



Case Report:

Rare Type of Course and Distribution of an Additional Right Hepatic Artery: A Possible Source of Iatrogenic Injury During Hepato-biliary and Pancreatic Surgeries

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Citation

Shetty P, Nayak SB, D'Souza MR. Rare Type of Course and Distribution of an Additional Right Hepatic Artery: A Possible Source of Iatrogenic Injury During Hepato-biliary and Pancreatic Surgeries *Online J Health Allied Scs.* 2017;16(2):18. Available at URL:<http://www.ojhas.org/issue62/2017-2-18.html>

Submitted: Jan 19, 2017; Accepted: July 14, 2017; Published: July 30, 2017

Abstract: Celiac artery shows frequent variations in its branching pattern. Knowledge of its possible variations is useful in gastric, pancreatic and hepato-biliary surgeries. During our dissection classes, we observed a rare variation of the branching pattern of celiac trunk. It divided normally into its three branches; left gastric, splenic and common hepatic arteries. Left gastric and splenic arteries were normal in their course and distribution. The common hepatic artery trifurcated to give hepatic artery proper, gastroduodenal artery and an additional right hepatic artery. The branching pattern of hepatic artery proper and gastroduodenal arteries was normal. The additional right hepatic artery gave origin to a right gastric artery and a large pancreatic branch to the head of the pancreas. It coursed parallel to the bile duct, being on its right side, passed through the Calot's triangle and entered the right lobe of liver through the fossa for gall bladder. In the Calot's triangle, it gave a cystic branch to the gall bladder. We discuss the clinical importance of this rare variation in this paper.

Key Words: Celiac trunk, Hepatic artery, Cystic artery, Bile duct, Calot's triangle, Common hepatic

Introduction:

Celiac trunk is the first ventral splanchnic branch of abdominal aorta. It arises from the aorta as soon as the aorta enters the abdomen through the aortic opening of the diaphragm. It has a short forward course of about half inch, after which it terminate by dividing into left gastric, splenic and common hepatic arteries.(1) Celiac trunk shows frequent variations in its branching pattern. Its branches may come directly from the abdominal aorta (2), or may come as common trunks with other nearby vessels like superior mesenteric, inferior phrenic or renal arteries. Celiaco-mesenteric trunk (3), Celiaco-mesenterico-phrenic trunk (4), gastrosplenic trunk (5) and hepato-gastric trunk (6) have been reported in the literature. Knowledge of the possible variations of branching pattern of celiac trunk is very useful in many surgical procedures in the upper abdomen. The aim of this case report is the alert the surgeons about the course and branching pattern of a rare additional right hepatic artery.

Case Report

During our dissection classes for undergraduate medical students, we observed the following variations in the branching pattern of the celiac trunk in an adult male cadaver aged approximately 70 years. The celiac trunk arose from the abdominal aorta and terminated by dividing into 3 branches; left gastric, splenic and common hepatic arteries in the usual manner. The course and distribution of splenic and left gastric arteries was normal. The common hepatic artery however, trifurcated to give hepatic artery proper, gastroduodenal artery and an additional right hepatic artery (Figure 1). The hepatic artery proper divided into right and left hepatic arteries, which entered the respective lobes of liver through the porta hepatis. The right hepatic artery gave a cystic artery just before entering the liver. The gastroduodenal artery terminated by dividing into right gastroepiploic artery and superior pancreaticoduodenal artery in the usual manner.

The additional right hepatic artery crossed in front of the bile duct from left to right, just above the first part of the duodenum. It ascended in the right free margin of the lesser omentum, on the right side of the bile duct, passed through the Calot's triangle and entered the right lobe of the liver through the fossa for gall bladder. While crossing the bile duct, it gave two branches; a right gastric artery which supplied the stomach and a large pancreatic artery which descended behind the head of the pancreas and supplied the same. Further, while passing through the Calot's triangle, it gave a cystic artery which supplied the gall bladder. Thus, the Calot's triangle in this case had additional right hepatic artery and two cystic arteries.

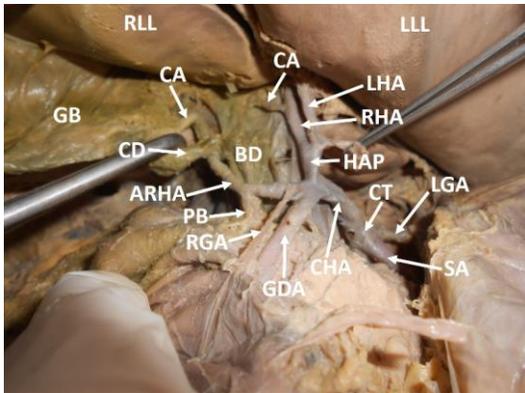


Figure 1. Dissection of the variant branching pattern of celiac trunk showing the additional right hepatic artery (ARHA) and its branches. (CT – celiac trunk; LGA – left gastric artery; SA – splenic artery; CHA – common hepatic artery; HAP – hepatic artery proper; RHA – right hepatic artery; LHA – left hepatic artery; CA – cystic artery; GDA – gastroduodenal artery; PA – large pancreatic artery from the additional right hepatic artery; RGA – right gastric artery; CD – cystic duct; BD – bile duct; GB – gall bladder; RLL – right lobe of liver; LLL – left lobe of liver)

Discussion

Close association of celiac trunk and its branches with stomach, pancreas, liver, gall bladder and spleen makes it a very important surgical landmark. Iatrogenic injuries of celiac trunk branches are common during surgeries of these organs. More so when there are variations in the branching pattern of the celiac trunk. The hepatic artery shows many variations. Its trifurcation, higher level of termination, aberrant branches and varied distribution have been well documented.(7-9) Aberrant right hepatic artery takes origin from superior mesenteric artery some times. In such cases it ascends up behind the head of the pancreas.(10-12) Presence of additional right hepatic artery is a rare occurrence and very few cases have been reported about this variation. Badagabettu et al (13) have reported the presence of an additional right hepatic artery forming a caterpillar hump. Nayak SB et al., have reported the presence of an additional right hepatic artery which passed behind the bile duct. It gave a cystic artery in the Calot's triangle. In the current case the additional right hepatic artery crossed superficial to the lower part of the bile duct, just above the first part of duodenum. It gave a right gastric artery and a large pancreatic artery while crossing in front of the bile duct. It also passed through the Calot's triangle and gave a cystic branch before reaching the liver. The lower part of the additional right hepatic artery might undergo iatrogenic injuries in pyloric and pancreatic surgeries. Its part in the Calot's triangle or its cystic branch might be endangered in laparoscopic cholecystectomy.

Conclusion

A rare additional right hepatic artery has been reported here. There is no report available on additional right hepatic artery supplying stomach, pancreas and gall bladder. Its course close to duodenum and along the bile duct, in the Calot's triangle and entry to the liver through fossa for gall bladder makes it vulnerable surgically.

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