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UNILATERAL ACCESSORY RENAL ARTERY- ITS EMBRYOLOGICAL BASIS - CASE REPORT

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ABSTRACT

Unambiguous information of vascular variation and planning of conducting surgical and radiological procedure is important during renal transplantation. During the routine dissection of a male cadaver we discovered unilateral accessory renal artery (UARA). It originated from the antero-lateral aspect of the abdominal aorta, at the level of inferior mesenteric artery (IMR) and below the renal artery (RA). The evolutionary history of kidney and renal artery is recapitulated during embryonic development. The reminding of this type of variation is also important while performing the surgeries or dissections.

Keywords: Kidney, Abdominal aorta, Renal artery, Accessory renal artery, Unilateral, Inferior mesenteric artery

INTRODUCTION

The main right and left renal arteries are originated from the antero-lateral or lateral aspect of the abdominal aorta at the level of L1-L2 origin of the superior mesenteric artery [1]. Usually one renal artery supplies each kidney which enters through its hilum [2].

Variations in the pattern of renal arteries have been reported more frequently than other large vessels in the literature. The most common variation of 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 (1956) [3], any artery arising from the aorta in addition to the main renal artery should be named 'accessory' and the renal arteries arising from sources other than the aorta should be called 'aberrant'[4].

Accessory renal arteries (ARA) are common 30-35% of individuals, usually arising from the aorta above or below the main RA and following it to

the renal hilum. Higher or lower origins are not uncommon, an accessory artery or leash of arteries passing to the superior or inferior renal pole. They are regarded as persistent embryonic lateral splanchnic arteries. ARA passes to the inferior pole of the kidney and crosses the anterior to the ureter and may, by its obstruction, cause hydronephrosis [1]. ARA commonly derived from the abdominal aorta [2,5,6,7].

Renal transplantation is one of the most common surgical procedures require good knowledge of arteries supplying it and the possible variations, then surgeon can avoid intra and post-operative complications like haemorrhage. Therefore, a thorough knowledge of normal and abnormal anatomy, arterial supply of the kidney is very important to surgeon performing surgeries in adults, children and infants.

CASE REPORT

During the routine medical undergraduate educational dissection of 65-years-old male cadaver in the Department of Anatomy, Mamata Medical College, Khammam. We identified the

presence of unilateral accessory renal artery to the right side kidney directly coming from the lateral aspect of the abdominal aorta and at the level of

inferior mesenteric artery below the main renal artery (Fig.1).

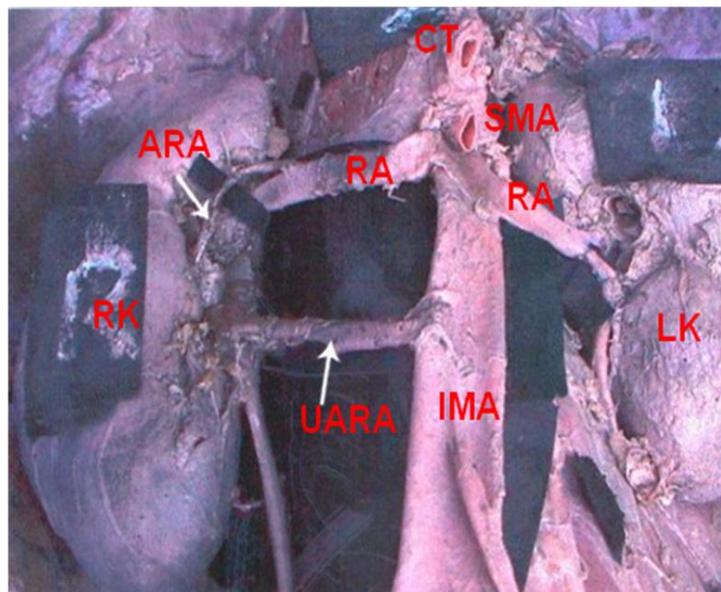


Figure.1 CT= Coeliac Trunk; SMA= Superior Mesenteric Artery; RA= Renal Artery; ARA= Accessory Renal Artery; UARA= Unilateral Accessory Renal Artery; RK= Right Kidney; LK= Left Kidney; IMA= Inferior Mesenteric Artery.

In this same case it was seen that the presentation of another accessory renal artery which is coming directly from the main renal artery at the level of L1-L2 superior mesenteric artery entering into inferior pole of the right kidney from the hilum. The competence of right UARA was less, as compared to that of main RA. The course of the main right RA was oblique whereas the course of the UARA was straight and reaching the hilum at anterior to the ureter (Fig.2).

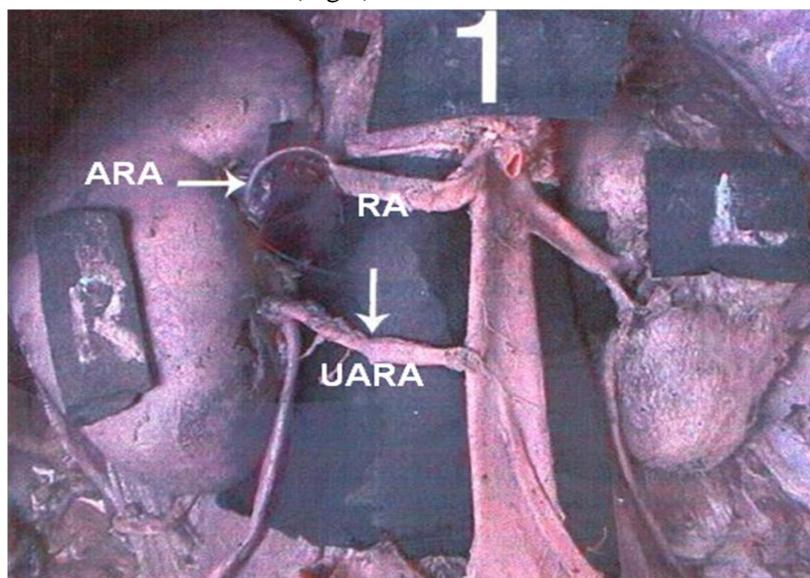


Figure.2 UARA= Unilateral Accessory Renal Artery; RA= Renal Artery; ARA= Accessory Renal Artery.

DISCUSSION

The findings of the present case report have been compared with those of previous workers on the subject.

According to authors Nayak, Harvey, Kara and Pestemalci [2,5,6,7] accessory renal arteries are common and mainly derived from the abdominal aorta as well as our case.

Lacout A, Gesase AP [8,9] has been reported the origin of an ARA from either superior or inferior mesenteric artery. In our case report stated that ARA originated at the level of inferior mesenteric artery.

According to study of Vrinda Ankolekar [10] the percentage of unilateral ARA was 11.67%, the inferior polar artery at hilum was 10%, the ARA from main renal artery 8.33%, the prevalence of ARA in 25%, the right and left RA at same level was 26.7% as well as our report stated that unilateral ARA was entering into the hilum at inferior pole of the kidney, we observed the another ARA from the main RA and right, left RA artery at same level.

In the present case reported that the renal arteries entered the renal cortex at one of the poles. ARA generally represented the inferior polar artery and usually derived directly from the aorta and passes anterior to the ureter it was general agreement with the reports of Kumar MP, Alper Atasever, H, S. Saritha, Kocabiyyik N [11,12,13,14].

Embryological explanation for the accessory renal arteries are not uncommon they are derived from the persistence of embryonic vessels that formed during the ascent of kidney. Kidneys develop in three stages of development pronephros, mesonephros and metanephros during this process the kidneys ascend from pelvic to the lumbar region and there was error in fusion of the dorsal and ventral vessels which appeared in distribution of these vessels at the hilum [15].

CONCLUSION

Although an accessory renal artery can be responsible for reno-vascular hypertension. Every

accessory renal artery is related to segmental arteries, so the risk of bleeding during urological surgery or renal transplantation, segmental ischemia and postoperative hypertension increases and the urologist should take care into account the origin of accessory renal artery when operating the lower pole of the kidney and segmental resection.

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