

Factors Associated with Spontaneous Migration of Stones for Common Bile Duct: A Retrospective Study

Ahlame Benhamdane* , Samir Mrabti , Tarik Addajou , R. Chaibi, S. Hdiye, I. Mouslim, Reda Berraida , I. El Koti, Fedoua Rouibaa , Hassan Seddik 

Departement of Gastroenterology II, Military Hospital Mohammed V, Rabat, Morocco.

Correspondence to: Ahlame Benhamdane, Departement of Gastroenterology II, Military Hospital Mohammed V, Rabat, Morocco.

Received date: May 16, 2024; **Accepted date:** June 14, 2024; **Published date:** June 21, 2024

Citation: Benhamdane A, Mrabti S, Addajou T, et al. Factors Associated with Spontaneous Migration of Stones for Common Bile Duct: A Retrospective Study. *J Med Res Surg.* 2024;5(3):70-73. doi:10.52916/jmrs244139

Copyright: ©2024 Benhamdane A, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

ABSTRACT

Introduction: Common Bile Duct (CBD) stones can spontaneously migrate through the duodenal papilla. In this case, ERCP may be unnecessary and a significant rate of complications may be avoided.

Aim: The aim of our study is to evaluate the factors associated with spontaneous migration of CBD stones.

Materials and Methods: This is a retrospective descriptive and analytical study including 575 patients who underwent ERCP for CBD stones between January 2019 and September 2023. All patients underwent MRCP for the diagnosis of CBD stones. MRCP was considered positive if stones were present in CBD. A positive ERCP was defined as the presence of stones in the CBD on cholangiography. Patients were classified into 2 groups: Group A (n=381): positive MRCP and positive ERCP. Group B (n=194): positive MRCP but negative ERCP. Statistical analysis was performed using JAMOVI software.

Results: The mean age in group A was 59.1 +/- 13.8 years and in group B 56.9 +/- 13.2 years, with no statistically significant difference (p=0.056). The sex ratio (M/F) in group A was 0.7 and in group B 0.54, with a significant female predominance in both groups (p=0.03). There was no statistically significant difference between the 2 groups in CBD diameter or presence of a periampullary diverticulum.

Comparing group A versus group B, patients with small stone diameter (P=0.001), a single stone (p=0.001) and distal stones (P=0.04) tended to pass their stones spontaneously.

Conclusion: In our study, the factors associated with spontaneous migration of CBD stones were a small stone diameter, a single stone and distal stones.

Keywords:

Common Bile Duct (CBD), Endoscopic Retrograde Cholangiopancreatography (ERCP), Radiology, Endoscopy, Magnetic Resonance Cholangiopancreatography (MRCP).

Introduction

Endoscopic Retrograde Cholangiopancreatography (ERCP) is the reference technique for the diagnosis and treatment of common bile duct (CBD) stones, with 100% specificity [1]. Although ERCP is considered a safe procedure, it can be associated with serious complications, and should be avoided unnecessarily [2].

Magnetic Resonance Cholangiopancreatography (MRCP) has replaced ERCP for the diagnosis of CBD stones, as it identifies up to 91% of stones, but stones smaller than 5 mm have only been detected in 71% of cases [3]. However, although CBD stones are detected during MRCP, they may not be detected during ERCP, which may be explained by the spontaneous passage of stones [4,5]. Assessment of factors predictive of spontaneous stone passage is therefore necessary to avoid unnecessary ERCP and associated complications [6]. In the literature, the number of studies evaluating these factors is insufficient.

In the present study, our aim was to evaluate the factors associated with spontaneous migration of stones from the CBD.

Materials and Methods

Study population

The study is retrospective, descriptive and analytical, including 575 patients undergoing ERCP for CBD stone between January 2019 and September 2023 in the Endoscopy Department of the Mohammed V Military Hospital in Rabat.

Our study included all patients older than 18 years who underwent MRI for the diagnosis of CBD stones.

We excluded patients with a history of ERCP, a history of abdominal surgery other than cholecystectomy and patients with a malignant tumor including hepatobiliary and pancreatic malignancies. In addition, patients with unsuccessful cannulation were not included in the study. MRCP was considered positive if stones were detected in CBD.

A positive ERCP was defined as the presence of stones in the CBD on cholangiography. Patients were divided into 2 groups: Group A (n=381) with positive MRCP and positive ERCP. Group B (n=194) included patients with positive MRCP but negative ERCP.

All patients were hospitalized on the day before ERCP. Patients with no complications were discharged 24 hours after the procedure.

Data collection

Demographic data (age, sex), clinical data (History and symptomatology) were collected from patient records. MRI findings, including stone diameter, number of stones, CBD diameter and proximal or distal stone site, were obtained from radiological reports. Endoscopic data (presence of periampullary diverticulum, CBD diameter, presence of stones) were recorded from ERCP reports. A positive CBD stone was defined as the visualization of a stone during cholangiography which had been removed during ERCP.

Statistical analysis

Data were expressed as mean ± standard deviation for quantitative variables and compared using Student's t-test and Mann-Whitney U-test. Qualitative variables were expressed as frequencies (percentages) and compared using the Chi-square

test. Univariate and multivariate logistic regression analyses were used to determine predictors of spontaneous passage of CBD stones. A p-value <0.05 was considered statistically significant. Statistical analysis was performed using JAMOVI software.

Results

Epidemiological and clinical characteristics

The mean age in group A was 57.6 +/- 13.9 years and in group B 59.2 +/- 13 years without statistically significant difference. A significant female predominance was observed in both groups. Clinical characteristics are summarized in Table 1.

Radiological characteristics

Between group A and B, the number of stones, stone size and distal stones were statistically significantly different (Table 2).

Table 1: Clinical characteristics of the study population .

	Group A	Group B	p-value
Age*	57,6 +/- 13,9 years	59,2 +/- 13 ans	0,056
Gender (Female)**	235 (61,7)	117 (60,3)	0,03
History of cholecystectomy**	225 (59,1)	5 (2,6)	<0,001
Clinical presentation			
Cholangitis**	60 (15,7)	39 (20,1)	0,19
Pancreatitis**	27 (7,1)	27 (13,9)	0,008
*Mean +/- Standard deviation; **Effectif (%)			

Table 2: Radiological predictors of spontaneous CBD stone passage.

	Group A	Group B	p-value
Number of CBD stones*	1.92 ± 1.28	0,9 ± 0,16	0,002
Stone size (mm)*	6.88 ± 3.3	3.4 ± 1.1	<0,001
Distal stones**	241 (63.5)	179 (92.3)	0,001
*Mean +/- Standard deviation; **Effectif (%)			

Endoscopic characteristics

Table 3 represents the ERCP findings of the study groups. No statistically significant difference was observed between the 2 groups in the presence of a periampullary diverticulum or in the CBD diameter.

Table 3: Endoscopic characteristics of the study population.

	Group A	Group B	p-value
Periampullary diverticulum**	41 (10,8)	26 (13,4)	0,351
CBD diameter (mm)*	10,1 ± 0.34	8,5 ± 0.38	0,14
*Mean +/- Standard deviation; **Effectif (%)			

Factors associated with spontaneous migration of CBD stones

In multivariate analysis, patients with a small stone size, a single stone and distal stones tend to evacuate stones spontaneously (Table 4).

Table 4: Multivariate analysis of predictors for spontaneous passage of CBD stone.

	OR	IC (95%)	p-value
Small stone diameter	5,15	2,47-10,76	0,001
Single stone	4,6	0,6-31,3	<0,001
Distal stones	13,4	2,02-83,9	0,04

Discussion

MRCP has been widely used for the diagnosis of CBD stones. However, these stones may not be detected on ERCP, which may be explained by spontaneous stone passage.

Given the potential for spontaneous stone migration, assessment of predictive factors may help to avoid unnecessary ERCP and related complications.

In our study, patients with a small stone diameter, a single stone

and distal stones tended to evacuate their stones spontaneously.

The revised ASGE guidelines (2019) consider age >55 years as a moderate risk factor for CBD stones [7]. In a study by Khoury et al, advanced age was also associated with failure of spontaneous passage of stones through the VBP [8]. However, in our study, advanced age was not a significant predictive factor in logistic regression analyses.

In our study, there was a significant female predominance in the 2 groups, but gender was not a significant factor in multivariate analyses. A previous study has shown that female gender is associated with an increased risk of cholelithiasis and CBD stones [9], although in the Khoury et al. study, male gender was associated with failure of spontaneous passage of CBD stones [8].

We found that stone number, stone size and distal stones were predictive factors for spontaneous stone passage. These radiological parameters have been evaluated in other studies with conflicting data, but the majority of previous studies showed that stone diameter <5 mm was associated with spontaneous passage [8,10,11]. Ding et al, showed that a stone diameter <0.33 cm was conducive to spontaneous evacuation [10]. Khoury et al. reported that a stone size of less than 3.5 mm was predictive of spontaneous passage, with a sensitivity of 71% and a specificity of 69% [8]. Sanguanlosit et al. demonstrated that a stone smaller than 4.8 mm in size was more likely to pass spontaneously, with a sensitivity of 81% and a specificity of 78% [11]. Inan et al also demonstrated that a stone less than 4.3 mm in size was significant in predicting spontaneous passage of CBD, with a sensitivity of 58% and a specificity of 85% [12].

Regarding the number of stones, Sanguanlosit et al. reported that a single CBD stone was more likely to pass spontaneously through the papilla [11].

In the study by Khoury et al, they reported that the distal location of the stone was predictive of spontaneous stone passage [8].

Biological data, in particular liver function, have also been the subject of past studies. Previous studies revealed no significant association between biochemical results on admission and spontaneous passage of stones [10,11,13,14]. Whereas recently, several studies have concluded that GGT is the most sensitive marker for predicting the presence of CBD stones, and is associated with the highest predictive value and diagnostic accuracy [15,16]. In our study, biological parameters were not investigated.

Our study has several limitations. It is a retrospective study carried out in a single center; the study groups were not similar in terms of the number of patients included. And we did not evaluate biological parameters.

Conclusion

In conclusion, in our study the factors associated with spontaneous migration of BPV stones are a small stone diameter, a single stone and distal stones.

As spontaneous passage of CBD stones through the papilla is common, identification of its predictive factors is crucial prior to ERCP to avoid an unnecessary invasive procedure and ERCP-related complications. Further prospective studies with larger

sample sizes are needed to determine the predictive factors for spontaneous passage of CBD stones.

References

1. Prat F, Amouyal G, Amouyal P, et al. Prospective controlled study of endoscopic ultrasonography and endoscopic retrograde cholangiography in patients with suspected common-bile-duct lithiasis. *Lancet.* 1996;347(8994):75-79.
2. Buxbaum JL, Freeman M, Amateau SK, et al. American Society for Gastrointestinal Endoscopy guideline on post-ERCP pancreatitis prevention strategies: Methodology and review of evidence. *Gastrointest. Endosc.* 2023;97(2):163-183.
3. Sugiyama M, Atomi Y, Hachiya J. Magnetic resonance cholangiography using half-fourier acquisition for diagnosing choledocholithiasis. *Am J Gastroenterol.* 1998;93(10):1886-1890.
4. Manes G, Paspatis G, Aabakken L, et al. Endoscopic management of common bile duct stones: European Society of Gastrointestinal Endoscopy (ESGE) guideline. *Endoscopy.* 2019;51(5):472-491.
5. Mohseni S, Bass GA, Forssten MP, et al. Common bile duct stones management: A network meta-analysis. *J Trauma Acute Care Surg.* 2022;93(5):e155-e165.
6. Chandrasekhara V, Khashab MA, Muthusamy VR, et al. Adverse events associated with ERCP. *Gastrointest Endosc.* 2017;85(1):32-47.
7. Buxbaum JL, Abbas Fehmi SM, Sultan S, et al. ASGE guideline on the role of endoscopy in the evaluation and management of choledocholithiasis. *Gastrointest Endosc.* 2019;89(6):1075-1105.
8. Khoury T, Adileh M, Imam A, et al. Parameters Suggesting Spontaneous Passage of Stones from Common Bile Duct: A Retrospective Study. *Can J Gastroenterol Hepatol.* 2019.
9. Klein S, Wadden T, Sugerman HJ. AGA technical review on obesity. *Gastroenterology.* 2002;123(3):882-932.
10. Ding S, Dong S, Zhu H, et al. Factors related to the spontaneous passage of common bile duct stones through the papilla: A single-center retrospective cohort study. *J Int Med Res.* 2021;49(11):3000605211058381.
11. Sanguanlosit S, Viriyaroj V, Yodying H, et al. The influence of stone size on spontaneous passage of common bile duct stones in patients with acute cholangitis: A retrospective cohort study. *Ann Med Surg.* 2020;60:72-75.
12. Inan B, Akbay A, Güven IE, et al. Assessment of The Factors Related to The Spontaneous Passage of Common Bile Duct Stones. *J Clin Med.* 2024;13(9):2672.
13. Bill JG, Kushnir VM, Mullady DK, et al. Evaluation of patients with abnormalities on intraoperative cholangiogram: Time to abandon endoscopic retrograde cholangiopancreatography as the initial follow-up study. *Frontline Gastroenterol.* 2016;7(2):105-109.
14. Spinn MP, Wolf DS, Verma D, et al. Prediction of which patients with an abnormal intraoperative cholangiogram will have a confirmed stone at ERCP. *Dig Dis Sci.* 2010;55(5):1479-1484.

15. Pereira-Lima[^] JC, Jakobs R, Busnello JV, et al. The role of serum liver enzymes in the diagnosis of choledocholithiasis. *Hepatogastroenterology*. 2000;47(36):1522–1525.
16. An MR, Lohse I, Tan ZJ, et al. Quantitative proteomic analysis of serum exosomes from patients with locally advanced pancreatic cancer undergoing chemoradiotherapy. *J Proteome Res* 2017;16(4):1763-1772.