



RIGHT & LEFT ACCESSORY HEPATIC ARTERIES – A CASE STUDY

Dr Akhil Dev*	PG Scholar , Department of Rachana Shareera ,SDM College Of Ayurveda , Hassan, Karnataka. *Corresponding Author
Dr Prasanna S	Associate Professor , Department of Rachana Shareera, SDM College Of Ayurveda , Hassan, Karnataka.
Dr Gowda Ketan Annaya	PG Scholar , Department of Rachana Shareera ,SDM College Of Ayurveda , Hassan, Karnataka.

ABSTRACT The Common hepatic artery is a vessel that supplies oxygenated blood to the lobes of liver parenchyma ,pylorus of stomach , duodenum , pancreas and gall bladder .It arises from the celiac trunk . Hepatic Artery proper is the short vessel that terminates to right and left hepatic artery which supplies to the left and right lobes of the liver , as well as the gallbladder and a part of stomach , it arises as a continuation of common hepatic artery , a branch of celiac trunk and courses alongside the portal vein and common bile duct .Two Accessory Hepatic Arteries was noted in a 72 year old male cadaver during the routine dissection of Post Graduate students. This accessory artery was branch of Hepatic artery proper. Anatomical variations of the hepatic artery are important in the planning and performing of abdominal surgical procedures. Normal hepatic anatomy occurs in approximately 60 % of cases, for the remaining 40% aberrant hepatic artery have been described.

KEYWORDS : Hepatic Artery Proper, Right Hepatic Artery, Left Hepatic Artery, Accessory Hepatic Artery.

INTRODUCTION

The Common Hepatic Artery in the adult is intermediate in size between the left gastric artery and splenic artery ,in the fetus and early postnatal life, it is the largest of the three branches of the celiac trunk . Common Hepatic artery takes its origin from the coeliac trunk of abdominal aorta at the level of 12 th thoracic vertebrae , the hepatic artery passes anteriorly and laterally below the epiploic foramen (foramen of Winslow) to the upper aspect of the first part of the duodenum .Common hepatic artery after giving a branch of Gastroduodenal Artery , it is termed as Hepatic Artery proper .It passes anterior to the portal vein and ascends anterior to the epiploic foramen between the layers of lesser omentum. Within the free border of the lesser omentum the hepatic artery is medial to the common bile duct and anterior to the portal vein. At portahepatis it divides into right and left branches which terminates by the bifurcation into Right and Left Hepatic Artery , before these run into the parenchyma of the liver which supplies to the right and left lobes of liver . A vessel that supplies a lobe in addition to its normal vessel is defined as an accessory artery. A replaced hepatic artery is a vessel that does not originate from an orthodox position and provides the additional sole supply to that two lobe of liver Pranchymas¹.

PROCEDURE

The abdomen was opened as per Cunningham's dissection manual ². Anterior abdominal wall was reflected. Greater and lesser omentum along with intestine, spleen & pancreas were removed to expose the liver properly ³. Liver was pulled downwards, avoiding injury to the inferior vena cava. Structures of the portahepatis were exposed and their pattern of entering the liver was noted. Branches of hepatic artery and portal vein were traced.

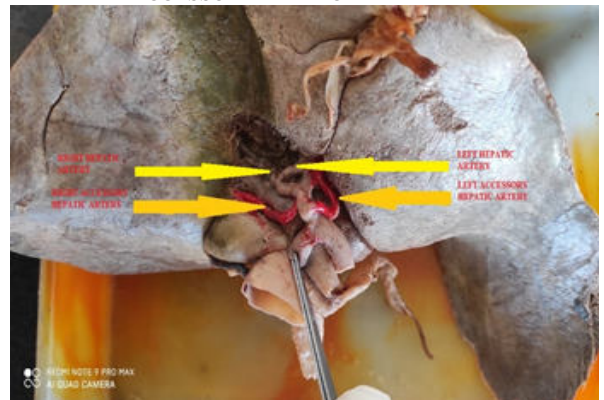
The accessory hepatic artery was encountered on observation . It was noted that this accessory hepatic arteries was branch of hepatic artery proper. Photograph of the same was taken and documented Figure 1 and 2 Respectively.



[Figure .1]

CHA- COMMON HEPATIC ARTERY

GDA- GASTRODEUDINAL ARTERY
HAP- HEPATIC ARTERY PROPER
RHA- RIGHT HEPATIC ARTERY
LHA- LEFT HEPATIC ARTERY
RAHA- RIGHT ACCESSORY HEPATIC ARTERY
LAHR- LEFT ACCESSORY HEPATIC ARTERY



[Figure . 2]

CASE REPORT

During routine dissection class for the Post Graduation students, we encountered the accessory hepatic artery in the 72 year old male cadaver.

The anterior abdominal wall, greater and lesser omentum were removed to expose the liver. Normally, Hepatic artery proper divides into right and left hepatic artery near portahepatis to supply the liver. But in present case, this accessory hepatic artery was a branch of hepatic artery proper .By tracing it further, it was noted that two accessory hepatic arteries got branching from the hepatic artery proper which ends to the left and right lobes of liver respectively .Right Accessory Hepatic Artery originated from the lateral aspect of the hepatic artery proper and ends in the right lobe of the liver other than normal course of Right hepatic artery, Approximately, a centimeter prior to reaching the point of bifurcation of normal course, also one Left Hepatic accessory artery where originated from the medial aspect of the Hepatic Artery proper 1.5 cm prior to the point of bifurcation .thus it gives an additional branch to the left lobe of the liver.

DISCUSSION

There are two types of aberrant hepatic arteries, the accessory and the replacing ones. The accessory hepatic artery is defined as a vessel that

supplies a lobe in addition to its normal one, while the replaced hepatic artery is a vessel that provides the sole supply to that lobe, but originates from other than the orthodox position'.

During the routine dissection of Post graduate scholars, we found two accessory hepatic arteries originating from hepatic artery proper as Shown in Figure 1 and 2 of 72 year old male cadaver. Other blood vessels i.e. left and right hepatic arteries, proper hepatic artery, Right gastric arteries were normal, but there was variation in classical representation in bifurcation of Hepatic artery proper.

An anomalous branching pattern is often due to an original development during embryonic life. At the beginning, the dorsal thoracic branches into the 10 to 13 splanchnic or vitelline arterial roots before its fusion. After the fusion, many of these arteries degenerate and later the celiac trunk and the superior and inferior mesenteric arteries develop and are present in adult. In general, the embryonic left hepatic artery, the middle hepatic artery and the right hepatic artery originate respectively from the left gastric artery, the celiac axis and the superior mesenteric artery. After that, the embryonic left hepatic and right hepatic arteries regress while the middle hepatic artery remains as the proper hepatic artery supplying the whole liver as shown in adult. In the case where failures in the regression of these embryonic arteries occur may lead to abnormal branching pattern of hepatic arteries.¹⁰

Some of the authors like Dr Prasanna et al,¹² accessory hepatic artery case reported originating from the left gastric artery, Dr Raju Sugavasi et al¹³ has also mentioned about the accessory hepatic artery originating from left gastric artery variation from the normal branching pattern and Dr George Noussios¹³ et al, in this article The Main Anatomical Variation of the Hepatic Artery and Their Importance in, Surgical practice: Review of the Literature mentioned that common variation as replaced Right Hepatic artery.

Table -1 Hepatic Artery Variants According To Michel's Classification

Serial No	Description	Frequency
1.	Standard anatomy	-60%(Range 55-61)
2.	Replaced Left Hepatic artery	-7.5%(Range3-10%)
3.	Replaced Right Hepatic artery	-10%(Range 8-11%)
4.	Replaced Right and Left Hepatic artery	-1%
5.	Accessory Left Hepatic artery from left Gastric artery	-10%(Range 8-11%)
6.	Accessory Right Hepatic Artery from Superior Mesenteric Artery	-5%(Range 1.5-7%)
7.	Accessory Right and Left Hepatic Artery	-1%
8.	Accessory Right and Left Hepatic artery and replaced Left or Right Hepatic artery	-2.5%
9.	Common Hepatic artery replaced to superior Mesenteric artery	-3%(range 2-4.5%)
10.	Common hepatic artery replaced to Left Gastric artery	-0.5%

CONCLUSION

Nowadays, there are many improvements and developments in abdomen surgical techniques: upper abdominal video laparoscopic surgeries, liver transplantation and radiological procedures. All of invasive procedures in the abdomen need for professional and wide knowledge of the proper anatomy of the abdominal and its structures, hepatic arterial system and their main variations. The frequency of inadvertent or iatrogenic hepatic vascular injury increases in the event of aberrant anatomy and variations. The knowledge of anatomical liver and its vascular variants is crucial for decreasing operative and postoperative morbidity and mortality during the performance of hepatic surgeries.

The accessory right and left hepatic artery arises from the hepatic artery proper provides collateral arterial circulation in case of occlusion of the vessels in porta hepatis but may also be injured during mobilization of the stomach as it lies in the upper portion of the lesser omentum.

So, the knowledge of variation in hepatic artery is beneficial for surgeons and anatomists.

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