The superior mesenteric artery syndrome is a clinical rarity often detected late. Among the numerous vessels present in the body, the superior mesenteric artery is a unique vessel which can get compressed and cause obstruction to the duodenum in most cases and sometimes the obstruction can progress rapidly leading to catastrophe. We report a case of a young patient presented with acute onset, severe abdominal pain. It was preceded by several days of anorexia. After evaluating the patient for several days and failure of relief in the context of severe abdominal pain, CT scanning revealed dilatation of the stomach and proximal duodenum with radiological evidence of superior mesenteric artery syndrome in the form of compression of the third part of the duodenum.

1. Introduction

The superior mesenteric artery can be angulated and compress the third part of the duodenum externally and lead to the syndrome. It is not a common entity and is rarely diagnosed. In most of the cases, the third part of duodenum is trapped between the superior mesenteric artery and the aorta. It is a rare but a life-threatening severe condition.

The syndrome was first described by Rokintansky. Females are most often affected. The embryological basis of blood supply of the gut reveals that the superior mesenteric artery is the artery of the mid-gut and the most important process of the rotation of the gut is around the axis of the superior mesenteric artery. The superior mesenteric artery is the anterior branch of the abdominal aorta and comes out of the aorta at a definite angle called as the aortomesenteric angle. The superior mesenteric artery arises anteriorly and inferiorly from the aorta as the second branch below the celiac trunk and above the inferior mesenteric artery. It usually arises at L1 level. It supplies the derivatives of mid-gut i.e., Lower 2/3 of duodenum below opening of common bile duct, jejunum, ileum, appendix, caecum, ascending colon, right 2/3 of transverse colon, lower 1/3 of the head of the pancreas.

The branches of superior mesenteric artery are inferior pancreaticoduodenal, jejunal, ileocolic, right colic and middle colic. As such, a severe obstruction can cause vascular compromise of a large segment of the gut. When the superior mesenteric artery is completely occluded, then the marginal artery may become significantly dilated as it is required to supply the whole of the midgut loop.

The location of superior mesenteric artery is usual in the fact that it originates behind the neck of the pancreas at the level of the first lumbar vertebra. Its origin is about 1.25 cm. below the celiac axis, and it exits the aorta at an acute angle through which passes the left renal vein and the uncinate process of the pancreas. This relation is important. Other important point is that the duodenum crosses the lumbar spine from right to left and it is at this point where the duodenum passes both upward and over the spine, that the bowel is most susceptible to anterior compression causing obstruction. Usually, the lumbar lordosis is maximum at about the level of the fourth lumbar vertebra, accounting for occasional duodenal compression at this level.

Any congenital or acquired condition which causes a reduction in this angle can cause compression of the vessel which lies in close relation to the duodenum. The aortic mesenteric angle in humans is responsible for normal blood flow through the arterial tree and any acute reduction of this angle can cause vascular compromise.
Besides in comparison to four legged animals, in humans due to shift of centre of gravity and consequent changes in the angle can cause vascular compression. In addition there is a specific distance between the aorta and the superior mesenteric artery to be maintained to avoid any obstruction. The normal angle is about 25-60 degrees and the normal distance between the aorta and superior mesenteric artery is 10-30 mm. Decrease in the angle and distance both are responsible for the vascular compression. This usually occurs at the level where the duodenum especially the third part of duodenum is compressed. The distance from the angle of origin of the vessel to the duodenal midpoint (aortomesenteric distance) averages 10 cm. It has been found that Studies of in-vivo subjects by both Mansberger and co-workers and Hearn obtained measurements using simultaneous barium contrast studies and arteriography to define shortened mesenteric distances and markedly narrowed aortomesenteric angles in patients diagnosed with the syndrome. Lukes and colleagues reported an average aortomesenteric angle of only 8 degrees in three patients with vascular compression of the duodenum as opposed to 37 degrees in controls; the average aorta-to-mesentery distance was 3.3 mm. versus 18 mm. in controls.

The fat around the mesentry is an effective means of support to the vessels in the vicinity of duodenum particularly the superior mesenteric vessels. The mesenteric pad of fat is lost in some cases and this removes the cushion support and duodenal obstruction sets. The syndrome is alternatively referred to as duodenal vascular compromise syndrome. Even lack of retroperitoneal pad of fat and paraduodenal pad of fat can lead to the syndrome. Any procedure or ailment which can reduce this fat mass like cachexia, anorexia nervosa, Bariaritic surgical procedures which can reduce the cushion pad of fat can also be an important predisposing factor for loss of support and compression.

The other anatomic causes include exaggerated lordosis of lumbar spine, spinal trauma, high attachment of ligament of Treitz, Low origin of superior mesenteric artery. The Ligament of Treitz is a fibromuscular band which supports the duodenojejunal flexure. It arises from right crus of diaphragm and is attached below to posterior surface of flexure and third and fourth parts of duodenum. The importance of ligament of treitz is that it marks the duodenojejunal junction and When it is attached only to flexure its contraction narrows duodenojejunal angle thus causing partial obstruction. The relationship of Ligament of Treitz is particularly important as the division of ligament can sometimes allow the duodenum to fall few centimeters inferiorly and avoid the complication. Mobilization of the duodenum is an effective way to prevent the complications and is one of the recognized modality of treatment of superior mesenteric artery syndrome.

The compression can be the result of a result of large intraabdominal tumor, loss of mesenteric fat due to wasting diseases, cancer, cachexia.

Rapid linear growth without compensatory increase in body weight in tall asthenic individuals has also been found to be a major factor in causation of the syndrome. However the territory of the gut affected varies considerably and the term Wildes syndrome is used alternatively.

**Figure - 1. CT Scan : Revealing SMA (Superior mesenteric artery) Syndrome**

**Conclusion:**

The Superior mesenteric artery syndrome should be regarded as one of the causes of severe and acute abdomen. A detailed examination and history of the patient can give a clue to the diagnosis. Early recognition and treatment of this condition is an important prerequisite. Basic Knowledge of the Anatomico surgical and medical pointers are important to diagnose and recognize this clinical rarity.

**References**


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