

VARIATION IN THE BRANCHING PATTERN OF THE COMMON HEPATIC ARTERY - A CASE STUDY

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ABSTRACT

Normal hepatic arterial anatomy occurs in approximately 50-80% of cases; for the remaining cases, multiple variations have been described. During the routine PG dissection in department of *Shareera Rachana*, SDM college of Ayurveda, Udupi, Karnataka, we observed that the common hepatic artery, which is a branch of coeliac trunk, has not continued as hepatic artery proper. Instead at the upper border of duodenum, it gave two terminal branches left hepatic artery and a common stem for gastroduodenal artery and right hepatic artery. From the right hepatic artery, right gastric artery was originated. This kind of variations has significant importance in radiological and surgical procedures

Keywords: *Hepatic artery, coeliac trunk, right & left hepatic artery, gastroduodenal Artery.*

INTRODUCTION

The first description of hepatic arterial variations was published in 1756. Michels' autopsy series of 200 dissections provided a classification scheme later updated in 1994 by Hiatt.^{1, 2}

The common hepatic artery runs downwards, forwards and to the right, behind the lesser sac to reach the upper border of the duodenum. Here it enters the lesser omentum. It then runs upwards in the right free margin of the lesser omentum, in front of the portal vein, and to the left of the bile duct. Reaching the porta-hepatis it terminates by dividing into right and left hepatic branches.

BRANCHES:

(a) The gastroduodenal artery is a large branch which arises at the upper border of the first part of the duodenum. The part of the hepatic artery till the origin of the gastroduodenal artery is called common hepatic artery. The

part distal to this is the hepatic artery proper.

The gastroduodenal artery runs downwards behind the first part of duodenum and divides at its lower border into the right gastro epiploic and superior pancreaticoduodenal artery.

The right gastroepiploic artery enters the greater omentum, follows the greater curvature of the stomach and anastomoses with the left gastroepiloic artery.

The superior pancreaticoduodenal artery runs downwards in the pancreaticoduodenal groove and ends by anastomosing with the inferior pancreaticoduodenal artery, a branch of the superior mesenteric.

(b) The right gastric artery is a small branch which arises from the proper hepatic artery close to the gastroduodenal artery. It runs to the left along

the lesser curvature and ends by anastomosing with the left gastric artery.

- (c) The cystic artery is the branch of the right hepatic artery. It passes behind the common hepatic and cystic ducts to reach the upper surface of the neck of the gallbladder where it divides into superficial & deep branches for the inferior & superior surfaces respectively.

The most invariable feature of the gastroduodenal artery is its intermediate position between the pancreas and duodenum, a point of surgical importance in view of the common involvement of this artery in duodenal ulceration.^{3,4}

Variations in the arrangements of the hepatic artery & its branches are common and of surgical importance.

- 1) The common hepatic artery may arise from the superior mesenteric artery.
- 2) An accessory left hepatic artery may arise from left gastric artery.
- 3) An accessory right hepatic artery may arise from superior mesenteric artery.⁵

CASE REPORT:

During the routine PG dissection in department of ShareeraRachana, SDM college of Ayurveda, Udipi, Karnataka, we observed that the common hepatic artery, which is a branch of coeliac trunk, has not continued as hepatic artery proper. Instead it gave two terminal branches left hepatic artery and a common stem for Gastroduodenal artery and right hepatic artery. From the right hepatic artery, right gastric artery was originated.



CS- Cystic Artery, LHA- Left Hepatic Artery, RHA- Right Hepatic Artery, CHA- Common Hepatic Artery, RGA- Right Gastric Artery, GDA- Gastro Duodenal Artery

DISCUSSION:

Along with the normal anatomy, knowledge of variations in the vascular pattern of the body is essential, in radiological & surgical point of view.

Although the hepatic artery supplies only 25-30% of the blood supply to the liver and can often be ligated, while doing surgeries we prefer to spare the primary blood supply to the proximal bile duct. Ligation of the hepatic artery can re-

sult in ischemic biliary injury and break down of the biliary-enteric anastomosis. Surgeons must have a comprehensive understanding of not only standard hepatobiliary arterial anatomy but also its variants in order to avoid potential complications.⁶ Arterial reconstruction should be strongly considered in the setting of pre-operative hyperbilirubinemia or simultaneous vein resection and reconstruction. When performing hepatobiliary and pancreatic operations, especially pancreaticoduodenectomy, it is vital to have a thorough knowledge of such anatomy including the patterns that have rarely been described.⁷

In the present study, Common Hepatic artery gave two terminal branches, left hepatic artery and a common stem for Gastroduodenal artery and right hepatic artery. From the right hepatic artery, right gastric artery was originated.

Ligation of GDA is a critical step during pancreaticoduodenectomy and the location of this artery is often excluded in the description of the variants. Knowledge of these anomalies is especially important in hepatobiliary and pancreatic surgery in order to avoid unnecessary complications. Misinterpretation while doing angiographic images is another chance.

Anatomical variations in the branching pattern of common hepatic artery are of considerable importance in liver transplantation, laproscopic surgery, radiological abdominal interventions and penetrating injuries to the abdomen.⁸

EMBRYOLOGY:

The ventral splanchnic arteries are originally paired vessels which are distributed to the wall of the yolk sac, but after fusion of the dorsal aortae they appear as unpaired trunks and are distributed to the primitive digestive tube. Longitudinal anastomotic channels connect these branches along the dorsal and ventral aspects of the

tube, forming dorsal and ventral splanchnic anastomosis. These longitudinal vessels obviate the need for so many subdiaphragmatic ventral splanchnic arteries, and these are reduced into three – the celiac trunk, superior mesenteric arteries and inferior mesenteric arteries. The ventral splanchnic anastomosis forms the right and left gastric arteries and the hepatic arteries.⁹

CONCLUSION

Anatomical variations in the branching pattern of common hepatic artery is of considerable importance in liver transplants, laproscopic surgery, pancreaticoduodenectomy, hepatobiliary surgeries as well as radiological abdominal interventions and penetrating injuries to the abdomen.

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