

## Case report:

### Long Coeliac Trunk and other variations in abdomen of a single cadaver

<sup>1</sup>Dr. Arunima Nag (Ray) , <sup>2</sup> Dr. Hironmoy Roy , <sup>3</sup> Dr. Champak Kumar Dey ,

<sup>4</sup> Dr Asutosh Pramanik , <sup>5</sup> Dr. Anupam Baske , <sup>6</sup> Dr. Saikat Kumar Dey , <sup>7</sup> Dr. Parijat Mukherjee ,

<sup>8</sup> Prof (Dr.) Sudeshna Majumdar

<sup>1</sup>Junior Resident, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>2</sup>Assistant Professor, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>3</sup>Demonstrator, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>4</sup>Junior Resident, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>5</sup>Junior Resident, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>6</sup>Junior Resident, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>7</sup>Junior Resident, Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012. West Bengal, India.

<sup>8</sup>- Professor and Head of the Department of Anatomy, North Bengal Medical College, Sushrutanagar, Darjeeling – 734012.

Corresponding author: Dr. Sudeshna Majumdar

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#### Abstract

In the month of January, 2016, while doing the routine dissection in the abdomen of a 70 year old female cadaver, in the department of anatomy, North Bengal Medical College, West Bengal, several variations were found. The coeliac trunk was about 5cm. long, the left sided obturator artery arose from the posterior division of the internal iliac artery, the left common iliac artery had a kinking. Moreover, the genitofemoral nerve on both sides had variations and the caudate lobe of the liver was big enough. This case report will help us to enhance our knowledge in gross anatomy and will be of help for surgical, radiological or other clinical interventions in abdomen.

**Key Words:** Coeliac trunk, obturator artery, common iliac artery, kinking, tortuosity, genitofemoral nerve.

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#### Introduction

**Coeliac Trunk** – This is the first aortic branch arising from the ventral surface of the abdominal aorta just below the aortic hiatus band at the level of T12/L1 vertebra. It is 1.5 -2cm. long and passes almost horizontally forwards and slightly to the right

above the pancreas and splenic vein. It divides into left gastric, common hepatic, splenic arteries. The superior mesenteric artery may arise with the coeliac trunk as a common origin. One or more of the superior mesenteric branches may arise from the coeliac trunk [1].

**Common Iliac Arteries:** The abdominal aorta bifurcates into right and left common iliac arteries antero-lateral to the 4<sup>th</sup> lumbar vertebral bodies. These arteries divide as they descend and divide at the level of the sacro-iliac joint into internal and external iliac arteries [1].

**Obturator Artery:** This artery runs antero-inferiorly from the anterior trunk on the lateral pelvic wall to the upper part of obturator foramen. It leaves the pelvis via the obturator canal and divides into anterior and posterior divisions. In the pelvis, the obturator artery gives the iliac branch, a vesical branch and a pubic branch and the latter anastomoses with the pubic branch of the inferior epigastric artery [1].

**The Genitofemoral Nerve:** This is a branch of the lumbar plexus (root value - L1& L2 ventral rami) and is formed within the substance of the psoas major. It descends obliquely forwards through the muscle to emerge on its abdominal surface near the medial border, opposite the third and fourth lumbar vertebrae. It runs beneath the peritoneum and above the inguinal ligament and gives the genital and femoral branches. It often divides close to its origin and the branches emerge separately from the psoas major [1].

#### **Aims and objectives**

The variations in the length of the coeliac trunk, the course of the common iliac arteries, branches of the internal iliac artery, the number and branching of the genitofemoral nerve were studied in this case report to enhance our knowledge in gross and clinical Anatomy.

#### **Materials and methods**

During the routine dissection for undergraduate students in the Department of Anatomy, North Bengal Medical College, West Bengal, variations were found

in the coeliac trunk, left common iliac artery, right obturator artery, both sided genitofemoral nerves inside the abdomen of a 70 year old embalmed cadaver.

A long coeliac trunk arose from the ventral surface of the abdominal aorta.

Dissection was done minutely in the abdomen, structures were observed in details, the length of the coeliac trunk was measured with a measuring tape and relevant photographs were taken.

#### **Observations:**

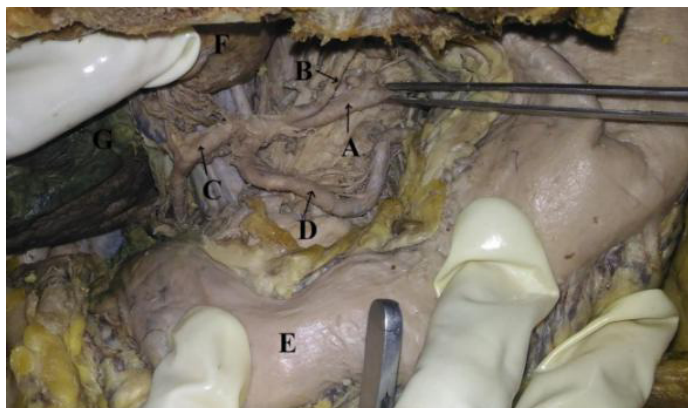
The coeliac trunk was about 5cm. long, instead of 1.5 to 2cm. long. The left gastric, splenic and the common hepatic arteries arose from it. The splenic artery was tortuous enough to reach the hilum of the spleen along the upper border of the pancreas, the common hepatic artery bifurcated into the common hepatic and gastroduodenal arteries and the left gastric artery reached the lesser curvature of the stomach (Figures – 1 & 2).

The abdominal aorta bifurcated into right and left common iliac arteries antero-lateral to the 4<sup>th</sup> lumbar vertebra. The left common iliac artery had a kinking and an oblique course, but the right common iliac artery descended normally (Figure – 3 & 5).

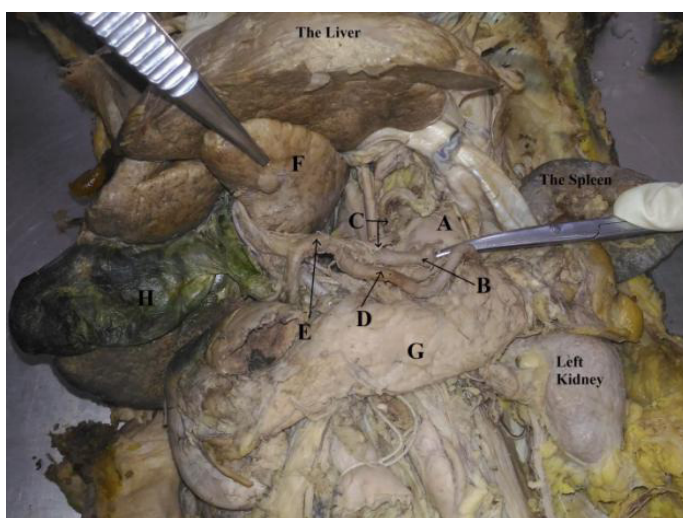
On the right side, the obturator artery arose from the posterior division of the internal iliac artery, instead of the anterior division. On the left side, no such variation was found (Figure – 3).

On the left side there were 2 genitofemoral nerves (one medial and the other lateral) – each of them gave two branches – genital and femoral to pierce the psoas major. The branches of the medial nerve pierced the anterior surface of the psoas major and those of the lateral one pierced the lateral margin of the same muscle (Figure –4).

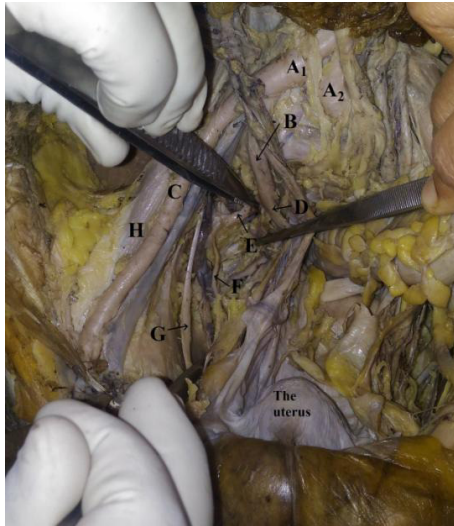
On the right side, the genitofemoral nerve divided into two branches - genital and femoral, in the upper portion of the psoas major muscle and pierced its anterior surface. (Figure – 5).  
The caudate lobe of the liver was big enough (Figure – 2).



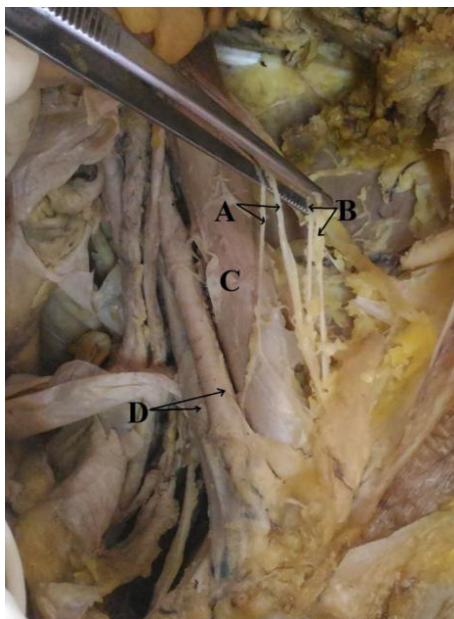
**Figure – 1:** The long coeliac trunk (A) and its three branches – the left gastric artery(B), the common hepatic artery (C), the splenic artery (D). The stomach (E), the caudate lobe of liver (F) and the gall bladder (G) were labeled in the vicinity in this photograph.



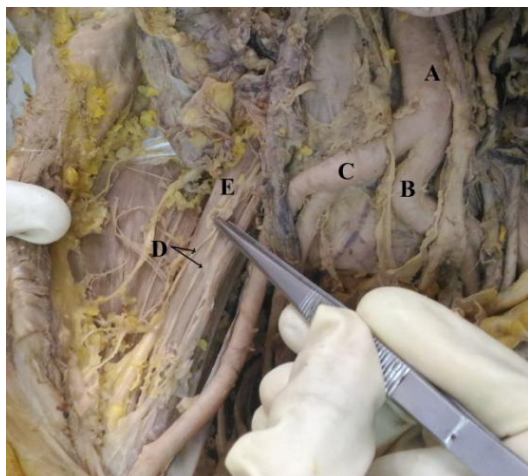
**Figure – 2;** the long coeliac trunk (B) arose from the abdominal aorta (A). Three branches of the coeliac trunk became clearly visible after removal of the stomach – the left gastric artery(C), the splenic artery (D) and the common hepatic artery (E). The common hepatic artery divided into gastroduodenal artery (descending one) and the hepatic artery proper (ascending one). The big caudate lobe of liver (F), the pancreas (G), and the gall bladder (H) were labeled in the vicinity.



**Figure – 3;** The right Obturator artery (**F**) arose from the posterior division of the internal iliac artery and ran parallel to the right Obturator nerve (**G**). The right common iliac artery (**A1**), the right external iliac artery (**C**), the right internal iliac artery (**B**) and its anterior (**D**) and posterior divisions (**E**) were also labeled in this photograph. The kinking of the left common iliac artery was marked by ‘**A2**’.



**Figure – 4;** on the left side, the two genitofemoral nerves (**A & B**) and their two divisions. **A** is the medial one and the **B** is the lateral one. The psoas major muscle (**C**) and the external iliac vessels (**D**) were labeled also.



**Figure – 5 :**

The right sided genitor-femoral nerve divided into two branches (D)- genital(medial one) and femoral (lateral one), in the upper portion of psoas major muscle (E). The abdominal aorta (A) divided into two common iliac arteries (B& C), whereas, the left one had a kinking (B)

### **Discussion**

**Embryological consideration:** Each dorsal aorta, even before the stage of its fusion, gives ventral splanchnic branches which supply the gut and its derivatives. Initially, these ventral branches are paired. With the fusion of the dorsal aorta, the ventral branches (derived from the vitelline arteries) fuse and form a series of unpaired segmental vessels in the form of 4 roots which run in the dorsal mesentery of the primitive gut. These roots divide into ascending and descending branches to form longitudinal anastomotic channels. The proximal parts of two central roots disappear and distal portions join with the 1st root to form classical 3 branches of the coeliac trunk and 4th root forms the superior mesenteric artery [2, 3].

### **General Discussion:**

In a study conducted by Yadav et al, the mean length of coeliac trunk was found to be 28.6 mm. But in the present case, the length of the coeliac trunk was

about 5cm. from its origin and it trifurcated to give the normal branches.

The anatomical knowledge regarding the coeliac trunk and its branching pattern can be applied in various radiological procedures like computed tomography angiography, intra-arterial digital subtraction angiography, etc. [4]. This knowledge can also be helpful to the surgeons who can plan their line of treatments in cases like liver transplantation, hepatobiliary tumours, splenic aneurysm, pancreatic carcinoma, coeliac axis compression syndrome, gastric carcinoma etc [4].

According to a study conducted by Boonruangsri et al, the tortuosity of common and external iliac arteries were prevalent in 1.76 and 20% cases. No tortuosity of internal iliac artery was observed in that study and the percentage of kinking(may be of 'S' shaped, reversed, low grade or 'V' shaped) of common, external, and internal iliac arteries were 4.71, 16.47, and 1.18%, respectively. The kinking of the left common iliac artery was 'S' shaped in the

present case. The prevalence of the aneurysm, tortuosity and kinking of abdominal aorta and iliac arteries is important for primary consideration in operative planning [5]. Recognitions of these phenomena are important for optimizing radiation doses, endovascular stent grafting or traditional Surgery [5].

In a study conducted by Rajive and Pillay, the Obturator artery had its origin from the posterior trunk of the internal iliac artery in 5 specimens (10%), like the present case. The study of vascular pattern of the pelvis is important due to concentration of organs within the limited special confines of the pelvic cavity. To perform endoscopic total extraperitoneal inguinal hernioplasty (TEP), or laparoscopic herniorrhaphy successfully, a sound knowledge of retropubic vascular anatomy is pivotal. Major surgical interventions in the pelvis like extended organ resection following tumours, or sepsis due to perforation of pelvic organs, need ligation and transection of the supplying arteries and veins [6].

Typically, the genitofemoral nerve bifurcates into its terminal genital and femoral branches midway along the anterior surface of the psoas major. In a study conducted by Anloague et al, it was found that the most common variation of the genitofemoral nerve occurred in 9 of 34 lumbar plexuses (26.5%) and

included a split of the genitofemoral nerve into the genital and femoral branches within the substance of the psoas major muscle with fibers of the psoas major passing between these branches. Seven variant genitofemoral nerves (20.6%) had this bifurcation occurring at the upper rather than mid portion of the anterior surface of the psoas [7]. In the present case, the genitofemoral nerve bifurcated in the upper portion of the psoas major muscle on the right side and on the left side there were two genitofemoral nerves to bifurcate high above.

The big caudate lobe of the liver had one probable underlying pathology.

#### **Conclusion:**

The knowledge of anatomy of coeliac trunk and its branches are of utmost importance for various surgical and radiological procedures to prevent any complication. Kinking of abdominal aorta and iliac arteries and also nerves around (branches of the lumbar plexus) are important for operative planning. The vascular pattern of the pelvic cavity is also important for conduction of different sorts of pelvic surgery. So the present case will enhance our knowledge in gross & clinical anatomy and will be of help for different abdomino-pelvic radiological, surgical interventions and also for approach in radiotherapy.

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