



## BILATERAL PRECAVAL AND PREHILAR DIVISION OF RENAL ARTERY- A CASE REPORT

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**Abstract-** During routine dissection of 67 years of embalmed male cadaver bilateral precaval and prehilal division of renal artery was found. Right ureter was arising 8 mm inferior to the renal vein. Lower segmental branch of left renal artery crossed left ureter on anterior aspect. The clinical significance of the variation found is discussed.

**Keywords-** Renal artery, Renal vasculature, precaval renal artery, prehilal division

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### Introduction

Renal arteries are the branches of abdominal aorta arising at right angles at L2 vertebra. Near the renal hilum, each artery divides into anterior and posterior division. These divide into segmental arteries supplying renal vascular segments. Renal vein which drains the kidney opens into inferior vena cava. Usually in the renal hilum, renal vein is anterior to renal artery and ureter is present on the inferior aspect.

Variations in the level of origin, number and relations are seen which create interest in nephrologists, radiologist and anatomists. When the renal artery is present anterior to the renal vein it is called precaval artery. Precaval renal artery is a rare but important variant of renal vascular anatomy and identifying this anatomy is important for the planning of minimally invasive renal surgery [1]. Usually renal artery divides at the hilum to give segmental branches. If this division is proximal to hilum then it is called as prehilal division or early branching. Prehilal division carries surgical importance during partial or complete nephrectomy. A vessel can cross the ureter and recognition of such crossing the ureter from anterior aspect is very significant as it reduces the risk of vascular injury and improve surgical outcome [2].

Variations in renal vascular anatomy should be taken in the account to achieve significant and impressive goal.

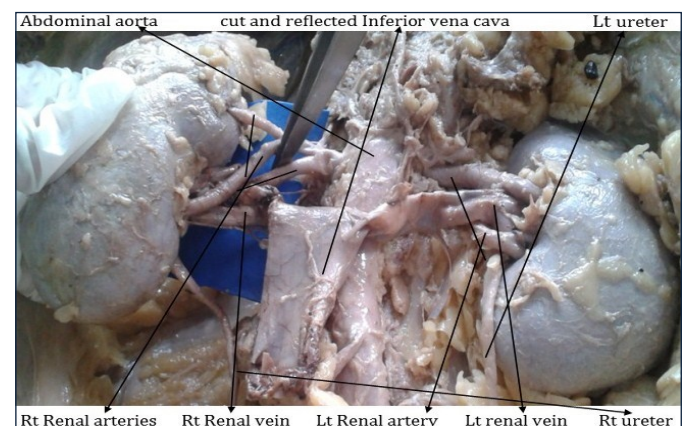
### Case Report- [Fig-1]

During routine dissection of 67 years of embalmed male cadaver the vessels in the hilum of the both the kidneys were displaced. Bilateral precaval renal artery and prehilal division of renal artery was seen.

Abdominal aorta gave two branches of which upper branch divided into two branches. Upper pole and hilar area was supplied by two

branches given by upper branch of abdominal aorta. The branch which went to hilum was lying anterior to renal vein. Lower branch went towards the hilum which was on posterior aspect of renal vein. Right ureter was arising 8 mm inferior to the hilum.

On the left side in between two branches given by abdominal aorta renal vein was present. Two branches of renal arteries were slightly anterior to renal vein. The lower branch crossed the left ureter from anterior aspect.



**Fig. 1-** Shows bilateral precaval and prehilal division of renal artery

### Discussion

The paired renal arteries take about 20% of the cardiac output to supply the kidneys [3]. Presence of renal artery posterior to the renal vein in the hilum of the kidney is thought to be normal anatomic relation. Wide literature is available regarding variations in the renal vasculature in terms of their branching pattern, number and location. Most of the times variations are found incidentally in rou-

tine dissection or procedure. Though variations in renal vasculature is common lot of varieties in variations are seen. Awareness of such variations along with precise anatomy of renal vasculature forms strong foundation for successful achievement in surgeries like nephrectomy and renal transplantation.

Morphological variability of prehilar branching was high [4]. In one case bilateral early and multiple branching of the renal arteries was seen [5]. The incidence of prehilar branching is 81.67%, 11.6%, 12.8%, 1.9% [5-8]. In the present case we have found bilateral prehilar branching of renal artery. On right side upper branch gave two segmental branches for upper and middle segments while lower branch traveled towards hilum. On the left side renal artery divides in to two branches. Renal vein was present in between two branches of renal artery. Knowledge of unusual branching pattern of the renal artery prior to surgery could be helpful to surgeons to gain vascular control by clamping the desired branch. Segmental vascular control may offer more benefits over total hilar control while reducing overall renal ischaemic injury [9].

Prevalence of precaval renal artery is extremely variable [10]. It is 4.6% [7], 6% 9.17%, 0.8%, 5% [10-13]. Finding of precaval right renal arteries in 5% in 186 patients suggests that these anomalies are not uncommon [14]. In the present case we have noticed bilateral precaval artery and thus reversal of renal vasculature in antero-posterior direction was noticed. These arteries are important to recognize because they can be mistaken for an aberrant hepatic artery during sonography [2] and can be confused with other vessels such as mesenteric or hepatic arteries at laparoscopy [14]. They are relevant to surgical planning for nephrectomy and aortic replacement [2]. A right precaval artery 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. This anterior origin may result in misidentification at laparoscopy 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 [14].

In the present case lower segmental branch of left renal artery crossed the left ureter at hilum while on right side ureter was arising 8 mm inferior to the renal vein. Precaval renal arteries can cause ureteropelvic junction obstruction [15,16]. 6% of patients with precaval right renal arteries may develop symptomatic ureteropelvic junction obstruction [14]. Crossing vessel plays contributing role in 50% of patients with ureteropelvic junction [2]. Identification of crossing vessels at radiologic imaging is important because they may be a source of massive bleeding during endopyelotomy [17] and the presence of a crossing vessel decreases the success rate of endopyelotomy from 83% to 33% [15].

Variations in renal vasculature have achieved great importance. Awareness of variations will certainly reduce the risk of unexpected complications and hemorrhage and increase the chances of successful achievement in partial or complete nephrectomy, renal transplantation and selection of donor kidney.

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