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Case Report

A case of celiacomesenteric trunk in combination with bilateral duplication of renal arteries and hypospadias

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ABSTRACT

A celiacomesenteric trunk, with common origin of the celiac and superior mesenteric arteries from the aorta, is quite rare. This variation may be accompanied by some other arterial anomalies, as well as being involved in pathological processes. We report the case of common celiacomesenteric trunk in combination with bilateral duplication of the renal arteries and hypospadias. Two large branches of celiacomesentric trunk were observed: the gastrosplenic and hepatomesenteric trunks. The gastrosplenic trunk was divided into the splenic artery and the left gastric artery. The hepatomesenteric trunk gave off the common hepatic artery and then was continuous as superior mesenteric artery. Bilateral duplication of the renal arteries, hypospadias and chordee were also presented. The embryological mechanism of celiacomesenteric trunk development is known. The association of the common celiacomesenteric trunk with bilateral duplication of renal arteries and anomalies of external genitalia (hypospadias) has not been reported. Knowledge about variations of arteries, particularly about the possibility of the celiacomesenteric trunk, is clinically important.

Keywords: Congenital anomalies, Vascular anomalies, Celiacomesentric trunk, Bilateral renal arteries duplication, Hypospadias

INTRODUCTION

The major part of the gastrointestinal tract is supplied by the anterior branches of the abdominal aorta: celiac trunk, superior mesenteric and inferior mesenteric arteries. Normally, these arteries originate separately from the abdominal aorta, the celiac trunk at the level of the twelfth thoracic vertebra, the superior mesenteric artery at the level of the first lumbar vertebra, the inferior mesenteric artery at the level of the third lumbar vertebra. Anomalies of the celiac trunk and superior mesenteric artery have been reported. A celiacomesenteric trunk (CMT), with common origin of the celiac and superior mesenteric arteries from the aorta, is quite rare and has incidence from 0.25% - 2.7% in various studies.[1,3-7,11,13,15] This anatomical variation may be accompanied by some other arterial anomalies[8]. Presence of celiacomesenteric trunk may be occasionally recognized during clinical examination, particularly when using medical imaging techniques.[7,12] Common celiacomesenteric trunk may be involved several in pathological processes: aneurysm, occlusion, thrombosis etc.[1,5,6,9,10] Mesenteric ischemia may accompany celiacomesenteric trunk.[14] Knowledge about variations of arteries, particularly about possibility of CMT, is clinically important. It may result in an accurate interpretation of disease symptoms and aid in the selection of optimal treatment options or interventions planning, that will avoid iatrogenic injuries and complications.

We report the case of common celiacomesenteric trunk in combination with bilateral duplication of the renal arteries and hypospadias.

CASE REPORT

During routine educational dissection, common anatomic origin of two of the ventral single branches of the abdominal aorta, the superior mesenteric artery and celiac artery, that is known as the common celiacomesenteric trunk, was found (Figure 1 (A)). Arising from this common trunk two larger branches were observed: the gastrosplenic (Figure 1, (B)) and hepatomesenteric (Figure 1, (D)) trunks. The gastrosplenic trunk was directed superiorly, forming a left sided flexure, indicating a course to the splenic hilum. The large caliber of the vessel suggested an arterial supply for the spleen, dorsal pancreas, and stomach. Origin of a smaller branch was visible on the flexure of the gastrosplenic trunk. This branch was left gastric artery (Figure 1, (C)). The hepatomesenteric trunk followed an inferior course along the anterior aspect of the abdominal aorta. Anterior to the body of the L2 vertebrae, the common hepatic artery arose from the left posterior aspect of the hepatomesenteric trunk (Figure 1, (E)), then turned to the right and suggested perfusion to the duodenum, head of the pancreas, liver and gallbladder. The rest part of hepatomesenteric trunk (superior mesenteric artery) continued inferiorly along the abdominal aorta (Figure 1, (F)).

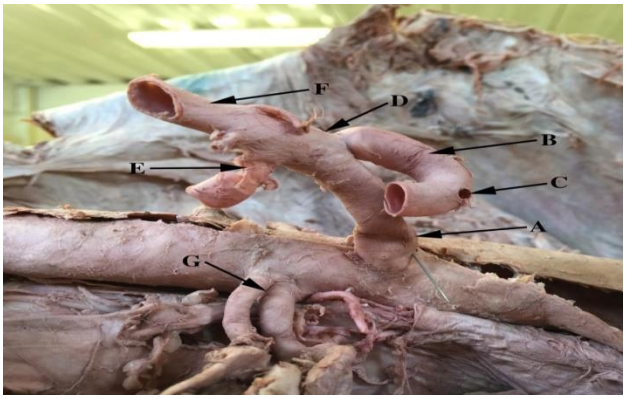

Figure 1: Common celiacomesenteric trunk and its main branches; (A) Celiacomesenteric trunk; (B) Gastrosplenic trunk; (C) Left gastric artery; (D) Hepatomesenteric trunk; (E) Common hepatic artery; (F) Superior mesenteric artery; (G) Duplicated left renal arteries.

Bilateral duplication of the renal arteries was also observed (Figure 2). Normally, each kidney receives one renal artery as a branch from the abdominal aorta, whereas in our subject the duplicated arteries arose from the lateral aspects of the abdominal aorta and both enter the kidneys through the hilum.

Figure 2: Duplicated renal arteries. Bilateral duplication of renal arteries originating from abdominal aorta is marked by black arrows. CMT – common celiacomesenteric trunk.

Along with the vascular variants, the subject also presented hypospadias. The urethral meatus was observed on the ventral aspect of the penis near the midshaft. Subject also had chordee, a downward curvature of the shaft (Figure 3).

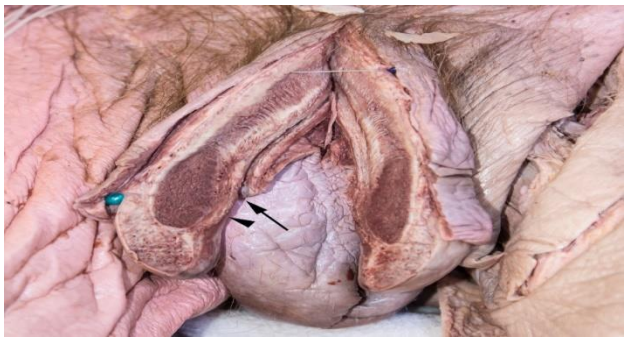

Figure 3: Hypospadias and chordee. Urethral meatus on the ventral aspect of the penis (black arrow), downward curvature of the shaft – chordee (black arrow head).

DISCUSSION

The embryological mechanism of CMT development is described.[1,6,10,13] The foregut and midgut are supplied by arteries derived from the 10th to 13th ventral visceral segmental arteries. Temporary longitudinal anastomosis running parallel to the aorta connects these arterial roots (Figure 4, (A)). Normally, 11th and 12th ventral segmental arteries, and the longitudinal anastomosis degenerate; 10th segmental artery becomes the celiac artery and the 13th segmental artery becomes superior mesenteric artery (Figure 4, (B)). Thus, variations in celiac and mesenteric arteries result from variation in the regression of the 10th to 12th ventral segmental arteries and longitudinal anastomosis. The 13th ventral segmental artery and persistent longitudinal anastomotic artery form the common origin of the celiac and superior mesenteric arteries – celiacomesenteric trunk (Figure 4, (C)).

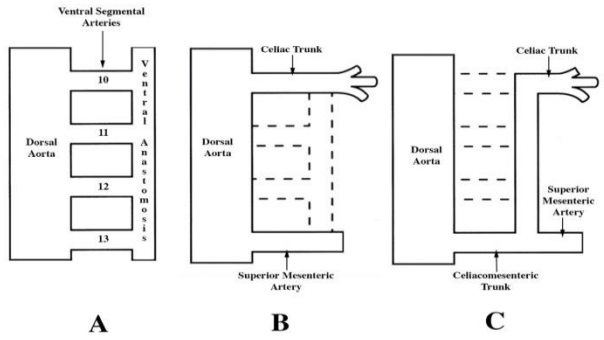

Figure 4: Embryological mechanism of CMT development; (A) Ventral segmental arteries and longitudinal anastomosis; (B) Normal development of celiac trunk and superior mesenteric artery from 10th and 13th ventral segmental arteries respectively; (C) Celiacomesenteric trunk develops from 13th ventral segmental artery and persistent longitudinal anastomosis.

There is nothing surprising in the fact that in our case CMT is combined with bilateral duplication of renal arteries that derive from lateral visceral segmental arteries. However, duplicated renal arteries per se are not uncommon.[2]

Association of common celiacomesenteric trunk with bilateral duplication of renal arteries and anomalies of external genitalia (hypospadias) has not been reported.

Understanding the anatomical variations has considerable clinical significance. Information about CMT is significant in the areas of laparoscopic or open surgery, radiological procedures, and should be kept in mind by clinicians to avoid complications. Celiacomesenteric trunk can potentially create high morbidity in case of thrombosis because of the large visceral territory supplied by a single artery.[10]

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