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DISCOVERY OF AN ACCESSORY RIGHT HEPATIC ARTERY DURING LAPAROSCOPIC CHOLECYSTECTOMY – A CASE REPORT

Hepatobiliary Surgery

Dr. Kharishma P Nair* MBBS, MS, Assistant Professor, Department of General Surgery, PSG Hospitals, Coimbatore, Tamilnadu. *Corresponding Author

Dr. Ajay Sivakumar MBBS, MS, Associate Professor, Department of General Surgery, PSG Hospitals, Coimbatore, Tamilnadu.

Dr. Muthuraman M MBBS, MS, Associate Professor, Department of General Surgery, PSG Hospitals, Coimbatore, Tamilnadu.

ABSTRACT

Hepato-biliary anatomy and its variations are essential to be aware of, since about 20% of the time, there are anatomical variations encountered during hepatobiliary surgeries. Identifying the critical view of safety and performing the Calot's triangle dissection are the key steps while performing Laparoscopic Cholecystectomy. Variations in the same can lead to inadvertent injury to vital structures. Here we present to you a peculiar case, wherein an anteriorly placed accessory right hepatic artery was seen to rise from the Common Hepatic artery, travelling anterior to Gallbladder fundus and infundibulum and draining into the anterior segment 5 of the liver.

KEYWORDS

INTRODUCTION:

Arterial variations have always been an interesting and eye-catchy topic of discussion especially amongst surgeons. In this era of advanced radiological investigations, identifying these variations pre-operatively can immensely help surgeons in performing hepato-biliary procedures. Being able to identify the anomalous arteries during laparoscopic cholecystectomy is extremely important and challenging in order to prevent intra-operative complications. In this case report, we discuss about a case of incidentally finding an accessory right hepatic artery coursing anteriorly in the Calot's triangle during a standard elective Laparoscopic Cholecystectomy.

CASE REPORT:

A 26 year old male, with no known co-morbidities came to the General Surgery OPD with complaints of right sided upper abdominal pain, on and off since one month, associated with nausea. On clinical examination, the abdomen was soft with mild tenderness in the right hypochondrium. On further investigating, the routine blood investigations were normal. Ultrasound Abdomen done showed Cholelithiasis, normal CBD and no evidence of Cholecystitis. We proceeded with elective Laparoscopic Cholecystectomy.

The procedure was performed by creating pneumo-peritoneum via the supra-umbilical port and introducing working ports under vision. Intra-operatively, during the Calot's triangle dissection, an accessory right hepatic artery was identified originating from the proper hepatic artery, anterior to the right hepatic artery, as shown in the Figure 1. This vessel was then delineated and found to be traversing anterior to the fundus and infundibulum of the Gall bladder to enter into the anterior segment 5 of the liver. The vessel was preserved and gall bladder was dissected out of the Gallbladder fossa after ligating cystic duct and the cystic artery. Furthermore, in our case, it was also noted that there were multiple branches from this accessory right hepatic artery supplying the Gall bladder, which were divided during delineation of the vessel as seen in Figure 2.

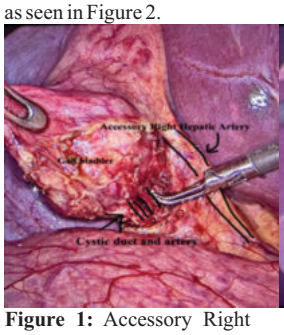

Figure 1: Accessory Right Hepatic artery

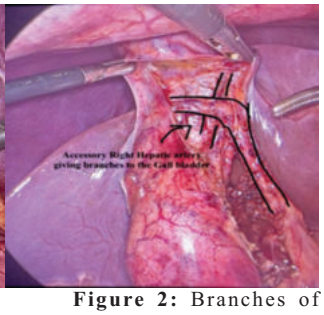

Figure 2: Branches of accessory right Hepatic artery to Gall bladder

After removal of the Gall bladder, the entire course of the vessel was identified and clearly visualized and was found to be draining into segment 5 of the Liver as seen in Figures 3 and 4.

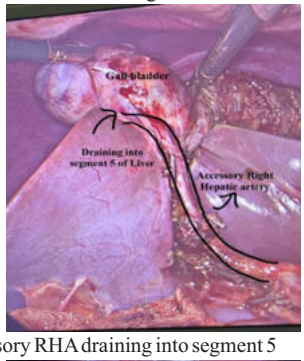

Figure 3: Accessory RHA draining into segment 5

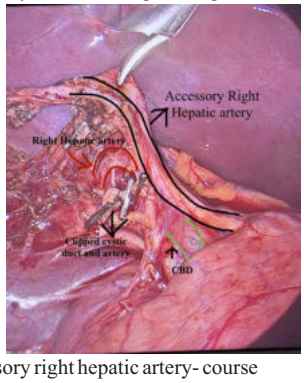

Figure 4: Accessory right hepatic artery- course

DISCUSSION:

Multiple anomalous origins and courses of both the cystic artery and the right hepatic artery have been documented since decades. The most common course and origin of the cystic artery is from the flexure of the Right hepatic artery and it courses posterior to the cystic duct, in the Calot's triangle and enters into the Liver posterior to the neck of the Gall bladder. This occurs in about 70-80% of the individuals. In 5% of the population, the cystic artery is seen coursing outside the Calot's triangle. Other alterations in the cystic artery include double artery(15%), origin from Gastroduodenal (3-7%), Superior Mesenteric, Left Hepatic Artery(1-3%) or Aberrant Right Hepatic artery(5-10%) [1-3]

With regard to the Right Hepatic Artery, multiple variations are seen with its origin and course as well. Research on the structure of the

hepatic arteries during liver harvesting for transplantation has offered a great database that records abnormalities.[4,5]

Modified Hiatt's classification which was derived from Michel's classification has 6 types of vascular anomalies.: the normal anatomy - Hiatt type I, the Left Hepatic Artery arising from the left gastric artery - Hiatt type II, the Right Hepatic Artery arising from the Superior Mesenteric Artery - Hiatt type III, every combination of a double replaced pattern - Hiatt type IV, the Common Hepatic Artery originating as a branch of the SMA - Hiatt type V; and the abnormality consisting of an isolated aortic origin of the CHA, which Hiatt introduced as type VI instead of including the rare variant with a Common Hepatic Artery arising from the left gastric artery.[6]

Another interesting variation is a replaced CHA arising from the SMA by a common trunk which is called as the hepatomesenteric trunk and has been classified as type 9. The incidence of such an anomaly has been found to range from 0.4% to 4.5%.[7]

A replaced RHA is more commonly encountered than an Accessory RHA. 15% to 25% of patients have a replaced RHA, branching off from the superior mesenteric artery. The other origins of RHA include Gastro duodenal artery, Aorta, right Gastric Artery, Celiac trunk. Majority of the times, the RHA is initially anterior to the junction of the cystic duct and CB, after which it courses posterior the Gallbladder to enter the liver. An anterior course of the RHA over the Gall bladder fundus and infundibulum is extremely rare, and further on the incidence of an accessory right hepatic artery is only 5% as in our case.[8,9]

Accessory Right Hepatic Artery can arise either from Proper Hepatic artery, from which the Right hepatic artery arises, or there could be other sources of origin too- SMA, GDA, Celiac Trunk, PHA, LHA, CHA, LGA, LHA, or directly from the AA. Origin from SMA seemed to be the most common variation of Accessory Right Hepatic Artery. Incidence of origin from Common hepatic Artery, as in our case, has been extremely rare (0.01%). [10]

CONCLUSION:

Thus, identifying the anomalous hepatic arteries is key to preventing hepatic ischaemia post operatively which can lead to dreadful complications. Injury to a replaced Right Hepatic artery is far more risky since majority of vasculature of the bile ducts and the liver is contributed by the RHA. Awareness of such variations can significantly reduce the risk of intra-operative complications and contribute to better surgical outcomes.

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