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## Case and Review

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# Liver Segmentectomy by Intrahepatic Lithiasis

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## Keywords

Intrahepatic lithiasis · Liver segmentectomy · Biliary tract

## Abstract

Intrahepatic cholelithiasis, which is defined as stones proximal to the confluence of the hepatic ducts, is considered endemic in Southeast Asia. Its pathogenesis is not completely understood yet. A 19-year-old female was admitted to the hospital with a history of recurrent biliary pancreatitis. Abdominal ultrasound detected normal gallbladder while magnetic resonance cholangiopancreatography revealed lithiasis at the hepatic duct of liver segment V. After preoperative evaluation a typical segmentectomy was done. The postoperative period was uneventful and the patient was well at 6-month follow-up.

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## Introduction

Intrahepatic cholelithiasis (IHC), which is defined as stones proximal to the confluence of the hepatic ducts, is not a common finding in the West but it is endemic in Southeast Asia [1]. Its pathogenesis is not completely understood; several factors are thought to be involved, such

as anatomic malformations and metabolic agents [2]. The high risk of secondary cirrhosis [1] and malignant transformation [1, 3] make surgical management a considerable option for IHC. Here, we report a case of intrahepatic lithiasis in the segment V duct detected by ultrasound (US). So far, this is the first report of isolated lithiasis at the hepatic duct of liver segment V (LsgV).

## Case Presentation

A 19-year-old female was admitted to the hospital with a history of recurrent biliary pancreatitis. The gallbladder was normal on abdominal US whereas intrahepatic stones were detected. Magnetic resonance cholangiopancreatography revealed lithiasis at the hepatic duct of LsgV (Fig. 1; arrows indicate the clear lithiasis in the duct of the LsgV).

After preoperative preparation, typical segmentectomy using harmonic scalpel (UltraCision) was done and Pringle's maneuver was conducted for 20 min, without any blood transfusion. Figure 2 shows the biliary duct (within the blue circle) of the LsgV intraoperatively and Figure 3 the specimen, the arrow indicating the intrahepatic lithiasis and the cyst. The postoperative period was uneventful, so the patient left the hospital on the next day. Pathological examination of the resected segment showed a cystadenoma (Fig. 4) with lithiasis and the gallbladder was free of stones. The patient was well without any episode of pancreatitis after 1 year of follow-up; no biliary lithiasis has been detected via abdominal US.

## Discussion

While reviewing the literature, we found only 3 cases where an isolated liver segment lithiasis was described [4, 5], in none of whom lithiasis in LsgV was reported. All other studies ( $n = 159$ ) discussed multiple IHC. Open surgery was conducted almost in all cases (Table 1). IHC is usually recognized in the left lobe with few cases being reported in the right lobe [4]. IHC is described as primary (no clear evidence about the etiology) and secondary forms (strictures or other causes defined). While reviewing the literature, many causes were mentioned, such as anatomic malformation, retained foreign bodies, metabolic disorders, and infection [2, 6, 7]. IHC generally manifest with jaundice [8], cholangitis, and pancreatitis [9]. In secondary forms, migration of stones from the gallbladder to settle in the hepatic ducts is noticed [1]. Our patient had a normal gallbladder on US while intrahepatic stones were detected by magnetic resonance cholangiopancreatography. Due to the risk of lobe atrophy [1, 10], malignant transformation [1, 3], secondary cirrhosis [1, 11], and liver abscess [11], Tsunoda et al. [12] considered surgical resection as the main choice for healthcare providers in IHC cases. Therefore, our patient underwent a typical segmentectomy without any blood transfusion. Pathological examination revealed a cystadenoma and a normal gallbladder, which is similar to the findings of Nuzzo et al. in 10 cases [13]. However, it is not clearly recognized whether cystadenoma or some anatomic malformation of the duct of LsgV caused the intrahepatic stasis which as a

result led to stone formation. Regarding the complications and risks of malignancy, surgical resection is considered the gold standard therapy for IHC.

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## Statement of Ethics

Our study was performed in accordance with the Declaration of Helsinki and was approved by the hospital's ethics committee. Informed consent to participate in our study and for publication, including images, was obtained from the participant and her parents.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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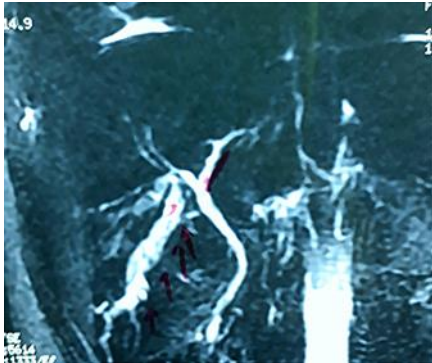
## Author Contributions

F. Rayya performed the operation, organized the photographs, and reviewed the article. E. Alhasan made a major contribution in writing the manuscript. Both authors read and approved the final manuscript. The datasets used during the current study are available from the corresponding author on reasonable request.

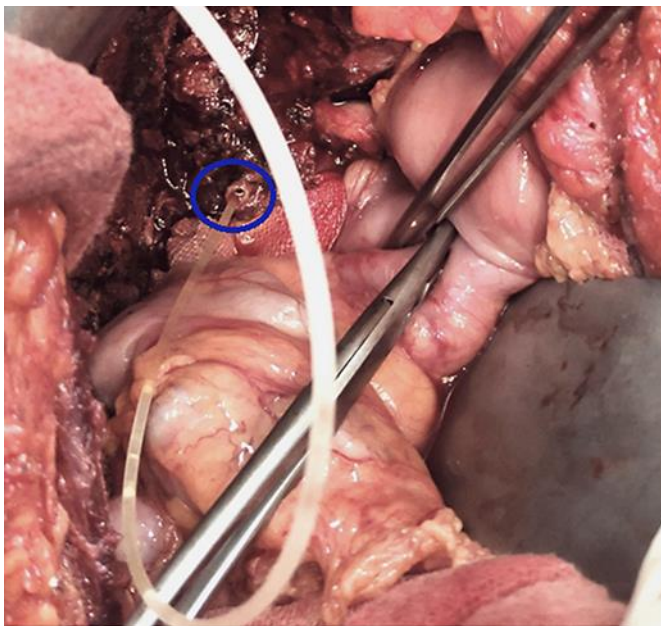
## References

- 1 Conzo G, Stanzione F, Celsi S, Candela G, Venetucci P, Palazzo A, et al. Integrated treatment of secondary hepatolithiasis. Case report. *G Chir*. 2011 Oct;32(10):424–8.
- 2 Pereira E, Kannebley J, Carvalho M, Mendes R, Marques M, Franco M. Primary intrahepatic lithiasis: report of a case and review of the literature. *Arq Gastroenterol*. 1994 Apr–Jun;31(2):63–8. Portuguese.
- 3 Ramacciato G, Amodio PM, Mercantini P, D'Angelo F, Ziparo V. Liver resection for intrahepatic lithiasis. Report of a case. *Hepatogastroenterology*. 2003 Nov–Dec;50(54):1889–90.

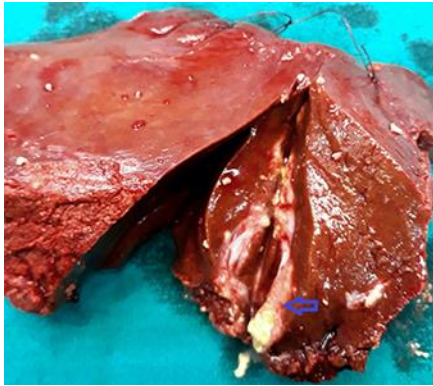
- 4 Qiao O, Hu P, Jin Y. Hepatic lobectomy and segmental resection of liver for hepatolithiasis. *West Indian Med J*. 2014 Mar;63(2):176–8.
- 5 Torres OJ, Neiva RF, Torres CC, Freitas TM, Fernandes ES. Right hepatectomy due to hepatolithiasis caused by endoclip migration after laparoscopic cholecystectomy: a case report. *J Surg Case Rep*. 2018 Jul;2018(7):rjy176.
- 6 Lv GY, Qiu W, Yu Y, Li T. Development of hepatolithiasis due to a celery stalk retained within the bile ducts of the liver. *Ann R Coll Surg Engl*. 2016 May;98(5):e77–8.
- 7 Juvara I, Gavrilescu S, Dragomirescu C. Intrahepatic lithiasis (considerations on 20 cases). *Rev Chir Oncol Radiol O R L Oftalmol Stomatol Chir*. 1981 May–Jun;30(3):161–76. Romanian.
- 8 Torres-Zevallos H, Sánchez-Gambetta S, Mendivil Zapata R, Valcárcel Saldaña M. Intrahepatic lithiasis. *Rev Gastroenterol Peru*. 2008 Jan–Mar;28(1):65–9. Spanish.
- 9 Roncoroni L, Violi V, Sgobba G, Peracchia A. Multimodal treatment of intrahepatic lithiasis with traditional surgery, endoscopy, and extracorporeal lithotripsy. Report of a clinical case. *G Chir*. 1994 Nov–Dec;15(11–12):495–7. Italian.
- 10 Napolitano L, Cotelleso R, Ricci A, Gargano E. Resection therapy in the treatment of intrahepatic biliary lithiasis. *Ann Ital Chir*. 1996 Sep–Oct;67(5):647–50; discussion 651. Italian.
- 11 Visokai V, Lipská L, Záruba P, Rotnágl J. Surgical management of intrahepatic cholelithiasis – two case reviews. *Rozhl Chir*. 2007 Jul;86(7):370–5. Czech.
- 12 Tsunoda T, Tsuchiya R, Harada N, Yoshino R, Noda T, Izawa K, et al. Long-term results of surgical treatment for intrahepatic stones. *Jpn J Surg*. 1985 Nov;15(6):455–62.
- 13 Nuzzo G, Clemente G, Giovannini I, De Rose AM, Vellone M, Sarno G, et al. Liver resection for primary intrahepatic stones: a single-center experience. *Arch Surg*. 2008 Jun;143(6):570–3; discussion 574.
- 14 Ponsot P, Attali P, Pelletier G, Roche A, Etienne JP. Stenosis of the left hepatic duct with intrahepatic lithiasis: treatment by the percutaneous transhepatic approach. *Gastroenterol Clin Biol*. 1984 Apr;8(4):325–9. French.
- 15 Lazaridis C, Papaziogas B, Alexandrakis A, Galanis I, Argiriadou H, Papaziogas T. Intrahepatic lithiasis as a late complication of hepaticojejunostomy. *Surg Endosc*. 2003 Apr;17(4):661.
- 16 Chen P, Bie P, Liu J, Dong J. Laparoscopic left hemihepatectomy for hepatolithiasis. *Surg Endosc*. 2004 Apr;18(4):717–8.
- 17 Machado MA, Makdissi FF, Surjan RC, Teixeira AR, Sepúlveda A Jr, Bacchella T, et al. Laparoscopic right hemihepatectomy for hepatolithiasis. *Surg Endosc*. 2008 Jan;22(1):245.
- 18 Senda Y, Nishio H, Ebata T, Yokoyama Y, Igami T, Sugawara G, et al. Hepatolithiasis in the hepatic hilum mimicking hilar cholangiocarcinoma: report of a case. *Surg Today*. 2011 Sep;41(9):1243–6.
- 19 Matsumoto T, Aoki T, Iso Y, Tago K, Shimoda M, Kubota K. Successful Right Hemihepatectomy for a Patient with Right-Sided Round Ligament. *J Gastrointest Surg*. 2016 Feb;20(2):470–2.



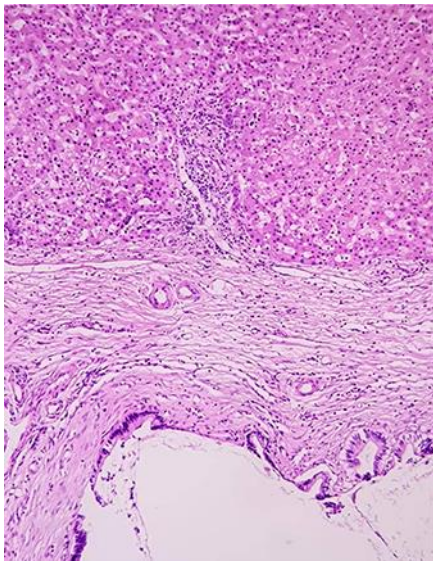
**Fig. 1.** Magnetic resonance cholangiopancreatography showing the liver segment V lithiasis (indicated by the arrows).



**Fig. 2.** Intraoperative view of the duct of liver segment V (within the blue circle).



**Fig. 3.** The specimen, with the blue arrow indicating the intrahepatic lithiasis (cystadenoma).



**Fig. 4.** Microscopic aspect ( $\times 40$ ) showing the normal hepatic parenchyma and the wall of the cyst.

**Table 1.** Literature review of IHC

Reference	Affected Lsg/lobe			Management		Follow-up
Ponsot et al. [14]	L lobe			percutaneous drainage		–
Napolitano et al. [10]	II, III			bisegmentectomy		1 year
Lazaridis et al. [15]	R lobe			intracorporeal lithotripsy + dilation		–
Ramacciato et al. [3]	L lobe			L lobectomy		–
Chen et al. [16]	L lobe			L lobectomy		–
Visokai et al. [11]	II, III			bisegmentectomy		–
Machado et al. [17]	V, VIII			R hemihepatectomy		7 months
Conzo et al. [1]	II, III, IV			percutaneous drainage		3 months
Senda et al. [18]	II, III, IV, VIII			L trisegmentectomy + total caudate lobectomy		45 months
Qiao et al. [4]	Lsg	Type 1	Type 2	Type 1	Type 2	–
	II, III	52	29	L hepatectomy	L lobectomy	
	II, III, IV	15	12	L hepatectomy		
	II, III, VII	9	0	L hepatectomy + segmentectomy		
	VI, VII	12	7	segmentectomy		
	VII, VIII	9	0	segmentectomy		
	VIII	0	2	segmentectomy		
	total	97	50			
Lv et al. [6]	II, III			L lateral lobectomy		–
Matsumoto et al. [19]	R lobe			R hemihepatectomy		6 months
Torres et al. [5]	VI			R hepatectomy		4 months
Our study	V			segmentectomy		6 months

IHC, intrahepatic cholelithiasis; L, left; Lsg, liver segment; R, right.