

*Case Report***Double Hepatic Artery and a Variant Gastro Duodenal Artery -
A Case Report**Radhika Kuttan¹, Mathivanan D², Deborah Joy Hepzibah¹, Jamuna Meenakshisundaram³¹Assistant Professor, ²PG in Anatomy, ³Professor,
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*Received: 22/04/2015**Revised: 08/05/2015**Accepted: 11/05/2015***ABSTRACT**

Hepatic artery and celiac trunk variations have been reported earlier. We observed a duplication of hepatic artery, originating from the CT individually, with higher origin and division of GDA from the LHA, were found during a routine dissection of teaching medical under graduate students. The arterial variants were dissected carefully and studied. LHA immediately after its origin from the CT gave a branch to the left lobe of liver and a GD branch dividing at a higher level into posterior superior pancreatico duodenal artery and supra duodenal artery. RHA gave a branch to right lobe of liver with a cystic branch. Findings of the above reporting's were rare and hence presented. The purpose was to provide the familiarity of an atypical variation before any surgical approaches to liver transplantation and during the interventional radiological procedures the variant should be considered to avoid the complications.

Key words: DHA-Double Hepatic Artery, CT- Celiac Trunk, GDA- Gastro Duodenal Artery, LG- Left Gastric, SP- Splenic, LHA-Left Hepatic Artery, RHA-Right Hepatic Artery, SPDA- Superior Pancreatico Duodenal Artery, SDA-Supra duodenal Artery of Wilkie and PV- Portal Vein.

INTRODUCTION

Reporting's of DHA had not been acknowledged greatly; however the incidence of DHA represented here was not mentioned in the classical Michel's classification (1955). The Duplication of hepatic artery was found initially by Rigaud et al (1957) ⁽¹⁾ and later reported by Gupta et al (1979). ⁽²⁾ Origin of RHA and LHA from the celiac axis independently was studied during a pre transplantation work, done by Fasel et al (1996). ⁽³⁾ CT divides into three

classical branches namely LG, CHA, and SP artery at the level of T12 vertebra in front of the aorta. CHA extends from CT till the origin of GDA and the hepatic artery proper from that point to the level of porta hepatis where it divides into a right and left hepatic branch. ⁽⁴⁾ GDA usually arises from the CHA; runs behind the first part of duodenum to its posterior surface which lies between the first part of the duodenum and the neck of pancreas. At the lower border of first part of duodenum GDA divides

generally into right gastro epibloic and superior pancreatico duodenal artery. The present case reports the duplication of the hepatic artery from CT. LHA bifurcates into a GDA and a LH branch. RHA to the right lobe of liver. GDA may also arise with RHA and LHA as a trifurcation. GDA divides in the present case at a higher level into PSPDA and SDA of Wilkie. Usually supra duodenal artery of Wilkie a branch of GDA is absent in 30% of cases. (5) Hence moreover of its clinical importance, the case has been reported.

CASE REPORT

During a routine dissection of the region abdomen for teaching medical undergraduate students of a 70 year old male cadaver the following findings were noted. The variant structures around the liver were dissected carefully and photographed. Duplication of HA were found, originating from the CT individually, in addition to the usual LG and SP branches. There was no Common Hepatic Artery or else Hepatic Artery Proper found. The arteries were named as such, its distribution to corresponding lobes of the liver as LHA and RHA. The LHA sprouts from the CT in between the layers of lesser omentum, course upwards to the free margin lying anterolateral to the PV and Common bile duct distributing to left lobe of the liver (Fig 1). In addition, LHA gives rise to a small stem of GDA above the first part of duodenum at a higher level. GDA divides into a SPDA, further run to the posterior surface of duodenum (Fig 2) and a SDA of Wilkie which courses anterior to the first part of duodenum, between the head of the pancreas and second part of duodenum (Fig 3).

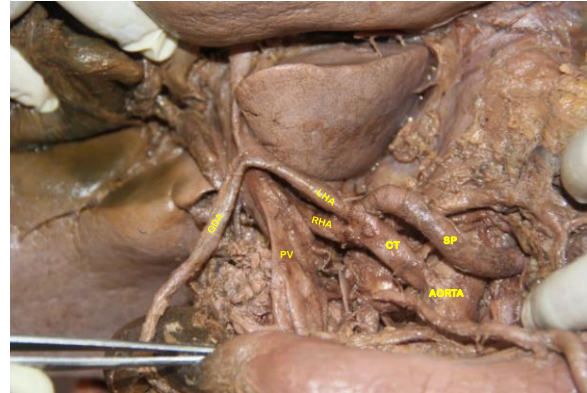


Figure 1: Shows CT - Celiac trunk with double hepatic arteries as LHA - Left Hepatic Artery, RHA-Right Hepatic Artery, GDA-Gastro duodenal Artery and PV-Portal vein

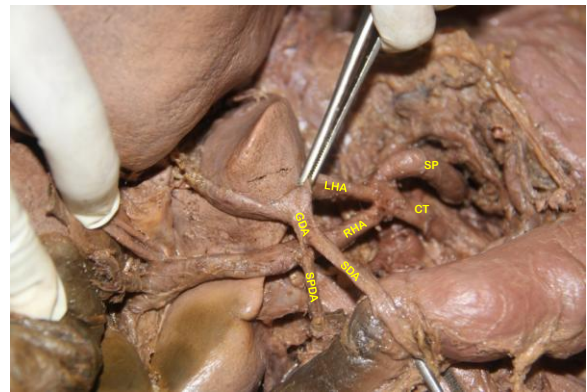


Figure 2: Shows CT- Celiac trunk, LHA-Left Hepatic Artery, RHA-Right Hepatic Artery. GDA-Gastro duodenal Artery branching from LHA and dividing into SPDA- Superior pancreatico Duodenal Artery and SDA – Supra Duodenal Artery of Wilkie.

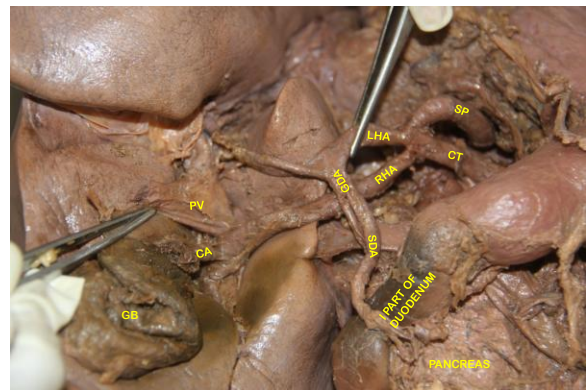


Figure 3: LHA- Left Hepatic Artery, RHA- . Right Hepatic Artery provides CA- Cystic Artery, GDA- Gastro duodenal Artery gives rise to SDA-Superior Pancreatic Duodenal Artery.

The RHA runs laterally to the right, arising separately from the celiac trunk to

right lobe of liver which lies posterior to PV and common bile duct with its usual cystic branch to the gall bladder.

DISCUSSION

Very few literature reveals the anomalous DHA and GDA pattern, but the present case is exceptional and a significant variant which is not included in Michel's classification. DHA refers to both the hepatic arteries arising from either celiac axis or from aorta. Corinne et al studied the frequency of different arterial variants by CT angiography before the pancreatic and hepatic biliary surgery. ⁽⁶⁾ He observed 4% of patients have DHA with RHA originating from celiac axis, and from the aorta in < 1% of patient also LHA sprouts from the celiac axis in < 1% of patients. Ann M. Covey et al performed digital subtraction angiographic studies and observed out of 61.3% patients, 3.7% patients had DHA. The RHA and LHA commence separately from celiac axis also observed in 2.5% of patients. They identified that the GDA arise from the RHA in 3.7% patients and 0.5% of it arise from the LHA. ⁽⁷⁾ Presence of DHA, with GDA origin from the LHA is found similar to our case. Reporting's of Rigaud et al, Gupta et al ^(1,2) says the prevalence of the RHA and LHA branching individually from the CT. Duplication of hepatic artery with GDA arising from LHA were also represented by Fasel et al ⁽³⁾ confirms with the present case. Incidence of a double hepatic artery around 9%, out of 97 recipient liver patients were found before a orthotopic hepatic allograft in which the modifications were done during an arterial reconstruction technique by Byers W. Shaw et al. ⁽⁸⁾ Higher division of GDA into SPDA and right gastroepiploic artery above the pyloric part of stomach were observed by Satheesha Nayak et al. ⁽⁹⁾ Ronald. A. Bergman discussed the following variants, as the common hepatic

artery may be doubled or tripled. The incidence of three hepatic arteries by Poynter in (1922) reveals that the right and left hepatic arteries arising independently from the celiac trunk while the third branch sprouts from the superior mesenteric artery. GDA's branches as posterior superior pancreaticoduodenal artery crosses the common bile duct in 42% of individuals, above relation of GDA and double hepatic arteries were similar to the present case. ⁽¹⁰⁾

Reasons for the Duplication of HA would be the abdominal aorta develops from distal part of fused aorta. Each dorsal aorta gives rise to segmentally arranged ventral splanchnic branches which supply the gut. Initially the ventral branches are paired with dorsal aorta to form an unpaired segmental vessel. ⁽¹¹⁾ As an event ventral branches are withdrawn and only three trunks persists as CT, SMA and IMA. The present DHA variation may be due to improper withdrawal of ventral splanchnic vessels of aorta or remnants of paired ventral branches.

CONCLUSIONS

HA and GDA variations are known but an anomalous duplication of HA from the CT dividing individually into LHA and RHA with the higher division of GDA were rare. These arterial variants should be considered before any surgical planning for the partial and whole liver transplantation. Recognizing these variations is also necessary during hepatectomy procedures and for the demonstration of angiography which greatly influences on interventional radiological procedures.

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