Double Precaval Right Renal Arteries - Its Clinical Implications

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ABSTRACT:
Precaval renal artery is a rare but important variant of renal vascular anatomy and identifying this anomaly is important for planning of minimally invasive renal surgery. A sound knowledge of variations of blood vessels is important during operative diagnostic and endovascular procedures in the abdomen. This report describes the presence of double precaval right renal arteries with multiple left renal arteries from abdominal aorta in a 50 year old male cadaver. A good knowledge of vascular variations in relation to the kidneys is very important in kidney transplantation surgery. Anomalies determine the choice of kidney in renal allo-grafting and may disqualify a potential donor, even in the face of ostensibly normal renal function. Therefore this case report would serve as a ray of light for knowing the possible anatomical variations associated with the renal vasculature.

KEY WORDS: Precaval renal artery, Abdominal aorta, Kidney transplantation

INTRODUCTION
More than that of any other organ in the body, the vascularization of kidneys (viscus elegantissimum) of the ancient anatomists has been the topic of repeated anatomic investigations, statistical analysis and description[1]. Precaval renal artery is a rare but important variant of renal vascular anatomy and identifying this anomaly is important for the planning of minimally invasive renal surgery [2]. A precaval renal artery is defined as a tubular structure with attenuation similar to that of and arising from the abdominal aorta or iliac artery that passes anterior to the inferior vena cava and terminates in the right kidney [3].

Anatomical knowledge of the presence of accessory renal artery may be important for radiological procedures involving the kidneys.
Presence of additional renal vessels may result in erroneous interpretation of angiograms and pyelograms. Prior anatomical knowledge of variations of the renal vessels may also be helpful for the surgeons for preoperative investigations as there are reports of surgical complications which include massive haemorrhage [4]. Interestingly, recent reports have also stressed the fact that the patients with galactosaemia need to be thoroughly investigated for the presence of any renal vascular anomalies [5].

CASE REPORT

During routine dissection of a 50 year old well embalmed male cadaver in Department of Anatomy, Punjab Institute of Medical Sciences, Jalandhar, Punjab, multiple renal arteries were observed on right and left sides. The right kidney received two renal arteries – superior and inferior, both arising from abdominal aorta, from its lateral and ventral aspect respectively (Figure 1). Both the arteries reached the hilum of the right kidney after passing anterior to inferior vena cava (Precaval renal artery).

**Figure 1:** Double precaval renal arteries on the right side
The left kidney received four renal arteries – upper three were arising from the lateral aspect while lowest one was arising from the ventral aspect. From above downwards, the second left renal artery reached the superior pole of the left kidney while the remaining three reached the hilum of the left kidney (Figure 2).

**Figure 2:** Four renal arteries on the left side

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**DISCUSSION**

Prevalence of precaval right renal arteries is extremely variable. Petit P [6] reported the prevalence of precaval right renal artery to be 0.8% in a series of 380 cases evaluated with the help of Ultrasonography while Yeh et al [7] described a prevalence of 5% in 186 cases with the help of spiral computerized tomography. According to Petit P [6] majority of precaval right renal arteries were single and dominant, while Yeh et al [7] suggested that most of precaval right renal arteries were accessory lower pole arteries.

The precaval renal artery is a rare but important variant of renal vascular anatomy, the reported prevalence being 0.8%. The embryologic origin is likely due to the late, incomplete division of the ureteral bud during the 8th week of gestation. The renal artery to the lower pole develops and persists after the post cardinal vein has become the inferior vena cava but before gonadal descent.

A right renal artery that passes anterior to inferior vena cava is of particular importance for presurgical planning, because it may be injured...
inadvertently, especially during the retroperitoneal approach when only the right gonadal vein is expected to lie in the precaval area. The anterior origin of precaval renal artery may result in misidentification at laparascopy of such vessels as the inferior or superior mesenteric or hepatic arteries. Awareness of the possible anterior origin of precaval arteries would also be important during endovascular embolization or stent placement procedures. Case reports show that precaval renal arteries can cause ureteropelvic junction obstruction.

The reported incidence of accessory renal arteries has a wide range between 8.7% and 75.7% [8]. It is important that a surgeon has prior knowledge of all such accessory renal arteries supplying the upper and lower poles because inadvertent injury or failure to restore circulation during renal surgeries and transplant operations might even result in necrosis [4]. Precise knowledge of the renal artery and its branches is important for any vascular reconstruction, endoscopic surgeries, treatment of abdominal aortic aneurism, treatment of renal artery stenosis and clinical evaluation of renovascular hypertension [9,10,11].

REFERENCES


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