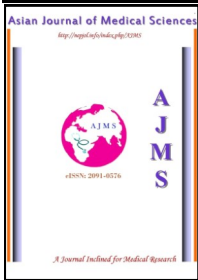


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## Variations of the Branches of the Coeliac Trunk: a Case Report

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### Abstract

The hepatic, splenic and left gastric arteries are considered as the “main classic branches” of the coeliac trunk. We reported two cases of coeliac trunk. Left inferior phrenic artery arose directly from coeliac trunk and accessory hepatic artery arose from common hepatic artery. 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.

**Key Words:** Coeliac trunk; Accessory hepatic artery; Left phrenic artery

### 1. Introduction

The hepatic, splenic and left gastric arteries are considered as the “main classic branches” of the coeliac trunk. During the normal development, both dorsal aortas give rise to many ventral segmental (omphalomesenteric) arteries. Both dorsal aortas fuse together in about four weeks. The ventral segmental arteries regress shortly after fusion of dorsal aortas. 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).<sup>1</sup> Anatomic variations involving the visceral arteries are common.<sup>2,3</sup> Also variations of branches of the coeliac trunk were reported by many authors.<sup>4</sup>

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.<sup>5</sup>

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

transcatheter therapy.<sup>6</sup>

### 2. Case Report

During the dissection of the posterior abdominal wall of two middle aged male cadavers for MBBS batch 2008/9 at Narayana Medical College, Nellore (INDIA), following variations of the coeliac trunk was found.

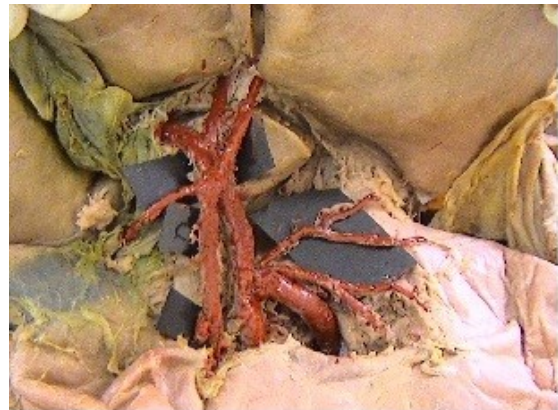


Figure 1: Dissection of abdomen showing the anomalous branching pattern of coeliac trunk. (1. Coeliac trunk, 2. Common hepatic artery, 3. Splenic artery, 4. Left gastric arteries, 5. Hepatic artery & 6. Accessory hepatic artery)

The coeliac trunk arose from the ventral surface of the abdominal aorta at the level of the intervertebral disc between T12 and L1 vertebrae. The coeliac trunk gave four branches (Figure 1 & 2). Beside three regular branches splenic, common hepatic and left gastric; a additional branch left inferior phrenic artery arose directly from coeliac trunk. The common hepatic gave of hepatic artery as well as accessory hepatic artery.

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Length of coeliac trunk from its origin to the point where its gives off main branches was 7 mm. The diameter of left inferior phrenic artery was 3 mm and diameter of splenic artery was 9 mm. The diameter of left gastric artery was 2 mm and diameter of common hepatic artery was 9 mm. The diameter of accessory hepatic artery for left lobe of liver was 3 mm. The diameter of all arteries was measured with the help of small spreading caliper and scale.

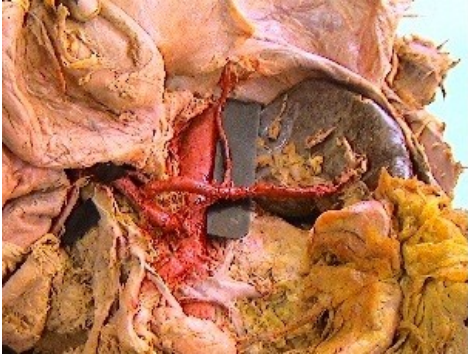


Figure -2: Dissection of abdomen showing the anomalous branching pattern of coeliac trunk. (1. Coeliac trunk, 2. Left inferior phrenic artery, 3. Splenic artery & 4. Abdominal aorta)

### 3. Discussion

The coeliac trunk is the chief artery of the foregut. It supplies all derivatives of the foregut that lie in the abdominal cavity. It arises from the ventral portion of the abdominal aorta opposite the thoracolumbar junction as a single trunk. 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.<sup>1,5</sup>

Yuksel et al. stated multiple variations. In their study they found an extremely long coeliac trunk. They also found an inferior phrenic artery arose from celiac trunk and an aberrant right hepatic artery derived from the superior mesenteric artery.<sup>7</sup> Vandamme and Bonte observed the absence of coeliac trunk in 1.25% of cases of the series.<sup>4</sup> Piano et al. 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 c) the latero-visceral arteries (adreno-renal system of the aorta) including the middle adrenal artery (2.9%), and renal artery (4.3%).<sup>8</sup>

Cavdar et al. 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.<sup>9</sup>

Kuo-Hsein Chiang et al. studied 405 patients angiographically for evaluation of hepatic artery variations. Single accessory hepatic artery was found in 28.1% (114) of cases. More than two hepatic arteries were found in 2.0% cases. Seventeen patterns were identified in this study. Some of important patterns were accessory hepatic artery direct branch from coeliac trunk, branch from common hepatic, left gastric etc.<sup>10</sup>

Peterella S et al. studied 89 (72 males & 17 females) cadavers from five centers in Brazil. In 31(26 males & 05 females) cadavers, 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. The inferior phrenic artery origin in the right contour of the coeliac trunk was observed in 05 of the 89 cases.<sup>11</sup>

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 upper four ventral segmental arteries of abdominal region. The two central roots disappear and the longitudinal anastomosis joins first and fourth root. The hepatic, splenic and the left gastric arteries originate at this longitudinal anastomosis. 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.<sup>12,13</sup> In our cases, the variations of the coeliac trunks are due to developmental changes in the longitudinal anastomosis between above mentioned ventral segmental arteries.

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.

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