 02.** Left kidney showing the presence of Accessory Renal Artery inferior to main Renal Artery.

LK=Left Kidney  
RA=Renal Artery  
ARA=Accessory Renal Artery



**Fig. 03**

or in part, from the intermediate mesenchyme of the mesonephric ridge. One testicular or ovarian artery and three suprarenal arteries persist on each side. The phrenic artery branches from the most cranial suprarenal artery and the renal artery arises from the most caudal one. Additional renal arteries are frequently present and may be looked on as branches of persistent lateral splanchnic arteries<sup>3</sup>.

Arey is of the view that anomalous blood vessels may be due to; a) choice of unusual paths in the

primitive vascular plexuses; b) persistence of vessels normally obliterated; c) disappearance of vessels normally retained; d) incomplete development; and e) fusion and absorption of parts usually distinct<sup>4</sup>.

After the induction of angioblasts (precursors to blood vessels), sonic hedgehog, secreted by the notochord, induces surrounding mesenchyme to express vascular endothelial growth factor (VEGF). In turn, VEGF expression induces the Notch pathway (a transmembrane receptor pathway), which specifies

arterial development through expression of ephrinB2 (ephrins are ligands that bind to Eph receptors in a pathway involving tyrosine signalling). Misexpression of one or more transcription factors as mentioned above may lead to aberration in the arterial development<sup>5</sup>.

During the changes in kidney position, they receive their blood supply from Vessels that are close to them. Initially the renal arteries are branches of the common iliac arteries. Later, the kidneys receive their blood supply from the distal end of the aorta. When they are located at the higher level, they receive new branches from the aorta. Normally the caudal branches of the renal vessels undergo involution and disappear<sup>6</sup> (Fig.3)

Ozkan et al.<sup>7</sup> in his angiographic evaluation of origin and variation of renal arteries(163 females & 692 males,)found renal arteries originating between the first and second lumbar vertebral level in most patients. Variations of renal arteries included multiple arteries in 24%, bilateral multiple arteries in 5%, and early division in 8% of cases. Additional renal arteries on the right side were found in 16% and on the left side in 13% of cases. Bilateral aberrant renal arteries were found in 13-16% of cases. This result should be kept in mind when a non-invasive diagnostic search is performed for renal artery stenosis or when renal surgery related to renal arteries is performed<sup>7</sup>

G. Praveen Kumar<sup>8</sup> in his study he noticed presence of bilateral superior accessory renal arteries originated from the antero lateral aspect of abdominal aorta below the origin of superior mesenteric artery and above the origin of main renal artery<sup>8</sup>.

## CONCLUSION:

Variations in the origin and course of the renal arterial blood supply occurs frequently and are of special interest to the urologist with respect to the disease associated with it. The relevance of the accessory arteries in systemic hypertension and urethral obstruction was established. With the advent of laparoscopic renal surgeries and donor nephrectomise, it becomes mandatory for surgeon to understand the abnormality or variation in the renal vasculature. Otherwise renal transplant may be jeopardized by the presence of accessory vessels. Therefore, considering the increase in incidence of the accessory and multiple renal arteries, the anatomical knowledge of such may be important for academic, surgical as well as radiological procedures and the

present study is a humble effort to highlight the same.

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