

Evaluation of interdisciplinary care of a series of 53 patients with hepatoolithiasis

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Abstract

Objectives: Evaluate the results of interdisciplinary care in a series of patients with hepatoolithiasis. **Patients and Methods:** A retrospective study of 53 patients with hepatoolithiasis who were evaluated over an eight year period. **Results:** 23 men (43%) and 30 women were studied. The average age was 50 ± 15 years (range: 25-83 years). Pain was the predominant symptom (94%), followed by jaundice (68%) and fever (57%). According to the Tsunoda classification, 6 patients were Tsunoda I, 12 were Tsunoda II, 4 were Tsunoda III, and 5 were Tsunoda IV. Left lobe hepatoolithiasis was most frequent (36%), followed by bilateral hepatoolithiasis (34%). Endoscopic cholangiography was successful in 64% of patients. Only 4 patients were treated by percutaneous cholangiography, with 2 successes. 35 patients (66%) were operated on. The most frequent surgery was left hepatectomy with subcutaneous loop in 7 patients (40%), followed by hepatojejunostomy with subcutaneous loop (26%). Four orthotopic liver transplantations with good evolution were performed in patients with cirrhotic complications. 40% had early complications. Most frequent were infection of the operative site (14%) and residual stones (9%). The most frequent delayed complication was residual lithiasis (23%). 80% of the patients who underwent surgery were asymptomatic compared with 72% of those who did not undergo surgery. There were no mortalities resulting from surgery. **Conclusions:** Hepatoolithiasis is a disease which does not have a well standardized treatment. Surgery is an alternative with good results, clinical improvement and low morbidity and mortality rates when there is interdisciplinary including interventionist radiology and biliary endoscopy.

Key words

Hepatoolithiasis, choledocolithiasis, cholangiocarcinoma, hepatectomy, hepatojejunostomy liver transplantation.

INTRODUCTION

Hepatoolithiasis is the presence of calculi in the intrahepatic biliary ducts. Calculi are mainly composed of calcium bilirubinate (1, 2). Hepatoolithiasis is a common disease in south-east Asia with an incidence of 20% in China and Taiwan (3, 4). Concomitant presentation with cholelithiasis has been observed at rates varying from 18% to 50% from one region to another (5-7). In contrast, hepatoolithiasis is only observed in 1% to 3% of patients in the West (6, 7).

Differences in incidences are related to variable etiologies in different parts of the world. Biliary stasis predominates in the West. It can be the result of postsurgical biliary stenosis, sclerosing cholangitis (in smaller numbers), chole-

docal cysts, Caroli disease or neoplasia. In contrast parasitic infestations of the biliary tree (*clonorchis sinensis* and *opisthorchis viverrini*) are predominate in the east (2).

Clinically, this entity can make its appearance with upper abdominal pain, occasional fever and less frequently with jaundice. The diagnostic arsenal for this disorder includes ultrasound as the first-choice procedure and magnetic resonance cholangiography (MRC) as the most efficient the diagnostic test (1, 2, 5).

Since there is of yet no consensus on the treatment of this disease, and since it also has a recurrence rate of as high as 20% for treated patients,⁸ its handling has to be individualized according to the extension and classification of the compromise. The surgical option is the best alternative

since it removes the calculi and stenosis as well preventing the development of cholangiocarcinoma (9-11).

PATIENTS AND METHODS

A retrospective review of patients diagnosed with hepatolithiasis was performed. The study included all patients sent to the gastroenterology service of the Hospital Pablo Tobon Uribe and all patients who were referred to hepatobiliary surgery of the Gastro-hepatology Group of the University of Antioquia in the Hospital Pablo Tobon Uribe between January, 2003 and December, 2007. All patients had either followed up consultations in the gastroenterology service or hepatobiliary surgery clinic, or were contacted by telephone to evaluate their evolution.

Patients received surgical treatment, endoscopic treatment or radiological intervention, or a combination of two or more of these. A total of 53 patients were found with diagnoses of hepatolithiasis. Patients' demographic characteristics, pathological and surgical histories, clinical profiles of disease presentation, diagnostic methods used, therapeutic procedures, surgical treatment, complications,

repeated interventions, follow-up and short and long term mortality were all analyzed.

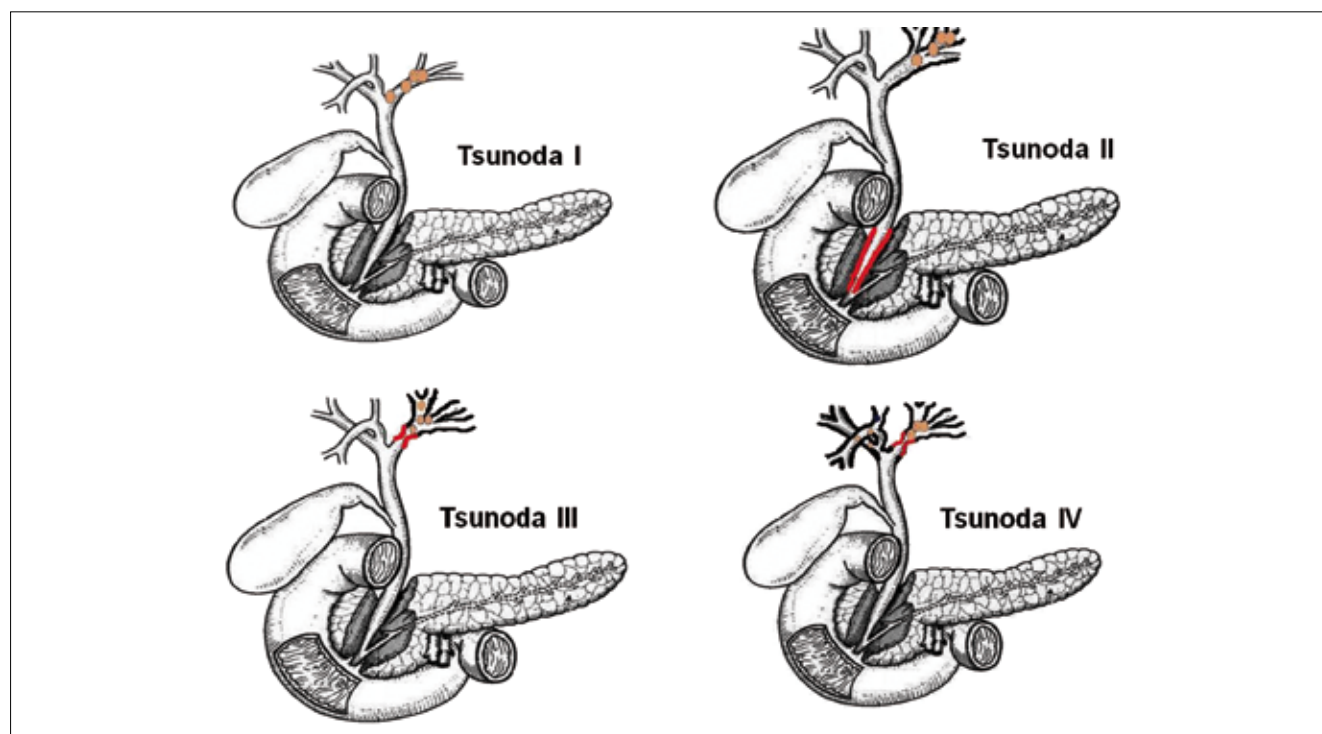
Intrahepatic compromise was classified using cholangiography according to the Tsunoda classification (Figure 1).

Endoscopic sphincterotomies were performed according to the preferences of each endoscopist when patients had pancreatitis or acute cholangitis. Calculi were extracted with a Dormia basket and pneumatic balloons. Plastic prosthetics of 8.5 and 10 FR were used to guarantee drainage when the complete removal of biliary calculi of the route could not be accomplished. Stenoses were dilated with pneumatic balloons or Sohendra dilators to allow intervention close to the stenosis.

Hepatic resection was considered in cases in which calculi and stenoses could not be resolved by endoscopic and/or percutaneous methods and in cases where there was lobar atrophy.

Hepatic transplant was performed when patients had cirrhosis or bilateral hepatic compromise which was not susceptible to endoscopic treatment, radiological intervention or smaller hepatic resections.

Information about patient follow-up was obtained from patients' clinical histories and through investigators' direct



Tsunoda I: Unilateral intrahepatic lithiasis without conduct dilatation or stenosis

Tsunoda II: Unilateral intrahepatic lithiasis with conduct dilatation and choledochus stenosis

Tsunoda III: Unilateral intrahepatic lithiasis with stenosis and conduct dilatation

Tsunoda IV: Bilateral intrahepatic lithiasis with stenosis and conduct dilatation

Figure 1. Endoscopic Classification of Hepatolithiasis according to Tsunoda. Tsunoda T, Tsuchiya R, Harada N, et al. Long-term results of surgical treatment for intrahepatic stones. *Jpn J Surg* 1985; 15: 455-462

telephone or personal contact with the patients to complement that information.

All data is expressed as standard deviations from averages. Statistical analyses were done with the Student's chi-square test. Statistical significance was acceptable when $p < 0.05$. SPSS version 15.0 (SPSS, Chicago, Illinois, USA) was used to perform the statistical analyses.

RESULTS

Demographic aspects

53 patients with Hepatolithiasis were identified. They included 23 men (43%) and 30 women (57%). There were no significant differences according to sex. The average age was 50 years with a range of 25-83 years. The largest numbers of patients were within the fifth and sixth decades of life (58%). One demographic factor that stands out is that the majority of patients (68%) came from rural areas (Table 1).

Table 1. Demographic aspects.

		n	%
Gender	Male	23	43
	Female	30	57
Age	≤ 30 years	5	10
	31-40	6	11
	41-50	20	38
	51-60	11	20
	61-70	6	11
	>70	5	10
Origin	Rural	36	68
	Urban	17	32

Clinical chart

Time of clinical presentation of symptoms varied between 1 month and 54 months with an average of 7.6 months (SD

9.14). Pain was the most frequent symptom, followed by jaundice and fever (Table 2).

Table 2. Clinical presentation.

Symptom	n	%
Pain	50	94
Jaundice	36	68
Fever	30	57

DIAGNOSTIC METHODS

Ultrasound was performed most frequently. 45 patients (85%) were examined with this procedure. Disease was detected in 41 of these cases (91%). MCRs were performed in 31 cases, detecting pathologies in 21 cases (68%). CAT scans were performed in 17 cases, finding disease in 100% of these scans (Figure 2).

INTERVENTIONIST HANDLING

Endoscopic retrograde cholangiopancreatographies (ERCP) were performed on 35 patients (28 within the institution). Hepatolithiasis was found in 28 of these cases (77%). Of the 28 ERCPs performed in the institution, 18 were successful (64%), 1 was unsuccessful (4%), and 9 patients remained with residual calculi (32%). The largest proportion of patients, 19 patients (36%), presented singular left lithiasis while 18 patients (34%) presented bilateral hepatolithiasis. 10 patients (19%) had left hepatolithiasis and choledochian syndrome. 4 patients (7%) had bilateral hepatolithiasis and choledochian. Only 2 patients (4%) were compromised exclusively on the right side. 26% had choledochian calculi compromise concomitant to intrahepatic compromise (Figure 3a).

Among the 27 patients with complete ERCPs the following distribution was found: Tsunoda I: 6 patients



Figure 2. Different diagnostic procedures used with patients. A. Ultrasound with left hepatolithiasis and dilatation of the biliary route. B. Axial Tomography with Hepatolithiasis and left lobe atrophy. C. Magnetic Resonance with Hepatolithiasis and left biliary stenosis.

(22%), Tsunoda II: 12 patients (44%), Tsunoda III: 4 patients (15%) and Tsunoda IV: 5 patients (18%). Success in endoscopic treatment was similar for Tsunoda I and II variants (16/17–94%), but much lower for Tsunoda III and Tsunoda IV variants (1/9–11%). (Figure 4).

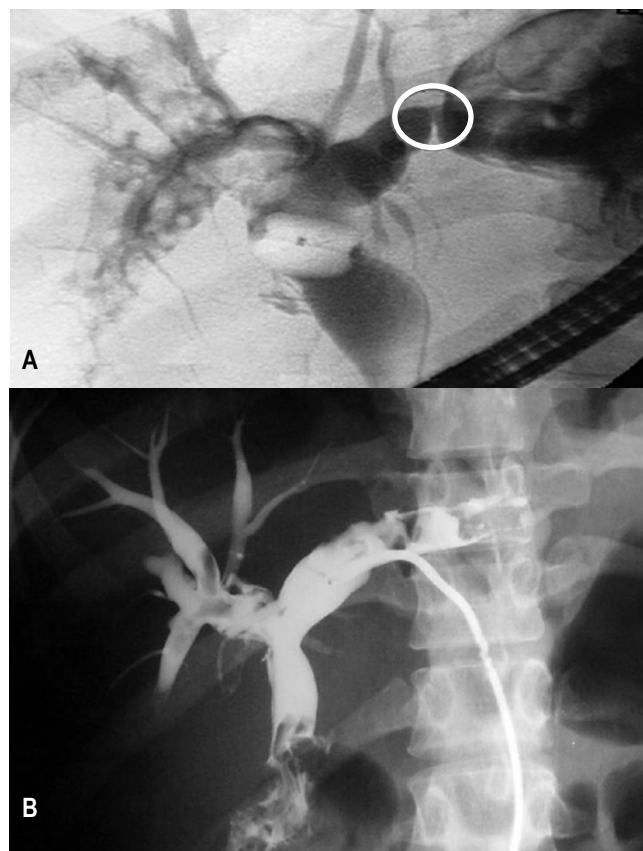


Figure 3. Endoscopic and Percutaneous Cholangiographies. A. Endoscopic cholangiography with bilateral lithiasis and hepatic stenosis (circle). B. Percutaneous cholangiography with bilateral lithiasis and narrow hepatojejunal anastomosis.

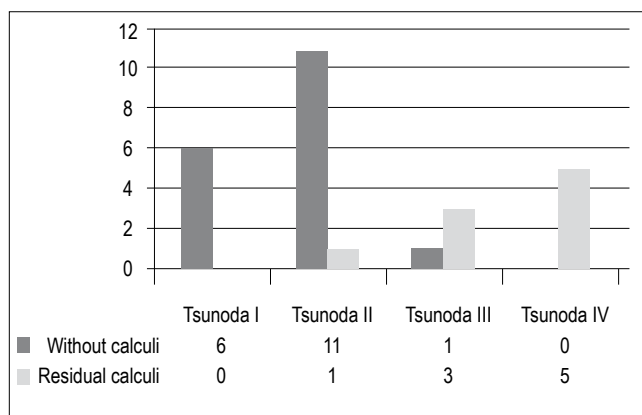


Figure 4. Results of endoscopic treatment according to Tsunoda classification.

Transparietal-hepatic cholangiography (TPHC) was performed on 2 of these patients with complete extraction of calculi. One of them also required radiological intervention that pushed an intrahepatic calculus into the extrahepatic biliary route after which endoscopic extraction was performed. This combined treatment is known as the rendezvous technique (Figure 3b). The various different ERCP interventions performed are presented in Table 3.

Table 3. Interventions performed with ERCP.

	Tsunoda I	Tsunoda II	Tsunoda III	Tsunoda IV	Total
Calculi removal	4	9	0	0	13
Stent and extraction	2	2	1	0	5
Stent and residual lithiasis	0	1	3	5	9
Total	6	12	4	5	27

The fact that stands out that at least 52% of these patients finished with at least one plastic biliary stent stands out. 9 patients were left with residual lithiasis, while five others whose calculi were completely extracted were given biliary stents as preventive measures against possible future cholangitis.

SURGICAL HISTORY AND SURGERY

31 of 53 patients (57%) had surgical histories. There were 19 (61%) of the most frequent operations: cholecystectomies without other surgical procedures. Four other patients (13%) had cholecystectomies plus other procedures (two biliary tract explorations, a choledochoduodenostomy and a hepatojejunostomy without subcutaneous loop.). Only two patients had biliodigestive surgical histories with subcutaneous loops for future interventions. None of the patients had histories of major hepatic segmental resections. Other operations are presented in Table 4 (Figure 5).

Table 4. Surgical history.

	n	%
Without previous surgery	23	43
Cholecystectomy	19	36
BTE	3	5
Cholecystectomy + BTE	2	4
Choledochoduodenostomy	2	4
HJ with subcutaneous loop	2	4
Hepatojejunostomy	1	2
Cholecystectomy + HJ	1	2
Total	53	100

HJ: Hepatojejunostomy. BTE: Biliary Tract Exploration.

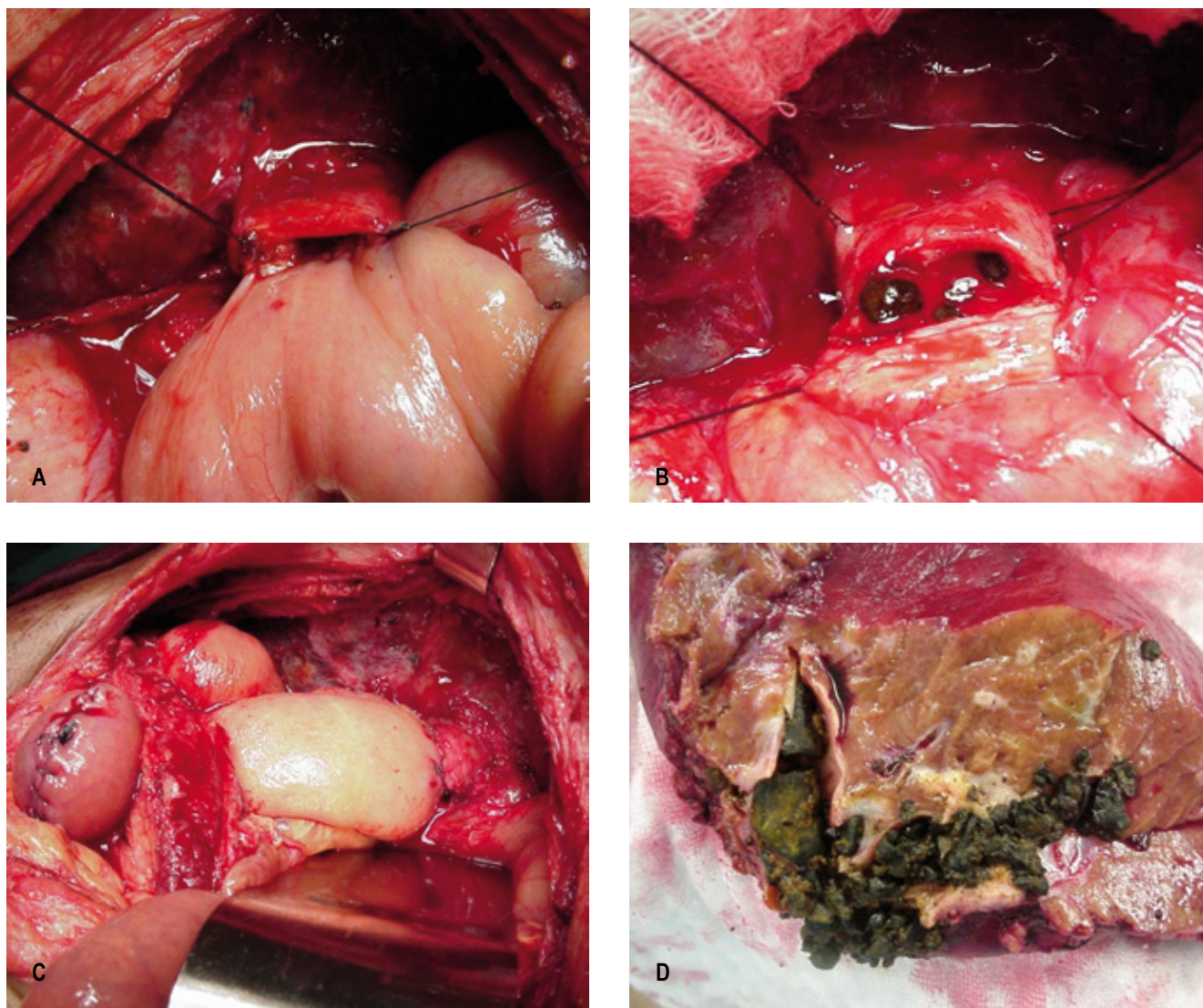


Figure 5. Surgical aspects of Hepatolithiasis treatment. A. Upper Hepatic Section at the confluence with calculi. B. Posterior aspect of the elaboration of hepaticojejunal anastomosis. C. Finished hepaticojejunal anastomosis and closed subcutaneous loop. D. Product of left hepatectomy with intrahepatic lithiasis.

35 of the 53 patients (66%) underwent surgical procedures at the Hospital Pablo Tobon Uribe. The most frequently performed operation was a left hepatectomy: 14 (40%) of these patients had this procedure, 7 with subcutaneous loops. Next most frequent were hepatojejunostomies with subcutaneous loops: 9 cases (26%). There were 6 cholecystectomies (17%) 3 which required biliary tract exploration (BTE). 4 patients received hepatic orthotopic transplants. Another patient had a choledochoduodenostomy, and another had a hepatojejunostomy without loop. 19 of the patients who underwent these surgical procedures had previous ERCPs (54%).

Of the 35 surgery patients, 28 (80%) are free of symptoms. Of the 7 symptomatic patients, 5 present pain. 4 of

these had had hepatojejunostomies with loops while one had had a choledochoduodenostomy. A patient who received a left hepatectomy without loop is now presenting pain and jaundice, while a patient with a cholecystectomy plus BTE is now presenting jaundice.

Four liver transplants were performed on patients who had complications from hepatic cirrhosis secondary to hepatolithiasis. These complications were two cases of continued bleeding due to portal hypertension, and one case each of refractory ascites and repeated bacterial peritonitis.

Of the 18 patients who were not treated surgically 5 (28%) were symptomatic. 2 presented pain, 2 presented pain and jaundice, and one presented only jaundice. Two facts are noteworthy: patients with subcutaneous loops

suffered more abdominal pain after hepatectomies, and all of the transplant patients developed favorably after surgery. Patients who had had cholecystectomies which developed favorably after surgery had had their intrahepatic biliary routes cleared by ERCP. These included 2 patients with Tsunoda I intrahepatic lithiasis and 1 patient with Tsunoda II intrahepatic lithiasis (Table 5).

14 patients (40%) had early post-operative complication. Most frequent were surgical site infections with 5 cases (14%), followed by residual calculi with 3 cases (8%), and fistulas and abscesses with 2 cases (6%) each. Finally one patient presented abscesses plus residual calculi (3%) and one transplant patient presented acute rejection (3%).

FOLLOW-UP

Prospective follow-ups of the groups of patients were conducted. It included periodic checkups with ultrasound and/or abdominal CAT scans every 4 to 6 months. Residual lithiasis in 8 patients (23%) was the most frequent delayed complication in the surgical group. There was one case of stenosis of a biliary-enteric anastomosis, one of cholangitis and one of delayed rejection of a hepatic transplant (in addition to the case of initial rejection. These were treated with conservative management, administration of antibiotics and endoscopic or percutaneous therapy.

In the group of patients with surgical treatment 3 patients died: 2 from gastric adenocarcinoma and one by cholangiocarcinoma. In the group treated without surgery, 2 patients died due to cholangitis.

MULTIVARIATE ANALYSIS (MVA)

In order to obtain a multivariate model of the characteristics of the patient's hepatolithiasis which can predict whether a

patient will have a better or worse outcome, unconditional logistic regression was used to analyze the information.

After eliminating independent variables which would have a p value greater than 0.05 if they were included in the model (sex, age, origin, history, surgery, fever, jaundice, pain, cholangitis, abscesses, early complications, delayed complications and definitive diagnoses) a predictive model was obtained with just one variable: previous surgery (Table 6).

DISCUSSION

Hepatolithiasis is defined as the presence of calculi in the intrahepatic biliary ducts. The main components are calcium bilirubinate and biliary pigment (1, 2). It is an uncommon disease in western society but is common in southeastern and eastern Asia. Its incidence is as high as 20% in China and Taiwan (3, 4). A variable relation with cholelithiasis has been observed region to another, ranging from 2.2% to 50% (5). In contrast hepatolithiasis is observed in only 1% to 3% of patients in the west (8, 12).

The etiology of hepatolithiasis has not yet been clearly determined. It is thought that ethnic and environmental factors are directly implied in the genesis of this pathology (5). Factors such as stasis, biliary overinfection, nutritional deficiencies and alteration of biliary mucin are important for the formation of intrahepatic calculi (1, 12, 13). Its incidence is similar in men and women. It occurs between the third and fifth decade of life (2). This correlates to our study's findings. Histologically the characteristic changes are inflammation, accompanied by fibrosis in the walls of the biliary ducts of the periportal space and stenosis in the hepatic parenchyma (14). There are no signs of pathognomonic symptoms of hepatolithiasis, and the clinical picture is superimposed over cholecystocholedocolithiasis with

Table 5. Evolution of patients after surgery.

	Asymptomatic	Pain	Pain and Jaundice	Jaundice	Total
No Surgery	13	2	2	1	18
Hepatojejunal plus loop	5	4	0	0	9
Left Hepatectomy plus loop	7	0	0	0	7
Left Hepatectomy	6	0	1	0	7
Liver transplant	4	0	0	0	4
Cholecystectomy	3	0	0	0	3
Cholecystectomy plus BTE	2	0	0	1	3
Hepatojejunal without loop	1	0	0	0	1
Choledochoduodenostomy	0	1	0	0	1
Total	41	7	3	2	53

Table 6. Absolute and percentage distributions, chi-squared test of independence, p values, odds ratios and 95% CIs of the different clinical variables related to the outcomes of patients with hepatolithiasis.

Variable	Category	Yes		No		Chi ²	p	OR	95% CI
		n	%	n	%				
Sex	Male	7	58,3	16	39	1,409	0,235	2,188	0,591; 8,091
	Female	5	41,7	25	61				
Age	> 50 years	6	50	16	39	0,461	0,497	1,563	0,428; 5,699
	≤ 50 years	6	50	25	61				
Origin	Rural	9	75	27	65,9	0,356	0,550	1,556	0,362; 6,681
	Urban	3	25	14	34,1				
Fever	Yes	6	50	24	58,5	0,275	0,600	0,708	0,195; 2,576
	No	6	50	17	41,5				
Jaundice	Yes	7	58,3	29	70,7	0,655	0,418	0,579	0,153; 2,191
	No	5	41,7	12	29,3				
Pain	Yes	10	83,3	40	97,6	3,519	0,125	0,125	0,010; 1520
	No	2	16,7	1	2,4				
Cholangitis	Yes	8	66,7	20	48,8	1192	0,275	2,100	0,546; 8,080
	No	4	33,3	21	51,2				
Abscess	Yes	2	16,7	6	14,6	0,030	0,863	1,167	0,203; 6,699
	No	10	83,3	35	85,4				
Previous Surgery	Yes	1	8,3	18	43,9	5,107	0,024*	0,116	0,014; 0,985
	No	11	91,7	23	56,1				

* Shows significant differences ($p < 0,05$).

upper abdominal pain, occasional fever and less frequent jaundice. In the clinical picture of our series the most frequent symptom was pain (94%) while jaundice was less frequent (68%).

Among the complications related to this disease are recurrent cholangitis, hepatic abscesses, ductal stenosis, atrophy, secondary biliary cirrhosis and neoplastic degeneration towards cholangiocarcinoma in up to 6% of patients. In contrast concomitant appearance of hepatolithiasis can appear in up to 17% of patients with cholangiocarcinoma (15, 16). With respect to arguments regarding malignant transformations, we think that the mechanical irritation caused by intrahepatic calculi together with chronic biliary infections and cholestasis, injures the biliary epithelium until it causes neoplasia (5, 8, 12, 17). There is some doubt about the order of appearance of these two diseases. In other words, there is doubt about whether stenosis is produced by the tumor thus causing hepatolithiasis, or vice versa. In the present series, we found only one case of cholangiocarcinoma (1.8%). 5 year survival rates for patients with hepatolithiasis and cholangiocarcinoma range between 3% and 23% (5, 6, 18, 19).

The presence of intrahepatic calculi can be determined by conventional imaging. Nevertheless, additional information including location, expansion and stenosis of the

biliary ducts and papillary stenosis must be kept in mind when treatment begins.

Ultrasound is the first choice procedure because it is cheap, noninvasive and offers considerable information about the liver and intrahepatic ducts. For these reasons it is the main method of screening (1, 2). Conventional CAT scans have a diagnostic sensitivity ranging from 63% to 81%. Helical CAT scans offer improved results including suitable images of intrahepatic lithiasis when the calcium content is high and the calculi are surrounded by bile in a dilated duct (12). Although it is difficult to differentiate between hepatolithiasis and cholangiocarcinoma when the calcium content is low, studies report specificity ranging 87% to 100% for cholangiocarcinoma diagnosis. Another advantage is that it contributes additional information about the presence of stenosis, abscesses and metastases (1, 11, 20). At the moment, MCR is the most sensitive non-invasive test and has the greatest specificity for evaluating the biliary route. It has replaced ERCP and TPHC, which have gone from being diagnostic methods to becoming therapeutic methods (1). This series did not show significant differences between diagnostic values of ultrasound and CAT scans for this pathology. However, the high performance of CAT scans deserves attention since it was greater than that of the MCR. This could be due to the characteristics of

the calculi (high calcium content) or because the MCR is a recently acquired tool here which is known for being highly operator-dependent (21, 22).

The primary treatment targets in this disease are extraction of calculi, elimination of stenosis and biliary stasis and prevention of both recurrence and the long term possibilities of the development of cirrhosis and cholangiocarcinoma (7, 8, 12). Therapeutic options are nonsurgical approaches, surgical treatment and combinations of both (2, 4). There is no consensus regarding handling and therapeutic modality for this disease, nor is there any clearly established treatment for asymptomatic hepatolithiasis. However, reports indicate good evolution without surgical handling or with minor interventions (4, 11).

The nonsurgical approach consists of extraction of calculi by radiological or endoscopic methods. These techniques are helpful for patients with recurrent hepatolithiasis. This disease compromises both lobes in the absence of atrophy, stenosis, cholangitis or suspicion of cholangiocarcinoma (7). Patients with calculi composed of cholesterol may be treated non-surgically by means of lithotripsy and extraction through the biliary route (10). In addition, ERCP allows performance of biopsies from zones of stenosis that present neoplasia. Among the different techniques, percutaneous cholangiography presents the highest morbidity, but this is only true in eastern series where there is more casuistry but there are less recurrences (4, 21).

Although in this study nonsurgical treatment of hepatolithiasis with ERCP and therapeutic TPHC could be successful at first, an important number of cases ended up as surgical treatments. ERCP achieved complete clearance of the biliary route 64% of cases. We have also proposed using metallic stents with ERCP for difficult cases of stenosis with recurrent hepatolithiasis (23). The percutaneous approach has also been implemented by the tract of the T-tube with good results in other services (24, 25).

There are diverse surgical options from simple choledochotomies with the positioning of a Kehr tube (10) to more complex procedures such as hepatojejunostomies (10), partial hepatectomies (12, 25-28) and liver transplants (29-32).

One worrying factor in relation to these patients is the rate of recurrence which is as high as 20% in some reports (2). In order to offer suitable treatment we need to establish whether the patient is suffering from primary or secondary hepatolithiasis since treatments are different. If it is secondary hepatolithiasis without atrophy, choledocholithiasis with secondary intrahepatic calculi) cholangitis or intrahepatic biliary route stenosis, then hepatojejunostomy is a suitable treatment, and there is no need to perform a hepatectomy (9, 10). This differs from the treatment of patients

with primary calculi and biliary stenosis with underlying hepatic disease for whom the rate of residual lithiasis is high if a hepatectomy is not performed (9).

Considering the objectives for treating this disease, hepatectomy is the most effective treatment when it is indicated since it obtains best long term results with 85% to 95% therapeutic success (7, 8, 10, 21, 36). It eliminates biliary stasis and avoids the risk of malignancy (4). However, two limitations are that it has a 2-3% mortality rate and a high morbidity that can go as high as 32% (21). These rates are elevated for a disease the course of which is benign in the majority of cases.

Indications for hepatectomy are hepatolithiasis of one lobe (generally the left), atrophy, cholangitis, cholangiocarcinoma, and endoscopically untreatable intrahepatic multiple stenosis (4, 9). In patients with bilobar disease, we recommend performance of a left hepatectomy and percutaneous treatment of the right lobe (or a derivation) (10). When a hepatectomy is not feasible, the surgical technique of choice is the hepatojejunostomy. This is useful in cases of hepatolithiasis of both lobes, recurrent lithiasis and when there are injuries to the extrahepatic biliary route. However, it does not work when there is stenosis of the intrahepatic ducts and when there is an elevated risk of cholangitis (9, 10).

In the surgically treated group results were similar to those from other series. 5 patients (40%) developed early morbidity with infection of the surgical site. There were three cases (8%) of residual lithiasis. The 6% rates of biliary fistula and abscesses (2 cases each) were low. There was one patient who presented abscesses plus residual calculi (3%), and one case of presented acute rejection of a liver transplant (3%). Cheung reported²⁸ a morbidity rate of 44%, while the Lee series⁹ rate of surgical morbidity was 33.3%.

In patients who presented complications inherent to hepatic cirrhosis secondary to hepatolithiasis, liver transplant has been described as an alternative (29-32). This was performed for 4 patients whose evolutions have been excellent, without great morbidity, with no mortality, and only minor rejection.

Surgical mortality was not documented, although there were 3 deaths. Two resulted from gastric adenocarcinoma and one from cholangiocarcinoma. It was found that a very high percentage (80%) of the patients who underwent surgery are asymptomatic.

There are noticeable socio-demographic differences in the etiology and treatment results for hepatolithiasis between east and west. Table 7 presents the results of different series and compares them with the results of this series. A high association between hepatolithiasis and cholangiocarcinoma is described in other parts of the world (35, 36), but this association was not present in any of our patients.

Table 7. Characteristics of patients from different geographical areas.

	Western		Current Series	Eastern	
	n=20 (33)	n=55 (34)	n=53	n=96 (35)	n=190 (36)
Average age	45 (19-83)	61 (22-88)	50 (25-83)	59 (21-87)	46 (28-80)
Gender (M/F)	6/14	13/42	23/30	46/50	75/115
Symptoms:					
Pain	20%	15%	94%	30%	NR
Jaundice		14%	68%	10%	
Cholangitis	80%	42%	57%	59%	
Location:					
Left	45%	42%	36%	34%	37%
Right	25%	18%	4%	9%	46%
Bilateral	30%	11%	34%	11%	27%
Intrahepatic & extrahepatic		29%	26%	46%	
Residual Calculi	10%	NR	20%	3%	15%

NR=Not reported.

There is a big question about asymptomatic patients without surgical indications such as absence of lobar atrophy, alteration of the hepatic profile or suspicion of a tumor. The expected handling of those patients appears to be sufficient since observation in series like that of Kusano (11) show good results.

We can conclude that surgical treatment is the best option for patients with hepatolithiasis when endoscopic and radiological options have been already tried. Mortality is low, while morbidity is notable. However, quality of life improves and the risk of cholangiocarcinoma is eliminated.

CONCLUSIONS

The following findings from this study should be highlighted:

1. There was a slightly higher number of women (57%) than men in contrast to what has been described in other series.
2. Patients most frequently affected were in the fifth and sixth decade of life (58% of the cases).
3. Greater incidence among patients from rural areas (68%).
4. On the clinical chart pain predominates (97%), and cholangitis is frequent (57%), but the history that predicts the worst outcome is prior surgery.
5. Ultrasound was the most frequently performed study (85%), but CAT was the one with greater specificity and sensitivity (100%).
6. The success of endoscopic cholangiography is related to the Tsunoda classification, the higher the Tsunoda classification (III-IV) the lower the possibility of completely extracting the intrahepatic calculi.

7. Intrahepatic compromises occur most frequently on the left side (36%) followed by bilateral compromises (34%). Intra and extrahepatic compromises occurred in 26% of cases.
8. The most frequently performed surgery was the left hepatectomy (46%, half with subcutaneous loops). This was followed by hepatojejunostomy (29%, only one patient without subcutaneous loop). 4 patients (11%) received orthotopic liver transplants.
9. Early post-operative morbidity was 40%, including infections of the operative site in 14% of cases, residual calculi in 8%, fistulas in 6%, abscesses in 6%, abscesses plus calculi in 3%, and one acute transplant rejection (controlled without problems).
10. Surgical treatment had the highest success rate in the treatment of these patients who continue without calculi. 80% of them continue to be asymptomatic in contrast to the percentages who remain asymptomatic after endoscopic cholangiography (64%) and percutaneous cholangiography (50%).

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