

**Research Article**

## **TORTUOSITY OF ABDOMINAL AORTA – SURGICAL AND CLINICAL IMPLICATIONS**

**\*Ambika Wadhwa and Sandeep Soni**

*\*Deptt. of Anatomy, Punjab Institute of Medical Sciences, Jalandhar  
Deptt. of Chest & TB, Punjab Institute of Medical Sciences, Jalandhar  
\*Author for Correspondence*

### **ABSTRACT**

A case of abdominal tortuosity was encountered during a routine dissection of 50 year old male cadaver. Such lateral deviation of abdominal aorta is found to be of clinical significance since it may be mistaken for an aneurysm when palpated through the abdominal wall as a pulsatile mass. Surgical and clinical implications of this anomaly has been stressed upon.

**Key-Words-** Abdominal Aorta, Tortuosity, Aneurysm

### **INTRODUCTION**

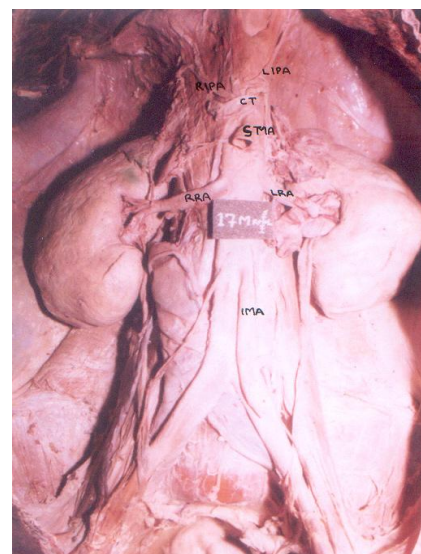
More than a century has passed since the publication of Quain's (1844), "The anatomy of the arteries of the human body". In the preface to this classic he wrote: "The difficulties, which have often occurred in the performance of those surgical operations in which the larger arteries are concerned, have arisen in great part from want of sufficient acquaintance with the differences in anatomical disposition to which these vessels are subject" (Sonneland *et al.*, 1958). The knowledge essential in the surgical approach to the abdominal aorta, including basic anatomical relationships of the neighbouring tissues, the important variation in the origin of aortic branches and applied anatomy is not only helpful to the vascular surgeon but also to those who study fluid dynamics (Feller and Woodburne 1961). Vessel curvature or tortuosity has usually been ignored in haemodynamic studies of the vasculature, vessels are commonly assumed to be straight and axisymmetric. This assumption is generally not valid and even for those vessels which are relatively straight in early life, such as abdominal aorta there is a tendency to develop tortuosity. The arterial tortuosity syndrome is a rare congenital connective tissue disorder characterised by elongation and generalised tortuosity of the major arteries including the aorta. It is also associated with hypextensible skin and hypermobility of joints.

### **ANATOMY**

The abdominal aorta (aorta abdominalis), begins at the median, aortic hiatus of the diaphragm, anterior to the lower border of the twelfth thoracic vertebra and the thoracolumbar intervertebral symphysis and terminates at the body of the fourth lumbar vertebra by dividing into two common iliac arteries (Williams *et al.*, 1995).

At its origin, the aorta is approximately 20 mm in diameter. After giving off its major branches, or at the level of L<sub>2</sub> vertebra, it is 16.5 mm in diameter. From this point to the bifurcation it reduces in diameter slightly, being 15.9 mm at its termination (Feller and Woodburne 1961). According to Quain (1892) variations in abdominal aorta are not common.

*IPA: Inferior phrenic artery; CT: Coeliac trunk; SMA: Superior mesenteric artery; RA: Renal artery; TA: Testicular artery; MSA: Middle suprarenal artery; IMA: Inferior Mesenteric Artery.*



**Figure 2: Normal course of abdominal aorta.**

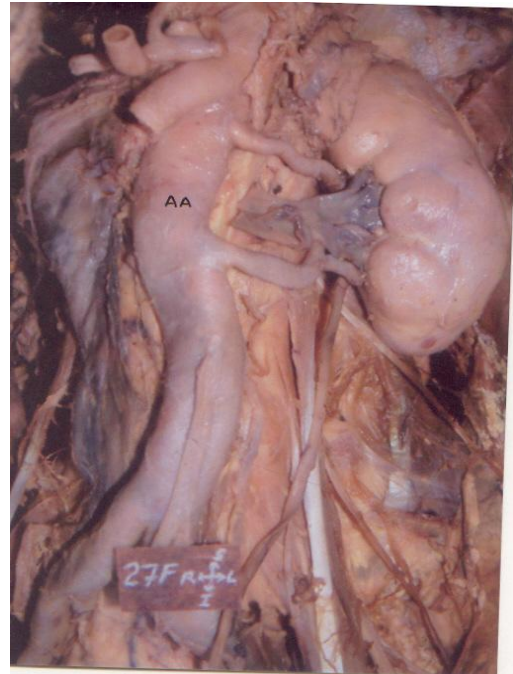
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### RESULTS

Out of the 30 adult human cadavers dissected in the Deptt. Of Anatomy , Govt. Medical College, Amritsar, a tortuous course of abdominal aorta was observed only in 1 cadaver. The abdominal aorta (AA) was deviated to right against vertebrae L1, L2 and deviated to left against vertebrae L3 and L4.

### DISCUSSION

Tortuosity of abdominal aorta may be mistaken for an aneurysm. Santilli and Santilli [6] in their study found that abdominal aortic aneurysms commonly encountered in infrarenal portion occur in 5 to 7% of people over 60 years requiring surgical repair. Abdominal aortic aneurysms are the 10<sup>th</sup> leading cause of death for men over age of 55 years. Therefore, early detection and timely repair are of paramount importance. Feller and Woodburne [1961] documented the lateral deviation of abdominal aorta to be of clinical significance since it may be mistaken for an aneurysm when palpated through the abdominal wall as a pulsatile mass. Knowledge of such cases has important clinical significance in an abdominal operation or invasive arterial procedure. The knowledge of the possible variations will thus aid the surgeon in avoiding troublesome and dangerous haemorrhage that otherwise could not be averted, and it is incumbent that the surgeon moves slowly in operative procedures until he has determined the exact anatomy of the part. Tortuous abdominal aorta is also one of the causes causing compression of inferior vena cava. This may result in centrilobular congestion and necrosis ultimately leading to fibrosis and cirrhosis of liver.



**Figure 1: Tortuous course of abdominal aorta (AA) with deviation to right against vertebrae L<sub>1</sub>, L<sub>2</sub> and deviation to left against vertebrae L<sub>3</sub>, L<sub>4</sub>**

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