

## A CASE REPORT ON THE PRE HILAR BRANCHING OF RIGHT RENAL ARTERY WITH VARIATIONS IN THE HILAR ARCHITECTURE OF THE RIGHT KIDNEY AND THE ORIGIN OF RIGHT TESTICULAR ARTERY.

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### ARTICLE INFO

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### ABSTRACT

The renal arteries are a pair of branches from abdominal aorta. Variations are very common in the anatomy of renal arteries because of their complex embryological development. During routine dissection in a 60 year old adult male cadaver, multiple variations were found in the right renal artery and the hilar vascular architecture of the right kidney. The origin of right testicular artery was different from the normal anatomy. Knowledge regarding such variations is very important for the urologists and interventional radiologists.

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### INTRODUCTION

The renal arteries are a pair of branches from abdominal aorta just below the origin of superior mesenteric artery at the level of first lumbar vertebra. Near the renal hilum the renal artery divides into anterior and posterior divisions and these arteries again divide into segmental arteries which supply the vascular segments of the kidneys. The anterior division gives 4 segmental arteries and posterior division gives 1 segmental artery. In the hilum the structures are arranged from anterior to posterior as renal vein, renal artery and renal pelvis. The testicular artery usually takes origin from the anterolateral aspect of abdominal aorta at the level of second lumbar vertebra caudal to the origin of the renal artery (1).

In this case report, we report the unusual variation in the branching pattern of right renal vessels and the hilar architecture of the right kidney with the variation in the origin of the right testicular artery.

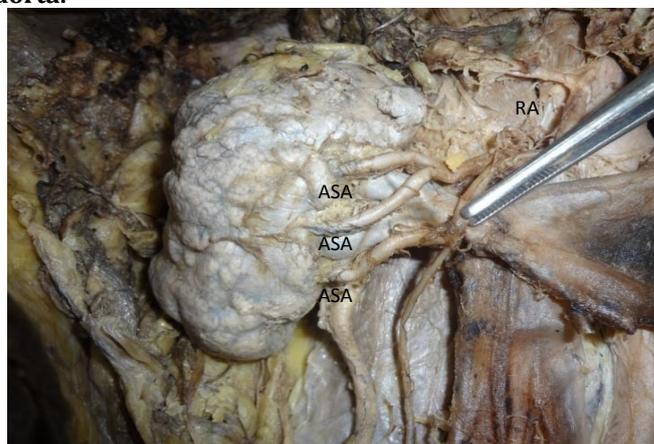
#### CASE REPORT:

During routine dissection in a 60 year old adult male cadaver at Department of Anatomy, PSG Institute of Medical Sciences and Research, we encountered following variations in the right renal artery and the hilar architecture of right kidney and also in the origin of right testicular artery. The right renal artery took origin from the abdominal aorta (Fig -1) just below the origin of superior mesenteric artery.

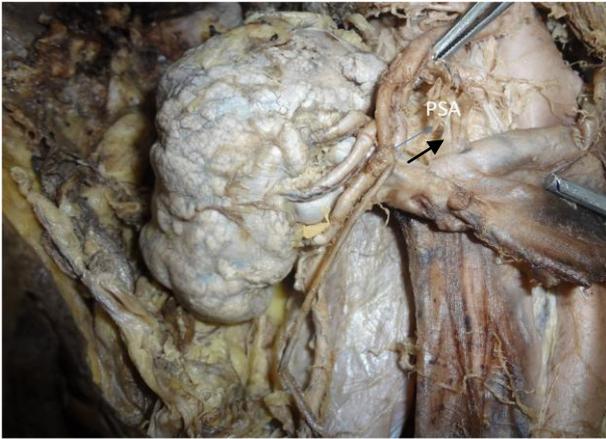
At about 2cm from its origin, it divided into anterior and posterior divisions in the prehilum region in front of the right renal vein. The anterior division gave 3 segmental arteries and the posterior division gave one segmental artery in the hilar region (Figs- 2 & 3).



**Fig-1:** Shows the origin of right renal artery from abdominal aorta. RA- Renal artery, AA- Abdominal aorta.

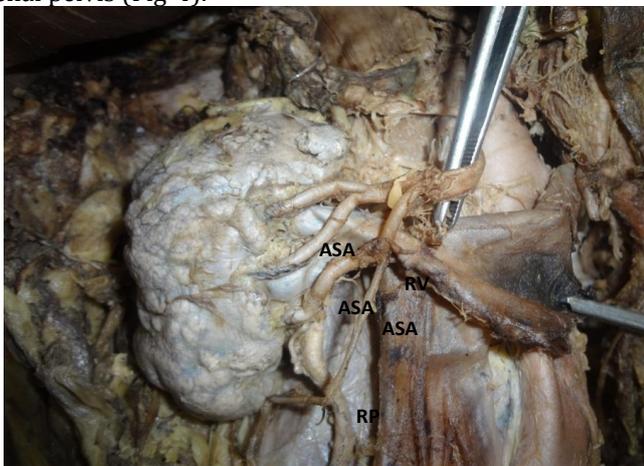


**Fig-2:** Shows three anterior segmental arteries branching from the renal artery. ASA- Anterior segmental artery.



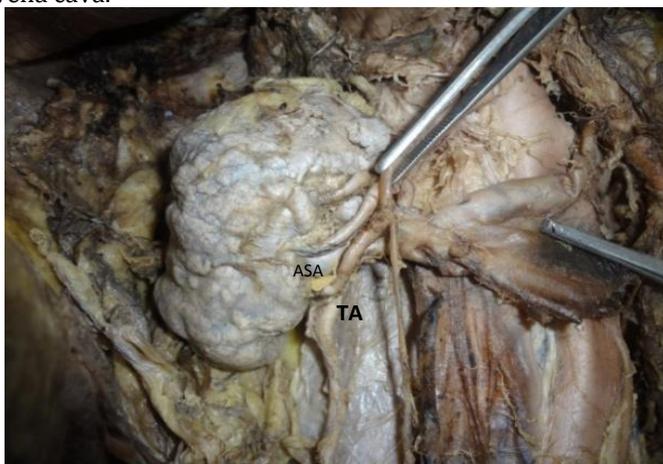
**Fig-3: Shows the origin of posterior segmental artery from the renal artery. PSA- Posterior segmental artery.**

The arrangement of structures in the hilum of right kidney anteroposteriorly was anterior division of renal artery, renal vein, posterior division of renal artery and renal pelvis (Fig-4).



**Fig-4: Shows the hilar architecture of the right kidney. ASA- Anterior Segmental artery, RV- Renal vein, RP- Renal pelvis.**

The right testicular artery took origin from the lower anterior segmental artery (Fig- 5). The right renal vein and the right testicular vein drained into the inferior vena cava.



**Fig-5: Shows the origin of right testicular artery from lower anterior segmental artery. TA- Testicular artery, ASA- Anterior Segmental artery.**

#### DISCUSSION

Healy J C et al stated that the renal vascular segment was originally recognized by John hunter in 1794, but first detailed account of primary pattern was produced

during 1950's from casts and radiographs of injected kidneys. Five arterial segments have been identified. They were apical, superior, middle, inferior and posterior segments (1).

Shoja M M et al., studied the prehilary branching pattern of renal artery. They reported four different patterns of branching in renal artery. They were fork pattern in 92.6% of kidneys, duplicate in 80.2%, triplicate in 12.4% and ladder pattern in 7.4% of kidneys (2).

Trivedi S et al, studied about the normal and variant anatomy of renal hilar structures and they found that the renal hilar arrangement was not according to the normal textbook in majority (73%) of the population. Anterior division of renal artery was seen in front of the renal vein at the hilum in 31% of cases and the renal pelvis was not the posterior most structure in 50% of cases. The variable pattern observed was classified into 5 different types (3).

Virendra B et al, studied the renal artery variation and found that prehilary multiple branching patterns in 11.66% cases (4).

Thaer M studied the origin of testicular artery in 20 cadavers. He found that out of 40 testicular arteries, one right testicular artery took origin from main renal artery, 2 left testicular arteries took origin from accessory renal artery and in remaining cases the testicular artery took origin from the abdominal aorta. They found 4 types based on their origin from aorta or renal vessels (5).

Musa K et al, reported the anomalous origin of left testicular artery from the additional renal artery (6).

In the present case the right renal artery divided into anterior and posterior divisions in the prehilary region in front of the right renal vein. Anterior division gave 3 segmental arteries and posterior division gave 1 segmental artery in hilar region. The arrangement of hilar structures anteroposteriorly was anterior division of renal artery, renal vein, posterior division of renal artery and renal pelvis.

According to Keibel F and Mall F P, in an 18 mm fetus, the developing mesonephros, metanephros, supra renal gland and gonads are supplied by 9 pairs of lateral mesonephric arteries arising from the dorsal aorta during development. Felix divided these arteries into 3 groups as follows, the 1<sup>st</sup> and 2<sup>nd</sup> arteries as cranial group, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> arteries as middle group, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> arteries as the caudal group. The middle group gives rise to renal arteries. Gonadal arteries may arise from any of these nine mesonephric arteries but usually from the caudal group (7).

In the present case the origin of right testicular artery from lower anterior segmental artery suggests the embryological origin of this vessel from the middle group.

#### CONCLUSION

Awareness regarding the variations in the renal artery, hilar architecture is very important in surgical procedures like renal transplantation and in interventional radiological procedures like renal artery angiography. Multi- Detector Computer Tomography, Angiography and Arteriography may be performed prior to every nephrectomy to avoid untoward complications during and after surgery. The origin of testicular artery from renal artery is very significant clinically because injury to this vessel may result in testicular infarction.

**Govindrajan et. al/ A Case Report on The Pre Hilar Branching of Right Renal Artery with Variations in the Hilar Architecture of the Right Kidney and the Origin of Right Testicular Artery.**

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