

## Hepato lithiasis in South Indian Scenario- A Case Series

K.Mohanraj<sup>1</sup>, Joeimon J L<sup>2</sup>, Aravind A<sup>3</sup>, Rajkumar Solomon<sup>4</sup>, Balamurali R<sup>5</sup>, Ramkumar G, Muthukumuran K  
Kilpauk Medical College, Chennai

### Abstract

**Aim:** We reviewed the cases of hepatolithiasis presented to our hospital over a 3-years period (July 2014-April 2017).

**Methods:** Patients with imaging evidence of hepatolithiasis were enrolled in the study and were observed for clinical presentation, laboratory parameters, imaging characteristics and the management chosen

**Results:** 12 patients were enrolled during the study period. Three patients were < 30 yrs while the other nine were middle aged (30 – 60). There was a male to female ratio of 5:7. Symptoms were right upper quadrant pain and fever. The mean duration of symptoms since the onset was 4 yrs. Two patients had undergone cholecystectomy while 2 patients had prior endoscopic intervention. One patient had a prior history of ascariasis. Liver functions were normal in 4 patients while the other patients having elevated bilirubin (1) and elevated ALP (2). Eight patients had clinical evidence of cholangitis. Ultrasound was the commonest first line investigation but additional investigations, such as computed tomographic (CT) scan and MRCP, were frequently necessary for complete delineation of the biliary disease. The intrahepatic stones were located predominantly in the left lobe of the liver. On imaging 8 patients had calculi limited to the left hepatic system, 2 patients had calculi in the right hepatic system and 2 patients had calculi in both left and right hepatic ducts. 6 had co-existent CBD calculi, 2 had CBD stricture and 6 patients had calculi in the GB. 9 patients underwent surgery while 3 patients were managed endoscopically. Two patients underwent a biliary bypass operation only, 5 had a hepatic resection only, and 2 had combined procedures. In the patients who underwent surgery, the biopsy of liver revealed evidence of early cirrhosis. Parenchymal atrophy was seen in 83% of patients. Follow-up ranged from 1 to 12 months. Postoperative recovery was generally unremarkable. Complications included subphrenic abscess (1 patient), recurrent stricture (1 patient) and recurrent stones (1 patient).

**Conclusion:** Hepatolithiasis, though a relatively uncommon disorder should be considered especially in patients with recurrent episodes of cholangitis. Management can be either surgical or endoscopic depending on the extent of the disease.

**Keywords:** Hepatolithiasis, southindia.RPC, Biliary Stricture, Liver resection

### I. Introduction

Hepatolithiasis is an uncommon entity in South India. Hepatolithiasis is common in the Asia-Pacific region, where its prevalence is around 30–50%. The disease is rare in the West, where its prevalence is about 0.6–1.3%. (2) Hepatolithiasis is defined as the presence of gallstones in the bile ducts proximal to the confluence of the right and left hepatic ducts, irrespective of the co-existence of gallstones in the common bile duct (CBD) and/or gallbladder. The aetiology of hepatolithiasis is not fully known, but genetic, dietary and environmental factors are thought to be contributory. Low socioeconomic conditions and Malnutrition are associated with a high incidence of intrahepatic stones. Intrahepatic stones occur commonly in the 5th and 6th decade (3,7) However, concomitant intrahepatic and extrahepatic stones occur commonly in older age groups (7th and 8th decades) 4 and are found in approximately 70% of all hepatolithiasis cases.

### II. Materials And Methods

This study was conducted in department of digestive health and diseases Kilpauk Medical College Chennai. Between August 2014 and March 2016, we detected 12 patients (7 female, 5 male; mean age ) with hepatolithiasis. For patients who presented with acute cholangitis or pancreatitis, endoscopic sphincterotomy was performed at the discretion of the endoscopist. Extraction of stones were done with the use of a Dormia basket or balloon. Stents were placed to secure drainage if extraction of stones was not feasible. When there is a stricture dilation was done with CRE balloon or SDHC dilators. Hepatic resection was done if the stones and strictures were localized to a single segment or single lobe of liver for curative purpose.

### III. Results

12 patients were enrolled during the study period. Three patients were < 30 yrs while the other nine were middle aged (30 – 60). There was a male to female ratio of 5:7. Symptoms were right upper quadrant pain

and fever. The mean duration of symptoms since the onset was 4 yrs. Two patients had undergone cholecystectomy while 2 patients had prior endoscopic intervention. One patient had a prior history of ascariasis. Liver functions were normal in 4 patients while the other patients having elevated bilirubin (1) and elevated ALP (2). Eight patients had clinical evidence of cholangitis. Ultrasound was the commonest first line investigation but additional investigations, such as computed tomographic (CT) scan and MRCP, were frequently necessary for complete delineation of the biliary disease. The intrahepatic stones were located predominantly in the left lobe of the liver. On imaging 8 patients had calculi limited to the left hepatic system, 2 patients had calculi in the right hepatic system and 2 patients had calculi in both left and right hepatic ducts. 6 had co-existent CBD calculi, 2 had CBD stricture and 6 patients had calculi in the GB. 9 patients underwent surgery while 3 patients were managed endoscopically. Two patients underwent a biliary bypass operation only, 5 had a hepatic resection only, and 2 had combined procedures. In the patients who underwent surgery, the biopsy of liver revealed evidence of early cirrhosis. Parenchymal atrophy was seen in 83% of patients. Follow-up ranged from 1 to 12 months. Postoperative recovery was generally unremarkable. Complications included subphrenic abscess (1 patient), recurrent stricture (1 patient) and recurrent stones (1 patient).



Picture 1: MRCP picture showing the intrahepatic biliary tree studded with calculi in one of our patients

Picture 2: Resected specimen of liver showing calculi

#### IV. Discussion

Hepatoolithiasis are more common in East countries such as Japan, Korea, and Taiwan [6]. The incidence of hepatoolithiasis in western countries is approximately 1%, whereas in Taiwan, South Korea, China the incidence were 20%, 18%, 38–45% respectively [6]. Biliary ascariasis is a common problem in some areas where the disease is endemic. Although hepatoolithiasis is uncommon in developed countries, with increasing immigration, one must know of hepatoolithiasis. *Ascaris lumbricoides* is most common parasite infesting over a billion people worldwide [5]. It is common than *Clonorchis sinensis* which is associated with hepatoolithiasis or cholangiohepatitis. Biliary ascariasis is more common among women [3]. Duration of symptoms may vary from over few years. The patients present with biliary pain(50%), acute cholangitis (30%), acute cholecystitis (12%), acute pancreatitis (8%) [4].

In the west, hepatoolithiasis is generally thought to be secondary to gall bladder stones, choledochal cysts or malignant biliary tumours primarily associated with sclerosing cholangitis, benign biliary strictures, [2,3]. The majority of cases in india are associated with recurrent episodes of pyogenic cholangitis and are usually common in regions with parasitic infestations are endemic' [2-4]. Co-existence of parasitic infestations with hepatoolithiasis appears to be incidental finding rather than causative one [4]. Incidence of bacteria in bile of patients with hepatoolithiasis is near around 100% [3,5]. The commonly found bacteria are *Klebsiella* species, *Pseudomonas* species, *Escherichia Coli*, *Bacteroides* species and *Enterococcus* species [5]. Most of the bacteria seen in the bile of patients with hepatoolithiasis show significant  $\beta$ -glucuronidase activity, which catalyzes the hydrolysis of direct bilirubin to the indirect unconjugated form. Unconjugated bilirubin is water-insoluble and which joins with calcium to form calcium bilirubinate (pigment) stones. Calcium bilirubinate stones comprises the majority of the cases of hepatoolithiasis [6]. In contrast, hepatoolithiasis in the west is usually composed of cholesterol stone. Congenital metabolic and Acquired factors are implicated in the development of cholesterol

hepatolithiasis [4]. Diet is implicated in the pathogenesis of hepatolithiasis. Asian diet is rich in carbohydrates and low in protein and fat. Low fat causes decreased release of cholecystokinin leading to biliary stasis whereas low protein leads to low level of Glucaro-1,4 lactone which is an inhibitor of  $\beta$ -glucuronidase, potentiating the deconjugation reaction [3].

Clinically the patients of hepatolithiasis may be asymptomatic or present with symptoms like upper abdomen or right upper quadrant pain, fever and jaundice [3,4]. In severe cases, it may progress to formation of hepatic abscess and biliary sepsis [4]. In asymptomatic patients, it is an incidental imaging will show findings[4]. However, there is no pathognomonic symptom or sign in patients with hepatolithiasis. There was an possible association between cholangiocarcinoma and hepatolithiasis and its prevalence ranges from 2.4% to 10% [4,7]. The causation for the development of cholangiocarcinoma has been possibly linked adenomatous hyperplasia and chronic proliferative cholangitis due to chronic bacterial infection, bile stasis and mechanical irritation of hepatolithiasis [8]. The risk of cancer is higher in calcium bilirubinate hepatolithiasis as compared to cholesterol hepatolithiasis [4]. "Dong's Classification" can be used to determine possible surgical approach to treat hepatolithiasis (Table 1).

Table 1. Dong's classification of hepatolithiasis for use in determining surgical approaches

Type	Definition or content
Type I	Localized stone disease: unilobar or bilobar.
Type II	Diffuse stone disease.
IIa	No atrophy of the hepatic parenchyma or stricture of the intrahepatic bile ducts.
IIb	Segmental atrophy or/and stricture of the intrahepatic bile ducts.
IIc	Biliary cirrhosis and portal hypertension.
Additional Type E	Extrahepatic stones.
Ea	Normal sphincter of Oddi.
Eb	Relaxation of the sphincter of Oddi.
Ec	Stricture of the sphincter of Oddi.

The different evaluation modalities include USG abdomen for ductal dilatation and calculi, CECT abdomen to discern hepatic architecture and atrophy and MRCP or ERCP for mapping of the biliary tree [2,6].

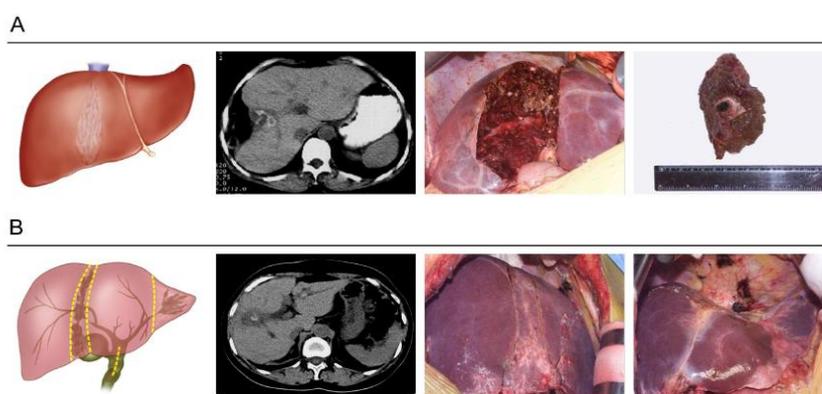


Figure 1. Type I hepatolithiasis. (A), Type Ia. Localized stone disease with stones located in only one lobe. In this case, stones were localized in the atrophic right anterior portion of the liver. Segmentectomy of S5 and S8 was performed; (B), Type Ib. Localized stone disease with stones located in both lobes. In this case, stones were localized in the atrophic right anterior portion and left lateral portion of the liver.

Several management strategies have been proposed ranging from non-surgical modalities to surgical options. Non-invasive treatments include radiological (percutaneous transhepatic cholangiography with or without lithotripsy) or endoscopic (endoscopic retrograde cholangiopancreatography with or without lithotripsy) guidance [4,6,7,9]. Percutaneous transhepatic cholangioscopic lithotripsy (PTCSL) is done for stone removal and dilation of strictures in right-sided, bilateral or recurrent disease [1]. Extracorporeal shock wave lithotripsy (ESWL) is used for extraction of cholesterol stones and holmium (Ho): YAG laser for calcium bilirubinate

stones [1]. However, postoperative residual and recurrent stones occur in 20% of patients treated with non-surgical procedures [9]. Surgical management includes liver lobectomy or segmental resection [6,8,9]. Indications for surgical management include unilobar hepatolithiasis particularly left-sided, atrophy or abscess of a liver segment/lobe, possibility of concomitant cholangiocarcinoma and localized intrahepatic calculi with biliary strictures [1, 4,9]. The advantage of treating hepatolithiasis by liver lobectomy or segmental resection is that all hepatic stones can be removed along with the pathologic bile ducts, which reduces the risk of recurrence [1,9]. Wound infection and bile leakage are the major complications of surgery for hepatolithiasis [10]. These are comparable with or less than those for non-surgical techniques [10]

## V. Conclusion

Hepatoslithiasis are associated with bacterial infections, helminthiasis and dietary factors. Presence of bacteria in the bile of the patients with hepatolithiasis is found in almost all cases and should be sent for culture. Several management strategies have been proposed ranging from non-surgical to surgical modalities. However, optimal management of hepatolithiasis poses a challenge for hepatobiliary surgeons.

## References

- [1]. Feng XB, Zheng SG, Xia F, Ma KS, Wang SG, Bie P, et al. Classification and [1] management of hepatolithiasis: A high volume, single centre's experience. *Intractable Rare Dis Res.* 2012;1:151-56.
- [2]. Pilankar KS, Amarpurkar AD, Joshi RM, Shetty TS, Khithani AS, Chemburkar VV. Hepatoslithiasis with biliary ascariasis – a case report. *BMC Gastroenterol.* 2003;3:35.
- [3]. NitinRao AR, Chui AK. Intrahepatic Stones – an aetiological quagmire. *Indian J Gastroenterol.* 2004;23:201-02.
- [4]. Sakpal S, Babel N, Chamberlain R. Surgical management of hepatolithiasis. *HPB (Oxford).* 2009;11:194–202.
- [5]. Sheen-Chen SM, Chen W, Eng H, Sheen C, Chou F, Cheng Y, et al. Bacteriology [5] & Antimicrobial choices in Hepatoslithiasis. *Am J Infect Control.* 2000;28:298- 301.
- [6]. Nakayama F. Intrahepatic Stones; [6] Blumgart's Surgery of the Liver & Biliary Tract. 765-774. 1994.
- [7]. Kayhan B, Akdoğan M, Parlak E, Ozarslan E, Sahin B. Hepatoslithiasis: a Turkey [7] experience. *Turk J Gastroenterol.* 2007;18:28-32.
- [8]. Lee TY, Chen YL, Chang HC, Chan CP, Kuo SJ. Outcomes of hepatectomy for [8] hepatolithiasis. *World J Surg.* 2007;31:479-82.
- [9]. Uchiyama K, Onishi H, Tani M, Kinoshita H, Ueno M, Yamaue H. Indication and [9] Procedure for Treatment of Hepatoslithiasis. *Arch Surg.* 2002;137:149-53.
- [10]. Li SQ, Liang LJ, Peng BG, Lai JM, Lu MD, Li DM. Hepatico-jejunostomy for [10] hepatolithiasis: a critical appraisal. *World J Gastroenterol.* 2006;12:4170–74.