A CASE OF COELIAC TRUNK VARIATION.

DR ILA GUJARIA ¹
DR MANOJ KULKARNI²
DR G V SHAH³

ASSOCIATE PROFESSOR ¹
ASSISTANT PROFESSOR²
PROFESSOR AND DEAN³

DEPT. OF ANATOMY

S.B.K.S MEDICAL INSTITUTE AND RESEARCH CENTRE

WAGHODIA PIPARIA
VADODARA (GUJARAT) INDIA

ADDRESS OF CORRESPONDING AUTHOR:

DR ILA GUJARIA
ASSOCIATE PROFESSOR
DEPT. OF ANATOMY

S.B.K.S. MEDICAL INSTITUTE AND RESEARCH CENTRE

WAGHODIA, PIPARIA, VADODARA (GUJARAT) INDIA

E-mail: dr.ilagujaria@rediffmail.com

ABSTRACT:

The coeliac trunk is the first anterior branch of abdominal aorta at the level of the twelfth thoracic vertebrae. Main classic branches of the coeliac trunk are hepatic, splenic and left gastric arteries. We came across a case of coeliac trunk which gave of five branches. It gave of three classical branches of celiac trunk i.e. hepatic, splenic and left gastric arteries. Beside these three branches right and left inferior phrenic arteries arose from celiac trunk. In our opinion arterial variations should not be ignored during abdominal operative procedures. Complications in abdominal surgeries can be avoided with an accurate knowledge of the anatomical variations of coeliac trunk.

Key words: Coeliac trunk; Right phrenic artery; Left phrenic artery
INTRODUCTION:
The coeliac trunk is the first anterior branch of abdominal aorta at the level of the twelfth thoracic vertebrae. The branches of the coeliac trunk are hepatic, splenic and left gastric arteries. During development, both dorsal aortae give rise to many ventral segmental (omphalomesenteric) arteries. Both dorsal aortae fuse together in about four weeks. The ventral segmental arteries regress shortly after fusion of dorsal aortae. The dorsal aorta gives off segmental branches to the digestive tube (ventral splanchnic arteries), to the mesonephric ridge (lateral splanchnic arteries) and intersegmental branches to the body wall (somatic arteries). Anatomic variations involving the visceral arteries are common. In addition, many authors reported variations of branches of the coeliac trunk.

The inferior phrenic arteries are two small arteries which supply the diaphragm. They usually arise from the aorta just above the coeliac trunk. They may arise by a common aortic stem or from the coeliac trunk.

The anatomical variations of the coeliac trunk are due to developmental changes in the ventral segmental (splanchnic) arteries. These ventral segmental arteries supply the yolk sac, allantois and chorion. Three ventral segmental arteries remain as coeliac trunk, superior mesenteric artery and inferior mesenteric artery. During embryological period, there are longitudinal anastomoses between roots of four upper ventral segmental arteries of abdominal region. The two central roots disappear and the longitudinal anastomoses join the first and fourth root. The hepatic, splenic and the left gastric arteries originate at this longitudinal anastomoses. These branches usually become separated from the fourth root (the future superior mesenteric artery) below their last end. If this separation takes place at the higher level, one of the branches is displaced to the superior mesenteric artery. If the first or fourth root disappears, a coeliacomesenteric trunk will be formed. In our case, the variations of the coeliac trunks are due to developmental changes in the longitudinal anastomosis between above mentioned ventral segmental arteries.

The vascular anomalies are usually asymptomatic, and so knowledge of these vascular anomalies is important in handling patients undergoing diagnostic angiography for gastrointestinal bleeding, coeliac axis compression syndrome, prior to an operative procedure or transcatheter therapy.
CASE REPORT:

During a routine dissection of the posterior abdominal wall of a middle aged male cadaver for undergraduate MBBS batch, the following variation of the coeliac trunk was found.

The coeliac trunk arose from the ventral surface of the abdominal aorta at the level of the intervertebral disc between T12 and L1 vertebrae. It gave of five branches. Beside three classical branches of celiac trunk i.e. hepatic, splenic and left gastric arteries, the right and left inferior phrenic arteries also arose from celiac trunk (Figure 1). Right inferior phrenic artery passed upward and laterally; then beneath the gall bladder and right lobe of the liver and was supplying the right dome of diaphragm. The left inferior phrenic artery passed upward and laterally; then by the side of the left crus of diaphragm and was supplying the right dome of diaphragm.

The length of coeliac trunk from its origin to the point where it gave of main branches was measured to be 8 mm. The diameter of the right and left inferior phrenic arteries was 4 mm and 3 mm respectively. While the diameters of splenic, common hepatic & left gastric arteries were 5 mm, 6 mm & 4 mm respectively.

DISCUSSION:

The coeliac trunk arises from the ventral portion of the abdominal aorta opposite the thoracolumbar junction as a single trunk. It supplies all derivatives of the foregut that lie in the abdominal cavity... It is about 1.25 cm in length and 6-8 mm in diameter. It gives three main branches as left gastric, hepatic and splenic arteries.2,5

Mburu KS et al, in their study found that the celiac trunk was trifurcated in 76 (61.7%), bifurcated in 22 (17.9%) and gave collateral branches in 25(20.3%). Collaterals were observed in 25 (20.3%) cases and included dorsal pancreatic (DPA), gastroduodenal, inferior phrenic and ileal arteries. DPA was the most common collateral occurring in 14.8% of the cases, while inferior phrenic arteries were found in 4.9%.

Piano et al.8, stated that the right and left inferior phrenic arteries occasionally originated as a common trunk from the aorta, coeliaco-mesenteric system or adreno-renal system. They observed that inferior phrenic arteries were usually paired (left and right) and their origins were summarized as follows; a) the aorta itself (61.6%), b) ventro-visceral arteries (coeliaco-mesenteric system of aorta) including the coeliac trunk (28.2%), and left gastric artery (2.9%), c) the
latero-visceral arteries (adreno-renal system of the aorta) including the middle adrenal artery (2.9%), and renal artery (4.3%).

Yuksel et al.,⁹ in their study found an extremely long celiac trunk. They also found an inferior phrenic artery arose from celiac trunk and an aberrant right hepatic artery derived from the superior mesenteric artery.

Vandamme and Bonte⁴ observed the absence of coeliac trunk in 1.25% of cases of the series. Cavdar et al.,¹⁰ reported a case, in which the left inferior phrenic artery and the left gastric artery arose from the long coeliac trunk (4.3cm) via a common trunk.

Peterella S et al.,¹¹ studied 89 cadavers, comprising 72 males and 17 females from 5 centers in Brazil. In 31 of the cadavers (26 males and 05 females), the inferior phrenic arteries had their origin in the coeliac trunk. The inferior phrenic artery origin in the left contour of the coeliac trunk was observed in 19(21.35%) of the 89 cases, while the inferior phrenic artery origin in the right contour of the coeliac trunk was observed in 05 of the 89 cases.

Chiang et al.,¹² studied 405 patients angiographically for evaluation of hepatic artery variations. While a single accessory hepatic artery was found in 28.1% (114) of these cases, more than two hepatic arteries were found in 2.0% cases and seventeen patterns were identified in this study. Some of the important patterns were accessory hepatic artery direct branch from coeliac trunk, branch from common hepatic, left gastric etc.

Pamidi N et al.,¹³ discovered a left inferior phrenic artery as direct branch of coeliac trunk in a 45 year old male cadaver. Left superior suprarenal artery arose from left inferior phrenic artery. In this case coeliac trunk emerged from the abdominal aorta as two roots named as left gastric artery and hepatosplenic artery.

Anatomical variations in the branching pattern of the celiac trunk are of considerable importance in liver transplants, laparoscopic surgery, radiological abdominal interventions and penetrating injuries to the abdomen. Vascular variations are usually asymptomatic. They may become important in patients undergoing celiacography for gastrointestinal bleeding, celiac axis compression syndrome, prior to an operative procedure, transcatheter therapy, chemoembolization of pancreatic and liver tumors. Careful identification and dissection of celiac trunk branches is therefore important to avoid iatrogenic injury [Astik & Dave, 2011]¹⁴. Knowledge of variation found in the present case is very
useful in surgical, oncologic or interventional procedures and should be kept in mind to avoid complications.

In our opinion; arterial variations should not be ignored during abdominal operative procedures. Complications in abdominal surgeries could be avoided with the accurate knowledge of the anatomical variations of coeliac trunk.

REFERENCES:


FIGURE:

Figure 1. Dissection of abdomen showing the variant branching pattern of coeliac trunk.

LEGENDS:

Figure 1. Dissection of abdomen showing the anomalous branching pattern of coeliac trunk.

CT- Coeliac trunk, RIPA- Right inferior phrenic artery, LIPA- Left inferior phrenic artery, SA- Splenic artery, CHA- Common hepatic artery, LGA- Left gastric artery