

Original Research Article

## A Study on Accessory Renal Arteries in Cadavers and Its Clinical Correlation

Pramila Padmini Mantraratnam<sup>1</sup>, Narasinga Rao Bhattam<sup>2</sup>

<sup>1</sup>Associate Professor, <sup>2</sup>Professor and HOD,  
Department of Anatomy, Gitam Institute of Medical Sciences and Research, Rushikonda, Visakhapatnam,  
Andhra Pradesh, India.

Corresponding Author: Pramila Padmini Mantraratnam

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### ABSTRACT

**Objective:** The study is done for the presence of accessory renal arteries which are persistent lateral mesonephric arteries.

**Methodology:** As a part of routine dissection for MBBS first year students, the abdominal cavity is dissected and the renal vasculature is studied.

**Result:** In two cadavers, bilateral accessory renal arteries arising from abdominal aorta and renal artery were noticed.

**Conclusion:** The knowledge of accessory renal arteries are clinically important in renal transplantation, renovascular hypertension, abdominal aortic reconstruction etc.,

**Key words:** accessory, aorta, hilum, hypertension, kidney, mesonephros.

### 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 paired renal arteries take about 20% of the cardiac output to supply organs that represent less than one-hundredth of total body weight. [1] Rarely, accessory renal arteries arise from the coeliac or superior mesenteric arteries near the aortic bifurcation or from the common iliac arteries [1,2] It is a misnomer to call such vessels as accessory; aberrant or even supernumerary, because they are not extra but essential, tissue-sustaining arteries without anastomoses between them, which correspond to the segmental branch of a single renal artery. [3] An accessory renal artery is the one that is accessory to the main renal artery accompanying the same

towards the hilum and entering the kidney through the hilum to supply it, while the aberrant artery supplies the kidney without entering its hilum. [1] Detection of these accessory arteries are clinically significant as they affect several operative procedures including graft deployment during endovascular aneurysm repair, renal transplantation, surgical reconstruction of the abdominal aorta, renovascular hypertension, and in planning invasive vascular interventional procedures.

### METHODOLOGY

Routine dissection of abdomen in cadavers conducted for medical undergraduates at the department of anatomy, GIMSR, constituted the study material. The kidneys along with their arteries were exposed and the

morphological variation in the renal vascular supply was observed.

## RESULTS

Two male adult cadavers showed accessory renal arteries bilaterally. In first male cadaver, accessory renal artery on the right side arose from abdominal aorta in close proximity and above the main renal artery. The accessory artery crossed the

main renal artery superficially and disappeared into lower part of the right hilum superficial to the right renal vein (RV). The left accessory renal artery (ARA) in the same cadaver arose from the abdominal aorta which was 5 cms away from the main renal artery (fig.1). This entered the lower part of hilum but below the left renal vein (fig.2).

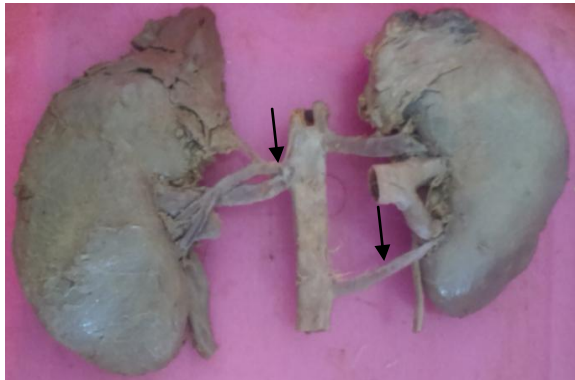


Fig.1-showing bilateral accessory renal arteries After in cadaver 1

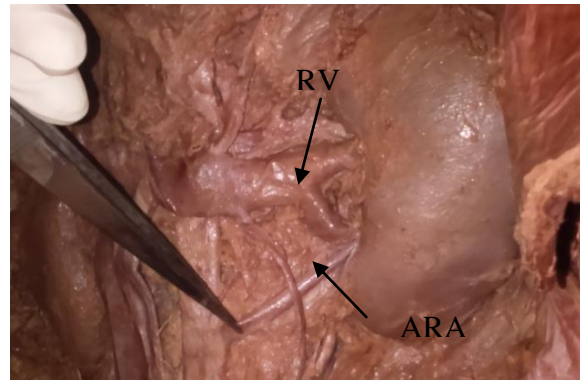


Fig.2-showing left ARA below left RV insitu in cadaver 1



Fig.3-showing accessory renal arteries in situ in cadaver 2

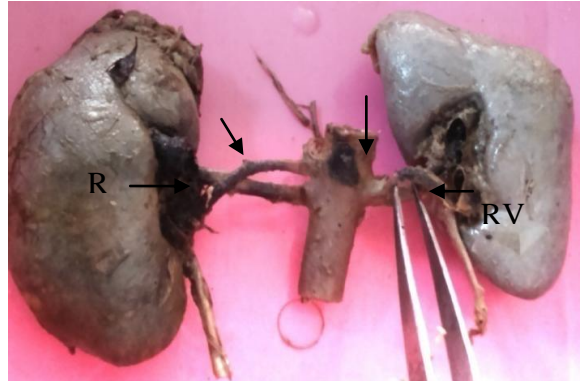


Fig.4-showing right and left ARA below RV after dissection in cadaver 2

In second male cadaver, the accessory renal artery arose from abdominal aorta and crossed the renal artery superficially and disappeared into the lower part of the hilum behind the right renal vein (fig.3). On the left side, the accessory renal artery arose from renal artery and disappeared into the left hilum behind the left renal vein (fig.4)

## DISCUSSION

In the developing human embryo the mesonephros, metanephros, adrenals and gonads are supplied by paired mesonephric arteries arising from the dorsal aorta. [4,5]

The 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> pairs of lateral mesonephric arteries supply the metanephros. The caudal branches usually disappear, leaving a single persistent renal artery. [5] When more than one of these lateral mesonephric arteries persist, multiple accessory renal arteries result. [6,4,5] The presence of accessory renal arteries is one of the most common urogenital variants. [7,8] It is well documented that the incidence of accessory renal arteries varies widely with ethnicity, ranging from 11.4% in Kenyans [9] to 59.5% in Indians. [6]

**Clinical correlation:** The use of kidneys with multiple renal arteries from live donors

has been discouraged, because of increased risk to the donor while obtaining a common aortic cuff, technical difficulty of completing multiple arterial anastomosis, prolonged ischemia time, and poorly controlled hypertension from segmental infarctions of the allograft. [10] The transplantation of the kidney with the single renal artery is technically easier compared to the kidney with multiple arteries. [8] Since the accessory renal arteries are end arteries, they must be re-implanted and would require several anastomoses and a prolonged ischemic time, leading to a theoretically higher incidence of renal failure, graft rejection and reduced graft function. [6,11,12] Fibromuscular dysplasia in an accessory renal artery can, even though infrequently, be responsible for renovascular hypertension. [13]

Identification of these accessory renal arteries are clinically important as they affect several operative procedures including graft during aneurysm repair, nephrectomy and renal transplantation, surgical reconstruction of the abdominal aorta, renovascular hypertension invasive vascular surgeries. So, the knowledge of accessory renal arteries is important in view of academic, radiological and surgical point.

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