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BRIEF ARTICLE

Does bilioenteric anastomosis impair results of liver resection in primary intrahepatic lithiasis?

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Abstract

AIM: To evaluate the long-term results of liver resection for the treatment of primary intrahepatic lithiasis. Prognostic factors, especially the impact of bilioenteric anastomosis on recurrence of symptoms were assessed.

METHODS: Forty one patients with intrahepatic stones and parenchyma fibrosis/atrophy and/or biliary stenosis were submitted to liver resection. Resection was associated with a Roux-en-Y hepaticojejunostomy in all patients with bilateral stones and in those with unilateral disease and dilation of the extrahepatic biliary duct (> 2 cm). Late results and risk factors for recurrence of symptoms or stones were evaluated.

RESULTS: There was no operative mortality. After a mean follow-up of 50.3 mo, good late results were observed in 82.9% of patients; all patients submitted to liver resection alone and 58.8% of those submitted to liver resection and hepaticojejunostomy were free of symptoms (P = 0.0006). Patients with unilateral and bilateral disease showed good late results in 94.1% and 28.6%, respectively (P < 0.001).

CONCLUSION: Recurrence of symptoms in patients with hepaticojejunostomy showed that this may not be the ideal solution. Further studies are needed to establish the best treatment for patients with bilateral stones or unilateral disease and a dilated extrahepatic duct.

Key words: Biliary lithiasis; Bilioenteric anastomosis; Cholangitis; Intrahepatic lithiasis; Liver resection

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INTRODUCTION

Primary intrahepatic lithiasis or hepatolithiasis, is a prevalent disease in Southeastern Asia but is rare in the Western world; it is a challenging condition due to its varied forms of presentation and complex treatment. In some Western countries, it has been increasingly diagnosed and a relative incidence of 2.1% from all cases of biliary stone disease has been reported[1,2]. The goals of treatment are to promote stone clearance, control bile infection, decompress the biliary tree, and prevent progressive hepatic dysfunc-

tion. Since each patient has a distinctive stone distribution within the biliary tree, treatment has to be individualized accordingly. Liver resection has been reported to promote excellent long-term results, since stones and biliary strictures can be simultaneously removed reducing the risk of recurrence. In patients with unilateral stones, liver resection is considered a potentially curative treatment[3-8]. For bilateral stones, the ideal treatment has not yet been established; bilioenteric anastomosis or a percutaneous approach associated or not with liver resection have been employed with good long-term results in up to two thirds of cases.

Although resection can lead to a cure in patients with bilateral disease, the recurrence of symptoms is not rare. Moreover, it has been shown that patients submitted to liver resection associated with a bilioenteric anastomosis, had higher rates of recurrent cholangitis when compared to those submitted to resection only[4,8].

The purpose of this study is to report our experience with patients submitted to liver resection for the treatment of non-oriental hepatolithiasis, and to evaluate the influence of different prognostic factors, especially bilioenteric anastomosis, on late results.

MATERIALS AND METHODS

Ninety eight patients with symptomatic primary intrahepatic lithiasis were treated at our institution between 1990 and 2006.

According to our treatment protocol, liver resection was indicated in patients with irreversible hepatic lesions such as unilateral or segmental liver fibrosis/atrophy or the presence of intrahepatic biliary stenosis. A complementary Roux-en-Y hepaticojejunostomy was performed in patients with unilateral liver disease who presented with common bile duct stones with a duct diameter larger than 2 cm, and in all patients with bilateral stones[2].

Forty one patients (41.8%) underwent liver resection; data regarding gender, age, history of cholangitis and previous biliary surgery, intrahepatic stone location, liver function tests, intraoperative findings, type of surgery performed and postoperative outcome are presented in Table 1.

There were 16 men (39.9%) and 25 women (60.1%), with a mean age of 41.3 years (range 18 to 67 years). A history of right upper quadrant pain was present in all cases, jaundice in 31 patients (75.6%), cholangitis in 25 (61%) and nineteen (46.3%) had previously undergone biliary tract surgery: cholecystectomy in 13, hepaticojejunostomy in 3 and cholecystectomy plus common bile duct exploration in 3. None of the patients showed any sign of liver failure at physical examination.

Preoperative diagnosis was based on ultrasonography, helicoidal three-phase tomography, endoscopic or percutaneous cholangiography that in the last 5 years were replaced by magnetic resonance cholangiography. A complementary operative cholangiography was performed in all cases.

Indications for liver resection were: parenchymal atrophy in 27 patients, intrahepatic biliary stenosis in 8 and unilobular severe liver fibrosis in 6. Two patients were submitted to liver resection in a septic condition, due to cholangitis.

Table 1 Analysis of the effect of each variable on late results

Variable (*n*)	Late complications (poor results) *n* (%)	Statistical analysis
Gender		
Female (25)	6 (24.0)	$P = 0.1406$
Male (16)	1 (6.3)	
Previous biliary surgery		
No (22)	3 (13.6)	$P = 0.5291$
Yes (19)	4 (21.1)	
History of cholangitis		
Yes (25)	7 (28.0)	$P = 0.0608$
No (16)	0 (0)	
Preoperative serum bilirubin		
Normal (32)	6 (18.8)	$P = 0.5905$
Raised (9)	1 (11.1)	
Preoperative white blood cells		
Normal (37)	6 (16.2)	$P = 0.6574$
Raised (4)	1 (25.0)	
Stone location		
Unilateral (34)	2 (5.9)	$P < 0.0001$
Bilateral (7)	5 (71.4)	
Type of surgery		
Liver resection (24)	0 (0)	$P = 0.0006$
Liver resection + HJ (17)	7 (41.2)	
Major liver resection (more than 3 segments)		
Yes (14)	1 (7.1)	$P = 0.2237$
No (27)	6 (22.2)	

HJ: Hepaticojejunostomy.

Mean follow-up was 50.3 mo, ranging from 18 to 198 mo. Long-term results were considered good when no recurrence of symptoms or complications of the disease such as cholangitis or liver abscess during the follow-up period were observed.

Independent variables and their impact on late prognosis were compared using Student's t and Pearson's χ^2 tests. Statistical significance was set at $P < 0.05$.

RESULTS

Forty one patients were submitted to liver resection, 34 (82.9%) had unilateral disease and the left lobe was more frequently affected (28 cases). Bilirubin, alkaline phosphatase and gamma glutamyl transpeptidase serum levels were raised in 21.9%, 61% and 53.7% of patients, respectively.

Five patients underwent right hepatectomy (12.2%), nine left hepatectomy (22%), twenty six bisegmentectomy 2-3 (63.4%) and one patient underwent a segment 5 resection. A Roux-en-Y hepaticojejunostomy was associated with liver resection in 14 patients as follows: seven with bilateral and seven (21.8%) with unilateral disease and common bile duct dilation larger than 2 cm in diameter. Another three patients with unilateral stones who had previously been submitted to hepaticojejunostomy were submitted to liver resection and the anastomosis was maintained. All patients had a drain placed at the site of resection.

There was no operative mortality. Two patients submitted to liver resection (right hepatectomy and bisetorectomy 2-3) in a septic condition had an uneventful outcome. Four patients (9.8%) had a postoperative biliary fistula and were conservatively managed with an uneventful outcome; one patient (2.4%) developed a right subphrenic abscess which was percutaneously drained with good outcome.

Thirty two patients with unilateral and two with bilateral disease (82.9%) had good long-term results. Seven patients (17.1%), 2 with unilateral and 5 with bilateral stones, had late complications of the disease: cholangitis associated with recurrent stones in three (bilateral disease); cholangitis in two (unilateral disease); liver abscess associated with recurrent stones in one and liver abscess in one (all with bilateral stones).

One of these patients had caudate lobe recurrent stones and an abscess 93 mo after resection of segments 2 and 3, and died 28 d after drainage of the abscess due to sepsis; one had a liver abscess percutaneously drained with good outcome; three patients with cholangitis and stone recurrence, received antibiotic therapy and percutaneous stone removal and have remained well; two patients with cholangitis were treated with systemic antibiotics with good outcome. The long-term mortality rate was 2.4%.

The overall rate of good long-term results was 82.9% and was 94.1% and 28.6%, respectively for unilateral and bilateral disease. Comparing the data of good results between patients with unilateral and bilateral disease, statistical analysis showed a significant difference ($P < 0.001$) (Table 1).

All patients submitted to liver resection only, showed good long-term results (100%), while seven of seventeen patients (41.2%) who underwent liver resection associated with hepaticojejunostomy had late postoperative complications. A comparison between liver resection alone and resection associated with hepaticojejunostomy showed a statistically significant difference ($P = 0.0006$) (Table 1).

Twenty seven out of 34 patients with unilateral disease were submitted to liver resection alone and all had a good outcome. Of the remaining seven patients with unilateral disease who were submitted to liver resection associated with a bilioenteric anastomosis, two had recurrence of symptoms (2/7, 28.5%). A comparison between liver resection alone and resection associated with hepaticojejunostomy for patients with unilateral disease, showed a statistically significant difference ($P = 0.0498$).

DISCUSSION

Primary intrahepatic lithiasis is a rare disease in Western countries but, the high number of cases diagnosed in our institution, led to a treatment protocol based on presentation of the disease[2,9], where 41 out of 98 patients with symptomatic hepatolithiasis underwent liver resection.

The aim of treatment was the removal of intrahepatic and extrahepatic stones as well as duct strictures and to promote adequate drainage of the remaining segments of the biliary tree. Liver resection is the only treatment that can achieve these goals, thus reducing the risk of recurrence[4,5,7,8,10-14]. In this series, liver resection was indicated in patients with irreversible lesions such as biliary strictures or severe parenchymal fibrosis or atrophy, criteria initially proposed by Choi and Wong[6] and employed by many others[4,7,15,16].

Hepatic resection for the treatment of hepatolithiasis can lead to low rates of cholangitis or stone recurrence and good long-term results ranging from 80% to 98%[3-5,7,10-13,16]. In this series, good late results were observed in 100% of the patients submitted to liver resection only, showing that in some situations cure of the disease is possible.

With regard to the long-term results, seven patients (17.1%), 2 with unilateral and 5 with bilateral stones, all submitted to liver resection and bilioenteric anastomosis, had complications: five had cholangitis and two had liver abscesses. One of these patients died and the other 6 were treated successfully.

Patients with unilateral disease had significantly better results compared to those with bilateral stones, 94.1% and 28.6% had good late results, respectively. These data are comparable to other reports from the Far East and to our own previous experience, where good results were achieved in 80% to 100% of patients with unilateral stones and in 50% to 80% of those with bilateral disease[3-7,9-11]. These results can be explained by the fact that in patients with unilateral disease, all the compromised liver parenchyma is removed, potentially leading to cure of the disease, while the same is not always possible in those with bilateral disease. Indeed, if one looks at our data, good late results were achieved in all patients with unilateral stones who did not present with extrahepatic biliary disease. However, if stones were present in the remnant parenchyma or there was a dilation of the extrahepatic biliary tree and a biliary drainage procedure and hepaticojejunostomy was required, the rate of good results fell significantly to 58.8%. This was probably due to two factors: (1) Associated extrahepatic biliary disease (persistence of a possible cause for stone formation and/or inadequate biliary or stone drainage); and (2) Bilateral disease (persistence of affected liver tissue).

Most authors emphasize that at long-term follow-up, patients submitted to liver resection associated with a bilioenteric anastomosis, have a worse prognosis when compared to those submitted to resection only[4,8]. In recent years, reports have shown higher rates of postoperative cholangitis in patients submitted to hepaticojejunostomy[17-19].

Although patients submitted to hepaticojejunostomy had a higher incidence of poor late results, it is difficult to state whether cholangitis in these cases was due to recurrent stones in the remnant liver or to the presence of a bilioenteric anastomosis. Indeed, Roux-en-Y hepaticojejunostomy is the procedure of choice because the long jejunal loop is employed to avoid bacterial reflux into the liver. In an attempt to solve this question, we compared only patients with unilateral disease, with and without hepaticojejunostomy and, despite a small number of patients; there was a significant difference between the groups

showing a direct effect of the bilioenteric anastomosis on patient outcome.

Although the majority of groups perform a Roux-en-Y hepaticojejunostomy in patients with bilateral stones, the real benefits of this procedure have not yet been proven. Indeed, Li *et al*[19] showed that stones located in the lateral and posterior segments of the liver, do not drain easily through the biliary anastomosis. Moreover, Chen *et al*[20] showed excellent results employing percutaneous treatment without any surgical treatment in patients with bilateral stones. According to this data and reinforced by the poor results in our patients with hepaticojejunostomy, a biliary anastomosis may not be the ideal solution for these patients. Further studies are needed to establish the best treatment for bilateral hepatolithiasis and for those with unilateral disease and a dilated extrahepatic duct.

This study with the largest non-oriental series of primary intrahepatic lithiasis showed that liver resection can lead to the cure of unilateral hepatolithiasis. However, in patients with bilateral disease and in those with extrahepatic biliary duct dilation, where a hepaticojejunostomy was performed, more than 30% of patients had symptom recurrence and a rigorous follow-up is necessary. For the late group of patients, other treatment modalities such as resection associated with percutaneous treatment instead of hepaticojejunostomy should be considered.

COMMENTS

Background

Surgical treatment of primary intrahepatic lithiasis in a Western country was evaluated. The paper reports the largest non-oriental series of liver resection for hepatolithiasis. Prognostic factors were evaluated and bilateral disease treated with a bilioenteric anastomosis had a negative impact on outcome.

Research frontiers

It may be necessary for surgeons who deal with this challenging disease to reevaluate the benefit of hepaticojejunostomy.

Innovations and breakthroughs

Evaluation of prognostic factors in patients submitted to surgical treatment of primary intrahepatic lithiasis.

Applications

The benefit of other treatment modalities such as resection associated with percutaneous treatment instead of hepaticojejunostomy in patients with extrahepatic biliary duct dilation and for those with bilateral intrahepatic stones.

Peer review

This is an interesting manuscript on a challenging group of patients.

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