

## Accessory Renal Artery –A Case Report

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**Abstract:** With the advent of laproscopic renal surgeries and donar nephrectomies, it has become important for the surgeons to understand the abnormalities or variations in the renal vasculature. Anatomical variations in the origin of the arteries in the abdominal area are very common. During routine dissection for teaching purpose, the posterior abdominal wall was dissected in a 50 years old embalmed male cadaver in the Department of Anatomy, Punjab Institute of Medical Sciences, Jalandhar. Following the fine dissection, we noticed that left renal artery was arising about 5 cm below the origin of right renal, at the upper level of L3 vertebra, from abdominal aorta and accessory renal artery was originating from aorta on left side about 1.5 cm below that of left renal artery at the lower level of L3 vertebra. However there was no such observation on the right. It is important to be aware that accessory renal arteries are end arteries; consequently, if an accessory artery is damaged or ligated, the part of the kidney supplied by it will become ischemic. These anatomical variations and anomalies are important to know before any therapeutic or diagnostic procedures are performed in the abdominal area.

**Keywords:** Accessory renal artery, Aberrant Artery, Inferior Polar artery, Renal Transplant, Urological Procedures, Abdominal Aorta

### INTRODUCTION

The renal arteries usually arise from anterolateral or lateral aspect of the abdominal aorta just below the origin of the superior mesenteric artery [1]. Usually one renal artery supplies each kidney which enter through its hilum [2]. However, renal artery variations are very common. Variations regarding their origin and number have been reported by many researchers [3,4,5]. The most common variation regarding renal artery is the presence of an accessory renal artery, which may enter through the hilum or through the surfaces of the kidney. Alternative nomenclatures have been used to describe the accessory renal artery as supernumerary, multiple, aberrant, additional etc. According to Graves [6], any artery arising from aorta in addition to the main renal artery should be named 'accessory' and renal arteries arising from sources other than the aorta should be called 'aberrant'.

Knowledge of the existence of accessory renal arteries 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 [7].

Accessory renal arteries are present in 30% of individuals, and usually arise from the aorta above or below (most commonly below) the main renal artery and follow it to the renal hilum. They are regarded as persistent embryonic lateral splanchnic arteries. Accessory vessels to the inferior pole cross anterior to the ureter and may, by obstructing the ureter, cause hydronephrosis. Accessory renal arteries may also enter the kidneys directly, usually into the superior or inferior poles. It is important to be aware that accessory renal arteries are end arteries; consequently, if an accessory artery is damaged or ligated, the part of the kidney supplied by it will become ischemic [8,9].

### CASE REPORT

During routine dissection for teaching purpose, the posterior abdominal wall was dissected in a 50 years old embalmed male cadaver in the Department of Anatomy, Punjab Institute of Medical Sciences, Jalandhar.

The medical history of the this cadaver was not available. Following the fine dissection, we noticed that left renal artery was arising about 5 cm below the origin of right renal, at the upper level of L<sub>3</sub> vertebra, from abdominal aorta and accessory renal artery was originating from aorta on left side about 1.5 cm below

that of left renal artery at the lower level of L<sub>3</sub> vertebra

shown in figure below.



**Fig-1:Left Accessory Renal artery (ARA) arising from Abdominal aorta(AA) LRA-Left renal artery, RRA-Right renal artery**

## DISCUSSION

Polar or multiple renal arteries to a normally positioned kidney represents a failure of complete regression of all primary vascular channels. These multiple arteries may constrict infundibulum, major calyx or uretero pelvic junction. These arteries may pose altered haemodynamics in renal physiology. The evaluation of renal angiograms will be difficult unless you know these anatomical variations. Moreover renal arteries are functional end arteries, the ligation of which may lead to degeneration of that segment of kidney. However none of these variations in the vascular tree increases the kidney's susceptibility to diseases[10]. Knowledge of the embryology of the renal vasculature and development of the kidney is essential in order to understand the possibilities of the multiple anomalies and variations of the renal arteries. Most of the abnormalities of renal artery are due to changing positions of the kidney as a part of its normal development and ascent. Knowledge of the embryology of the renal vasculature and structural development of

the kidney is essential to the understanding of the multitude of anomalies that may occur. With the complex development of the kidneys through the three stages of pronephros, mesonephros and metanephros, and the migration of kidney from the pelvis to the lumbar region, along with its longitudinal location and simultaneous acquisition of a vascular supply, there is reason to understand why the possibility for anomalous development in the kidney may be greater than for other organs within the body[11,12].

Incidence of multiple renal arteries has been reported to be 20.2% on the right side and 19% on the left side [13]. There was much discrepancy regarding the side of accessory renal arteries, many authors have reported a higher frequency on the left side, others reported this variation to be more frequent on the right side.<sup>[5]</sup> There are reports of duplication of renal arteries[14,15]. Bordie P et al studied renal vascularization and reported 54 cases of double renal arteries supplying one kidney and originating from

aorta. Of the 54 cases, six cases were bilateral. In about 28 cases, supplementary renal artery entered the kidney through the hilum, in 16 cases it was inferior polar, in five cases it was superior polar [16]. In this study, we found accessory renal artery on the left side entering the lower pole as inferior polar artery. On the right side, normal renal artery was found. Some authors have reported a higher frequency on the left side [5,16,17] others reported this variation to be more frequent on the right side [6,18,19,20].

Renal artery variations have gained importance in the last decade because of the widespread development in transplantation surgeries, repair of abdominal aorta aneurysm, urological procedures. As anatomists we believe that variations in the renal vasculature are of importance not only for the surgeons, but for the radiologists, especially in the interventional radiological approaches.

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