

Frequency of Extra Hepatic Biliary Tree Anomalies Seen During Cholecystectomy

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Objective: This study was undertaken to identify various anomalies of the extra hepatic biliary tree seen during cholecystectomy.

Study Design: Descriptive study.

Place and Duration: This study was carried out in the Department of surgery, D H Q Hospital, Sargodha from April 2007 to September 2008.

Patients and Methods: Patients of either gender and all ages, who had cholelithiasis and underwent open or laparoscopic cholecystectomy were included in the study.

A detailed history was taken followed by clinical examination and ancillary investigations. The history, examination findings, investigations and peroperative findings were all documented on a detailed pro-forma.

Results: Out of 100, 80 patients were females while the rest were males. Majority of the patients were in their fourth and fifth decades of life. Moynihan's hump and accessory cystic artery were the most frequently found anomalies (each n=6), followed by double cystic duct (n=1) and long cystic duct (n=1). There was no mortality in this series.

Conclusion: Extra hepatic biliary tree anomalies are found in a significant number of patients. A sound knowledge of their normal anatomy, various anomalies and judicious use of intra-operative cholangiography is imperative to avoid accidental trauma to the extra hepatic biliary channels and vessels.

Key Words: Extra hepatic biliary tree. Anomalies. Cholecystectomy.

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Introduction

The variations of the extra hepatic biliary tree which a surgeon may encounter during cholecystectomy bear an important relationship with the gall bladder. A sound knowledge of these congenital anomalies is very important because unfamiliarity with these may result in inadvertent injuries to extra hepatic biliary apparatus during open and laparoscopic cholecystectomy.¹ Congenital anomalies of the gall bladder are rare and can be accompanied by other malformations of the biliary or vascular tree. These are difficult to diagnose during routine preoperative studies. The anomalies like choledochal cyst and double cystic duct can surprise the surgeon during open and laparoscopic cholecystectomy.² It has been recommended that the presence of any congenital anomaly or the mere suspicion of its existence should lead to exercise of surgical prudence, limited use of electro coagulation and ensuring that no structure is divided until a clear picture of the bile ducts and blood vessels has been obtained. If necessary intra operative cholangiography should be

performed to further define the biliary system.^{3, 4} Some have suggested that if the anomaly remains unclear and enough information can not be obtained, open cholecystectomy should be considered to avoid any undesirable complications.⁵ At our center, open and laparoscopic cholecystectomies are routinely being performed. A detailed pre-operative imaging study of biliary tract is carried out as this has been shown to be cost effective. We perform intra-operative cholangiography in selected patients where difficult or ambiguous anatomy of extra hepatic biliary tree is seen.

This study was undertaken to document various anomalies of the extra hepatic biliary tree seen during cholecystectomy.

Materials and Methods

This study was carried out in the Department of surgery, D H Q Hospital, Sargodha from April 2007 to September 2008. Patients of either gender and all ages, who had cholelithiasis and underwent open or laparoscopic cholecystectomy were included in the

study. Informed consent was taken from all patients. A detailed history was taken followed by clinical examination and ancillary investigations including complete blood count, urine routine examination, liver function tests, random blood sugar levels, and ultrasonography. All patients were admitted one day before surgery. Fifty patients were subjected to open cholecystectomy and remaining fifty were subjected to laparoscopic cholecystectomy. Intra operative cholangiography was performed in selected cases where anatomic variations were seen per-operatively.

The findings were all documented on a detailed pro-forma and subjected to statistic analysis.

Results

Out of 100, 80 patients were females while 20 were males. Majority of the patients were in their fourth and fifth decades of life. Age distribution of the patients is shown in Table I.

Table I: Age distribution of the patients. (n=100)

Age	Number on patients
30-40 Years	26
41-50 Years	50
51-60 Years	16
61-70 Years	08

Sixty patients presented with acute cholecystitis whereas the remaining forty patients had chronic cholecystitis. The mean duration of symptoms in patients with acute presentation was 2 days whereas it was 6.5 months in case of chronic disease. The various anomalies found are shown in Table II.

Table II: Anomalies found among the patients (n=14)

S. No.	Anomalies found	No. of patients / %
1	Moynihan's hump	6 (6%)
2	Accessory cystic artery	6 (6%)
3	Double cystic duct	1 (1%)
4	Long cystic duct	1 (1%)

In our study mean hospital stay was 2.85 days. The various complication encountered are shown in

Table III. There was no mortality in this series.

Table III: Complications encountered among the patients. (n=7)

Complications	Number of patients
Wound infection	03
Atelectasis	03
Superficial thrombophlebitis	01

Discussion

Cholelithiasis is common worldwide. Laparoscopic and open cholecystectomy are the two methods to treat symptomatic gall stones. Cholecystectomy offers 90%-95% cure.^{6,7}

Surgical treatment mandates careful exploration of Calot's triangle and proper identification of extra hepatic biliary and vascular channels. Failure to identify these structures may lead to injury, division or ligation of major bile ducts or arteries with grave consequences. Various studies have shown that a typical text book anatomy arrangement of these structures is present in only 50% patients, the remaining showing some variation in anatomy, leading to increased risk of injury during surgical procedures.²

The extra hepatic biliary tree can be visualized preoperatively using imaging techniques such as ERCP and MRCP, however these are expensive and time consuming and hence not advisable in all cases. Instead a sound knowledge of the normal anatomy of extra hepatic biliary tree and the accompanying vessels and its variation has been recommended to decrease the risk of complications.⁸ Among our patients, 86% had the normal anatomic configuration of extra hepatic biliary tree. These patients were subjected to intra operative cholangiography which clearly displayed the biliary tree making the procedure safe and thus avoiding injury.

Moynihan's hump and accessory cystic artery were the commonest (each 6%) variations among our patients. Moynihan's hump is an important variation as the right hepatic artery may be mistaken for cystic artery and thus ligated and divided. A Chinese study of 72 autopsies also found similar variations.⁹

Division of an unexpected accessory artery without ligation may result in injury to biliary tree during an attempt to secure hemostasis. It has been recommended that hemorrhage in Calot's triangle should be controlled temporarily by Pringle's manoeuvre and the bleeding vessels should be identified and secured rather than blindly applying hemostats and

causing injury to biliary tree. The common denominator of the development of bile duct injuries during laparoscopic cholecystectomy is the failure to identify the structures in Calot's triangle.¹⁰ One patients in our study had double cystic duct and this anomaly was confirmed by carrying out intra operative cholangiography.

In our study one of the patient had a long cystic duct running parallel to the common hepatic duct and joining it low in supraduodenal area. Cholecystectomy in such a patient may be complicated by injury to biliary apparatus unless extreme vigilance is exercised.

The junction of cystic duct to common hepatic is located in the supraduodenal part of the biliary tree in 80% of the population. This union may extend to retroduodenal or retropancreatic area. This union may be angular (75%), parallel (20%) or spiral (5%).¹¹

Conclusion

Extra hepatic biliary tree anomalies are found in a significant number of patients. A sound knowledge of their normal anatomy, various anomalies and judicious use of intra-operative cholangiography is imperative to avoid accidental trauma to the extra hepatic biliary channels and vessels.

References

1. Lamah M, Dickson GH. Congenital abnormalities of the extra hepatic biliary duct: a personal audit. *Surg Radiol Anat* 1999; 21:325-7.
2. Lamah M , Karanjia ND, Dickson GH . Anatomical variations of the extra hepatic biliary tree : review of the world literature . *Clin Anat* 2001;1:167-72.
3. Adkins RB Jr, Chapman WC , Reddy VS. Embryology, anatomy and surgical applications of extra hepatic biliary system. *Surg Clin North Am* 2000;80:363-79.
4. Kumar A , Dixit VK , Shukla RC . Bifurcated extra hepatic biliary tract. *J Assoc physicians India* 1998;46:736-7.
5. Asif Zubiari bhatti, M Imtiaz Rasool, Masood Rashid, Safdar Ali Malik, Asim Shabbir, Umar Javeed ,et al. Agenesis of Gall bladder. *J Coll Phy Surg Pakistan* 2001.
6. Harris HW .Biliary system. In *Surgery Basic Science and Clinical evidence*. Norton JA ed. 2000 Springer 561.
7. Gilliland TM, Travesco LW. Modern standards for comparison of Cholecystectomy with alternative treatments for symptomatic cholelithiasis with emphasis on long term relief of symptoms. *Surgical gynecological obsetetrics* 1990:170:39-44.
8. Fulcher A S, Turner MAZ, Fass AM. A new technique for evaluation of the biliary tract and pancreatic duct. *Gastroenterologist*, 1988;6:82-7.
9. Chen TH . Variations of the cystic artery in Chinese adults . *Surg Laparosc Endosc Percutan Tech* 2000;10:154-7.
10. Azeem M, Abbas SM, Virk NM, Durrani K. Bile duct injuries during laparoscopic Cholecystectomy- Two years experience at Sheikh Zayed Hospital, Mechanism of injury, prevention and Management. *Ann King Edward Med Coll Sep* 2001;7:238-41.
11. Bismuth H. Surgical anatomy and anatomical surgery of liver. *World J Surg* 1982;6:3.