Case Report

ID: JCDR/2012/4268:2495

Anatomy Section

An Accessory Renal Artery from a Tortuous Abdominal Aorta: A Case Report

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ABSTRACT

A sound knowledge on the variations of the blood vessels is important during operative, diagnostic and endovascular procedures in the abdomen. The knowledge on the variations in the renal arteries is important for urologists, radiologists and surgeons in general. The objective of this case report was to bring awareness to the clinicians about the variations in the blood supply to the kidney. This report may also be useful to the clinicians who perform invasive techniques and vascular surgeries and also in cases of trauma. The surgical and the clinical implications of this anomaly have been stressed upon.

Key Words: Tortuous, Abdominal aorta, Renal artery, Accessory

INTRODUCTION

Classically, and in 75% of the people, the kidney is supplied by a single renal artery; about 25% of the adult kidneys have 2 or 4 renal arteries. It is a misnomer to call such vessels as accessory; aberrant or even supernumerary, because they are not extra but essential, tissue – sustaining arteries without anastomoses between them, which correspond to the segmental branch of a single renal artery [1]. This knowledge is essential when a surgical approach is made to the abdominal aorta, which includes the basic anatomical relationships of the neighbouring tissues, the important variations in the origin of the aortic branches and applied anatomy, which are not only helpful for the vascular surgeons but also to those who study fluid dynamics [2]. The vessel curvature or tortuosity has usually been ignored in the haemodynamic studies of the vasculature and the vessels are commonly assumed to be straight and axisymnetric. This assumption is generally not valid and even for those vessels which are relatively straight in early life, such as an abdominal aorta, there is a tendency to develop tortuosity. The arterial tortuosity syndrome is a rare congenital connective tissue disorder which is characterized by the elongation and the generalized tortuosity of the major arteries, which include the aorta. It is also associated with hypextensible skin and hypermobility of the joints.

The objective of the case report was to bring awareness to the clinicians about the variations in the blood supply to the kidney. This report may also be useful for the clinicians who perform invasive techniques and vascular surgeries.

CASE REPORT

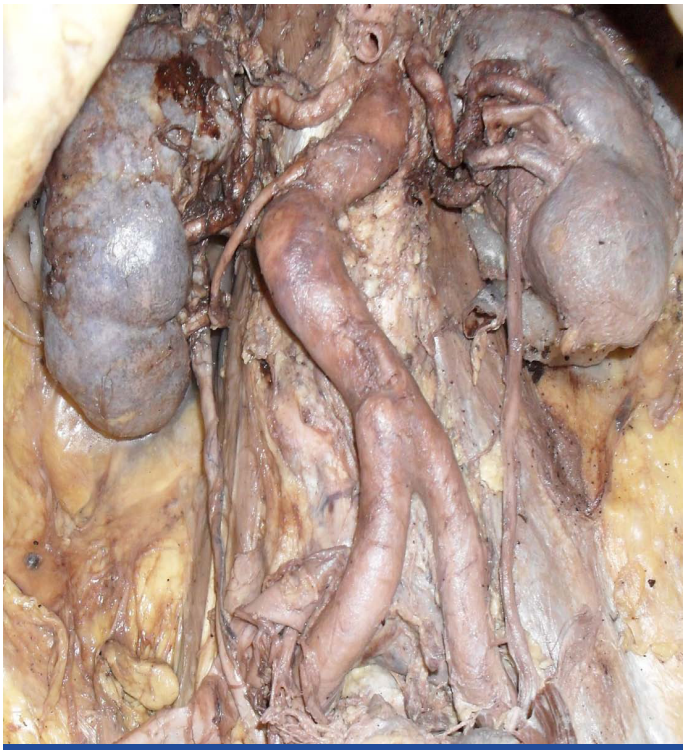
During the routine dissection of a 60 year old male cadaver, certain variations in the abdominal aorta and the renal artery were observed.

On the right side, the main renal artery originated from the abdominal aorta, from its lateral aspect, 8.5cm above its bifurcation. It passed behind the inferior vena cava to reach the kidney hilum. The accessory renal artery arose 3.5cms distal to the main renal artery from the ventral aspect of the abdominal aorta. On the left side, a single renal artery was observed, which divided into segmental branches on reaching the hilum of the left kidney.

The abdominal aorta had a tortuous course and it deviated to the right against the vertebrae L1 and L2 [Table/Fig-1].

DISCUSSION

Supernumerary renal vessels occur in about 30% of the kidneys. 2-4 in number and of equal frequency as to the sides, they disperse along the aorta from the eleventh thoracic to the fourth lumbar vertebra. Usually parallel, they enter the hilum in sequence and they may be precaval or postcaval in position. These are the renal segmented arteries whose origin is more proximal than the normal [3].



[Table/Fig-1]: Showing accessory renal artery from the ventral aspect of a tortuous abdominal aorta

The incidence of the multiple arteries has been reported to be about 20.2% on the right side and 19% on the left side [4]. These mesonephric arteries extend from C6 to L3 during their development. Most of the cranial vessels disappear, while the caudal arteries form a network, the rete arteriosum urogenitale, that supplies the metanephros in future [5]. Eventually, some roots degenerate, while the persistent roots of the network form these segmental arteries of the adult kidney, which have variations at their points of origin [6].

The knowledge on this potential anomaly is important for surgical procedures which are related to the posterior abdominal wall, renal transplantations, abdominal aorta aneurysms, ureter surgeries and angiographic interventions. Although it is very rare, the fibromuscular dysplasia in an accessory renal artery can be responsible for a renovascular hypertension. A selective renal angiography should be performed as the "gold standard" test when a renovascular intervention is considered. Every multiple renal artery is related to the segmental arteries and so the risk of bleeding during urological surgeries or renal transplantations, segmental ischaemia and postoperative hypertension increases [7]. Lately, the demand for kidney donations has rapidly increased and so it is essential to be aware of the possibility of donors with multiple renal arteries [8-9]. In order to precisely plan the surgical procedure and to avoid any vascular complications, an arteriography should be performed before every nephrectomy [7].

Feller and Woodburne [2] documented the lateral deviation of the abdominal aorta to be of clinical significance since it could be mistaken for an aneurysm, when it was palpated through the abdominal wall as a pulsatile mass. The knowledge on such cases has an important clinical significance in abdominal operations or invasive arterial procedures. The knowledge on these possible variations will thus aid the surgeons in avoiding a troublesome and a dangerous haemorrhage that otherwise may not be able to be averted and it is incumbent that the surgeon moves slowly in the operative procedures until he has determined the exact anatomy of the part. A tortuous abdominal aorta is also one of the reasons which causes compression of the inferior vena cava. This may result in centrilobular congestion and necrosis, ultimately leading to fibrosis and cirrhosis of the liver.

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FINANCIAL OR OTHER COMPETING INTERESTS:

None.

Date of Submission: **Mar 21, 2012**
Date of Peer Review: **May 29, 2012**
Date of Acceptance: **Aug 16, 2012**
Date of Publishing: **Sep 30, 2012**