ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 02 | February - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"ANATOMICAL VARIATIONS IN BLOOD SUPPLY OF EXTRAHEPATIC BILIARY DUCTAL SYSTEM AND ITS CLINICAL SIGNIFICANCE,,

Anatomy

Dr. Amish Kumar* Junior Resident, Deptt of Anatomy IGIMS Patna.*Corresponding Author
Dr. Naveen Utpal Junior Resident, Deptt of Anatomy IGIMS Patna.
Dr. Prem lata Junior Resident, Deptt of Anatomy IGIMS Patna.
Dr. Pramita Junior Resident, Deptt of Anatomy IGIMS Patna.
Dr. Avanish Kumar Prof. and Head, Deptt of Anatomy IGIMS Patna.

ABSTRACT

Background: The major blood supply of extrahepatic biliary ductal system is by cystic artery,which supplies to cystic artery has been a subject of extended research due to its clinical implications. Cholecystectomy remains the only satisfactory treatment for symptomatic gall bladder stones, structures in the hepatoduodenal ligament.
Materials and methods: The study material consisted of 25 cadavers in dissection hall, at department of Anatomy Indira Gandhi Institute of medical sciences patna bihar, a cross sectional study was conducted. Twenty five human cadavers of both sexes were included. Cadavers with scars of hepatobiliary surgery, which various vascuobiliary injuries encountered after cholecystectomy were simulated.
Conclusion: The blood supply of the normal biliary system and Anatomical variations of extrahepatic biliary ductal systemare common anatomical foundation for successful reconstructive surgery.

KEYWORDS

Cholecystectomy, extrahepatic biliary system ductal.

INTRODUCTION

The extrahepatic biliary ductal system is one of the surgical procedure, and the cystic artery is the chief source of blood supply to gall bladder, cystic duct, common hepatic duct and upper part of the bile duct.the lower part of bile duct is supplied by ascending marginal vessels derived from the postero superior pancreaticoduodenal artery. And Right and left hepatic ducts supplied by the right and left hepatic arteries and their sectoral or segmental branches.

They emerge at the porta hepatis anterior to branches of portal vein and hepatic artery. Common hepatic duct (CHD) is formed by the union of right and left hepatic ducts near the right end of porta hepatis.the common disorder of the extrahepatic biliary system are cholelithiasis, cholecystitis, gall bladder atresia, malignant neoplasm of the gall bladder or other parts of the biliary tracts,jaundice is frequently the primary presenting signs in humans with disorder involving the gall bladder or extrahepatic biliary structures, abdominal effusion may indicate bile peritonitis, specifically, in the context of a cholecystectomy, it has been recognized since long that misinterpretation of normal natomy as well as the occurrence of major postoperative complications especially biliary injuries.

There is now a fair amount of data to suggest that the acceptance of laproscopic cholecystectomy as the standard procedure has led to an increase in the bile duct injuries. This seems partly related to the different anatomical exposure of the area around the gall bladder especially the calots triangle during the laproscopic procedure as opposed to the open procedure.

Both anatomically as well as surgically, it is interesting to study the normal anatomy and its variations in the components of extrahepatic biliary ductal system.

Variations in cystic and hepatic duct and cystic and right hepatic artery are not uncommon. The anatomical variations are an important reason of iatrogenic injuries to these ducts and vessels, during cholecystectomy and other hepatobiliary surgeries.

The cystic artery arises from the right hepatic artery and runs parallel and medial to the cystic duct in as much as 95% of cases the anatomy of the biliary system has been the subject of extended,the major importance of knowledge of blood supply of extrahepatic biliary system may well lie in the understanding of the etiology of postoperative bile duct strictures and in their prevention, hepatic vascular and biliary anatomy delineation, in adult right hepatic lobe. Extrahepatic biliary system ductal was carefully dissected and relevant photographs were taken.special attention was given to the relationship of the cystic artery to the calots triangle.

MATERIALS AND METHODS

The present study of the blood supply of extrahepatic biliary ductal system has been conducted on twenty five adults cadavers.A cross sectional study was conducted. In the Department Anatomy, Indira Gandhi Institute of medical sciences patna bihar. Special attention was given to the relationship of the cystic artery to the calot's triangle, along with the arteries, the variations in the venous drainage, these observations were taken in similar manner to those taken in cadavers.extrahepatic biliary ductal system (hepatoduodenal ligament,) type of cystic duct with CHD.

level of termination of cystic duct, accessory ducts, cystic and right hepatic artery and Calot's triangle boundaries) were studied.

INCLUSION CRITERIA:

Macroscopically healthy and undamaged liver with intact gall bladder and other components of EHBDS from cadavers of both sexes.

EXCLUSION CRITERIA:

Following livers were excluded from the study.

1. Hepatobiliary surgery.
2. Cholecystectomy.
3. Liver trauma affecting EHBDS.

RESULTS

All twenty five (100%) cadavers have a single extrahepatic gall bladder on the inferior surface of right lobe of liver in gall bladder fossa. Only one (4%) had a mesentery. Twenty four (96%) were pear shaped and one (4%) had a Hartmann's pouch. (Table-I)

Angular type of union of CD with CHD to form common bile duct (CBD) was present in 20 cases (80%) and parallel type in 5 cases (20%). Twenty two cases (88%) showed a normal level of termination of cystic duct, two (8%) showed a high and one (4%) had a low level. Morphologically hepatoduodenal ligament was normal in 24 cases (96%) and one (4%) showed an abnormal structure or arrangement. Accessory cystic and right hepatic ducts were also noted. Accessory cystic and right hepatic ducts were found in one (4%) and two (8%) cases respectively. Twenty one cases (84%) showed a normal cystic artery, one (4%) double cystic artery, one (4%) an accessory cystic artery and two (8%) had an abnormal course of it. Right hepatic artery was normal in 24 cases (96%) and only one (4%) showed an abnormal course. Calot's triangle boundaries were normal and well defined in 24 cases (96%) and abnormal in one case (4%). (Table-II)

Table-I: Gross anatomical features of gall bladder

Anatomical Features	Details	n
Number	Single	25(100%)
Position	Inferior surface of right lobe of liver	25(100%)
Situation	Extrahepatic in gall bladder fossa	25(100%)
Mesentry of GB	Absent	24(96%)
	Present	1(4%)
Shape	Pear shaped	24(96%)
	Hartmann's pouch	1(4%)

Table-II Gross anatomical Features of EHBDS

Hepatoduodenal ligament	n	%age
Type of union of Cystic duct with Common Hepatic Duct (CHD)		
Angular	20	80%
Parallel	5	20%
Level of termination of cystic duct		
Normal	22	88%
High	2	8%
Low	1	4%
Hepatoduodenal ligament		
Normal	24	96%
Abnormal	1	4%
Accessory ducts		
Cystic duct (CD)	1	4%
Right hepatic duct (RHD)	2	8%
Cystic artery		
Normal	21	84%
Double	1	4%
Accessory	1	4%
Abnormal course	2	8%
Right Hepatic artery		
Normal	24	96%
Abnormal course	1	4%
Calot's triangle boundries		
Normal and well defined	24	96%
Abnormal	1	4%

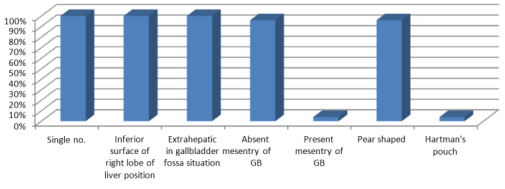

Fig. I: Gross anatomical features of gall bladder

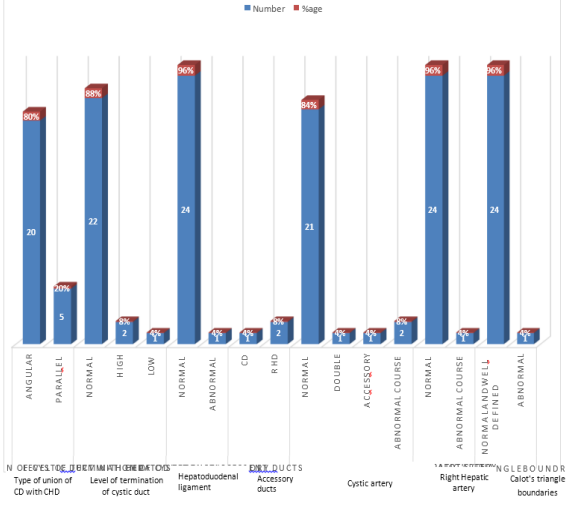

Fig.2:

DISCUSSION

The variations in the anatomy of gall bladder and extrahepatic biliary apparatus is essential for surgeons as failure to recognize them may lead to iatrogenic injuries in laparoscopic cholecystectomy. Incidence of extrahepatic biliary ductal system anatomical variations ranges between 7.3% to 47%. Correct identification of EHBDS anatomy and its possible variations is the key to a safe surgical procedure.

All twenty five cadavers had a single, extrahepatic gall bladder on the inferior surface of right lobe of liver in gall bladder fossa (100%). These findings resemble that of Anandhi. The key abnormality found in the gall bladder is Hartmann's pouch. In this study, it was found in one case (4%). Anandhi also found Hartmann' pouch in 4% cases. Leena ABobserved it in 4.3% cases. In contrast van Eijick found a very high incidence of Hartmann's pouch (52%). Hartmann's pouch may be a frequent but variable feature of both physiologic and pathologic gall bladder and is usually associated with gall stones[15]. Mesentery of gall bladder was indentified in one case (4%).

cystic duct to CHD to form CBD was angular type in 80% and parallel type in 20% in our study. Anupama found angular type in 86% and parallel type in 2%. However another type, spiral was present in 12%. Descomps and Eisendrath found angular type in 80% and 75% respectively. Level of termination of cystic duct was normal in 88% cases, high in 8% and low in 4% in the present study. Anandhi reported a normal level of termination of cystic duct in 82%, high in 16% and low in 2%. Hepatoduodenal ligament was normal in 96% and 4% had an abnormal arrangement or contents in our study. This is comparable with Anandhi who found 98% normal and 2% abnormal.

Accessory right hepatic and cystic ducts were present in 12% cases and Anandhi found them in 14%. Double cystic artery and accessory cystic artery were present in 4% each. Eighty four percent cases had normal cystic artery. Similar results were reported by Anadhi. A cystic artery is an important structure to be clipped or ligated in cholecystectomy. The complications like haemorrhage or hepatobiliary injury are because of likelihood of variations in cystic artery course and relations to the biliary ducts. In our study right hepatic artery was normal in 96% and only 4% had an abnormal course. It is comparable to Anandhi who found an abnormal course of right hepatic artery in 4% Calot's trinagle boundaries were normal and well defined in 96% and only 4% has an abnormal boundary.

CONCLUSION:

The Anatomical variations of extrahepatic biliary ductal system, the varied patterns of hepatic and cystic artries. Because variation are very common in hepatic and cystic arteries. Knowledge will allow the surgeons, safe laproscopic or open cholecystectomy.

REFERENCES

1. Hicken. Anatomic Variations of extrahepatic Biliary system ductal. Surg; 1954;10:577-84.
2. Osler.G. & Dow.R. Variations and anomalies of the biliary duct system and its associated blood supply. West J. Surg 1945;53:316-21.
3. Sandrini. Congenital abnormalities of bile passage. Arch of surgery 1944;(1):262-66.
4. Brewer. G.E. Anatomy of the Gallbaldder region. Medical news. 1903;82:821-23.
5. Agvey. I.Rogeus. Congenital absence of Gallbladder with Choledocholithiasis. Gastroenterology. 1965;48:4.
6. Moosman. Anomalies of Biliary tract System. Surg. Obst, Gynae. 1970;82:655-62.
7. Eisendrath. Surg, Obst, Gynae. Operative injury to Common hepatic & Bile Ducts. Surg, Obst, Gynae 1920;31:1-18.
8. Lurje et al. Topography of extra Hepatic Biliary passage. Annals of Surgery, 1937;105:161-168.
9. DL N. The biliary system. Sabiston DC Text Book of Surgery. 13Ed. Igaku-Shoin: W.B. Saunders company: 1986: 1128-36.
10. Suhocki PV. Injury to aberrant bile ducts during cholecystectomy: a common cause of diagnosed error and treatment delay. 1999;72:955-59.
11. Lamah M, Dickson GH. Congenital anatomical abnormalities of the extrahepatic biliary duct a personal audit. Surg Radiol Anat. 1999:21(5):325-7.
12. Dundaraddy MG. Study of Variations in the Extrahepatic Biliary System. Biomirror J. 2012;3(3):1.3.
13. Anandhi PG, Alagavenkatesan VN. Anatomical variations in the extra hepatic biliary system: a cross sectional study. 2018;6:1342-7.
14. Leena AB. Study of Hartmann's pouch in south keralites. Journal of evolution of medical and dental sciences-JEMDS. 2015;4(26):4491-5.
15. van Eijck FC, van Veen RN, Kleinrensink GJ, Lange JF. Hartmann's gallbladder pouch revisited 60 years later. Surg Endo. 2007;21(7):1122-5.
16. Anupama D, Shivaleela C, R Lakshmiprabha Subhash. A Study of Anatomy of Extra Hepatic Ducts and its Variations with Clinical Significance. Int J Anat Res 2016;4(1):2029- 2033. DOI: 10.16965/ijar. 2016.138.
17. Dowdy et al. Surgical Anatomy of Pancreatic Biliary System. Surgery 1962;108(6):p233-34.
18. Daniel.N.Eisendrath. Anomalies of Bile ducts and blood vessels. 1918;71:864.
19. Dandekar DK. Cystic Artery: Morphological Study and Surgical Significance. Anatomy Res Inter. 2016;2016:7201858.