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Variation of renal artery on the left side - A case report

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Abstract

Recently, laparoscopic surgeries and renal transplantations are gaining wide popularity and it has become mandatory for every clinician to be aware of the renal vascular anomalies. The anatomical knowledge of accessory renal arteries is very essential before performing any transplantation surgeries, where microvascular techniques are employed to reconstruct renal arteries, as the accessory renal arteries are end arteries. Prior to any surgical intervention renal angiogram is mandatory. The evaluation of renal angiograms will be difficult unless we know the anatomical variations. Considering the increasing incidence of accessory renal arteries, the anatomical knowledge of such may be important for academic, surgical as well as radiological procedures and the present study is a humble effort to highlight the same. With the increasing demand for kidney transplantation, living donor grafts have become the major source for maintaining the donor pool and successful allograft with double renal artery has become a necessity. Thus the variations observed in the current observation present a unique pattern of congenital renal vascular variants having surgical and radiological importance.

Keywords: renal artery, accessory renal artery, end artery, variations, renal angiograms.

Introduction

Renal artery variation including their number, source and course are very common. The most common anomaly is the presence of an additional vessel k/a Accessory renal artery which usually arise from the aorta, but may also arise from suprarenal, celiac, superior mesenteric, inferior mesenteric, common iliac, middle sacral or external iliac artery [2]. It is important to be aware that accessory renal arteries are end arteries, therefore if an accessory renal artery is ligated or damaged, the part of kidney supplied by it is likely to become ischemic. So, a sound knowledge of the variations of blood vessels is important during operative, diagnostic and endovascular procedures.

The objective of this case report is to bring awareness among the clinicians, surgeons, radiologists and urologists about the variations in the blood supply of kidney while performing invasive techniques and vascular surgeries as the commonly occurring accessory renal arteries are the end arteries.

Observation

During undergraduate dissection in the department of anatomy, we observed that the left kidney of an adult female cadaver was supplied by double renal artery. Both arteries originated from the abdominal aorta about 2cm apart and enters the kidney through the hilum. The caliber of both arteries are comparable. The first renal artery originated at the level of 2nd lumbar vertebra. Second artery is also found 2cm below the first artery and enters the kidney at a lower point of hilum. The left gonadal artery arises from this accessory renal artery.

Right kidney has a single renal artery arising out of the abdominal aorta at the level of L1 along with celiac trunk and superior mesenteric arteries.

Discussion

Variations in the blood supply of kidney reflects the manner in which the blood supply is continually changing during embryonic and early foetal life. The normal single renal artery represents the persistence of only one of a number of vessels which at one stage of development supplied the structures of the urogenital ridge.

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Anomalous renal arteries are said to occur more frequently than anomalies of any other large vessels. In one study Anson, Richardson and Minear found that 65% of bodies possessed atleast one accessory renal vessel, usually an artery. In a more extensive study Pick and Anson found that 40.5% of all kidneys examined had more than two vessels. Anomalous renal arteries are more(almost twice) common than anomalous renal veins. Gillaspie and co-workers, Pick and Anson found supernumerary arteries in 32.25% of kidneys and 14.4% in renal veins. Anson found this arterial anomaly to be 1% on the left and 27.8% on right [3].

Lloyd reported that supernumerary renal arteries seem to be somewhat more common in whites than in Negroes but that in the later the number of renal arteries arising from the aorta tends to be greater, if at all any accessory vessels are present. Multiple renal arteries are usually limited to two or three, but as many as five have been reported on a number of occasions by Kartar and Gray.

Anomalous renal arteries arising from aorta tends to be larger than those arising from other arteries. According to Sadlar, accessory renal arteries are derived as a result of persistence of embryonic vessels that formed during the ascent of kidney.

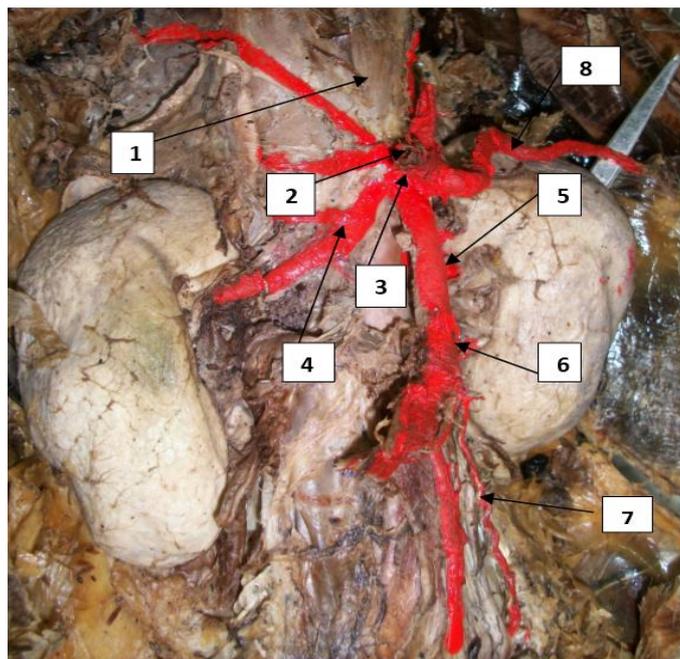
Satyapal *et al.* have reported difference in the incidence of accessory renal arteries according to sex and ethnic origin

(Males 28%, females 16.4%, Africans 31.1%, Indians 13.5%, White 30.9% and coloured 18.5%) [4].

Identification of vasculature variations is an important factor determining success in Laparoscopic surgery where the operative field and view are limited, further the aforesaid knowledge can be useful in reducing interventional radiological complications. Accessory renal arteries can compress the ureter, which can complicate into hydronephrosis. Accessory renal arteries are end arteries, hence their damage can lead to ischaemia of the part of kidney supplied by them. Vascular anomalies on one hand are important in surgeries related to posterior abdominal wall, ureter and vascular pedicels of the kidney. They are important practically for the correct interpretation of roentgenographic examinations in angiographic procedures.

Conclusion

Knowledge of vascular variations is important to avoid inadvertent vascular injuries while performing appropriate ligation of blood vessels and correct vascular anastomosis, which is an integral part of many abdominal surgeries. Knowledge of the variations of renal vascular anatomy has importance in exploration and treatment of renal trauma, renal transplantation, renal artery embolization, surgery for abdominal aneurysms and conservative radical renal surgeries.



1 – Abdominal aorta, 2 – Coeliac Trunk, 3 – Superior mesenteric,
4 – Right Renal artery, 5 & 6 – Double Left Renal artery,
7 – Left gonadal artery, 8 – Splenic artery

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