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

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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).
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).

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).

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
