

Performance of Echo-Endoscopy in Dilatations of the Common Bile Duct without Visible Obstacle at Imaging

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Abstract

Introduction: The dilation of the bile ducts which the obstacle could not be visualized by conventional imaging, constitutes a daily challenge in our medical practice. This work aims to evaluate the frequency and the role of biliopancreatic echo-endoscopy in the etiological diagnosis of bile duct dilatation. **Material and methods:** This is a descriptive and monocentric retrospective study conducted within the department of 'Digestive Functional Explorations and Hepato-gastro-enterology' at the Ibn Sina Hospital in Rabat, from September 2015 to April 2023. It includes 115 patients admitted for dilation of the common bile duct with no visible obstacle to conventional imaging and who underwent a bilio-pancreatic echo-endoscopy. **Results:** Our study included 81 patients, whose mean age was 61.2 years with a clear female predominance. Echo-endoscopy confirmed the presence of bile duct dilatation in 67% of cases. It established an etiological diagnosis in 82% of cases. Lithiasis of the common bile duct was found in 42,9% of cases, followed by cystic dilatation in 12,9% of cases and chronic pancreatitis in 5.2% of cases. A pancreatic tumor has been revealed in 3,8% of cases as well as an ampulloma in 3,8% of cases. **Conclusion:** Our study, despite its limitations, highlight the role and performance of biliopancreatic echoendoscopy in the etiological diagnosis of bile duct dilatation without any visible obstacle to conventional imaging.

Keywords: Echo-endoscopy, bile ducts, dilation.

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INTRODUCTION

The dilation of bile ducts, are commonly revealed by conventional imaging, reflecting the presence of an obstacle. The absence of the latter constitute a real challenge diagnostic.

Echo-endoscopy is nowadays an essential diagnostic and therapeutic tool in biliary-pancreatic and digestive affections. However, it remains a third line examination after conventional imaging.

The aim of this work is to study the frequency and the role of bilio-pancreatic echo-endoscopy in dilations of common bile duct visualized on conventional imaging, which the etiological diagnosis could not be specified.

MATERIAL AND METHODS

This is a descriptive and monocentric retrospective study conducted within the department of 'EFD-HGE' at the Ibn Sina Hospital in Rabat, from September 2015 to April 2023. It includes 115 patients admitted for dilation of the bile duct with no visible obstacle to conventional imaging and underwent a bilio-pancreatic echo-endoscopy.

RESULTS

Out of a total of 649 bilio-pancreatic ultrasound endoscopies performed during the period from September 2015 to April 2023, 115 patients (17,7%) were indicated for dilation of the common bile duct without visible obstacles in the conventional imaging (Figure 1).

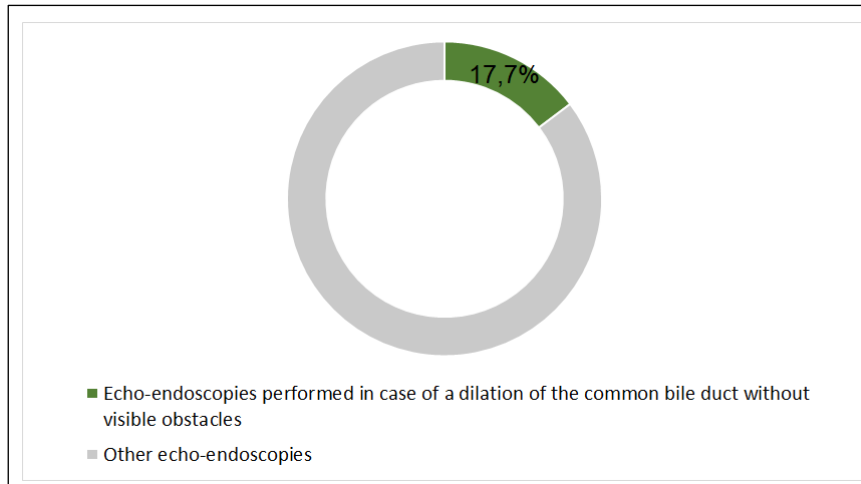


Figure 1: Frequency of echoendoscopies performed in case of a dilation of the common bile duct without visible obstacles

The mean age of our patients was 61,2 years (18-93 years) with a femal predominance, sex-ratio of 2,7 (Figure 2).

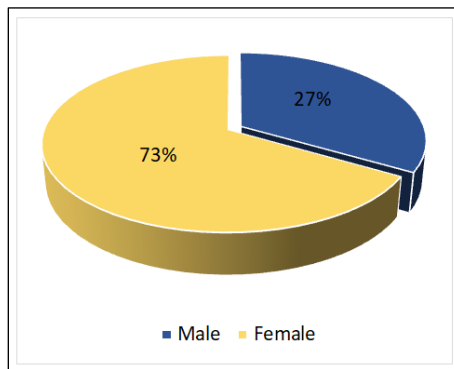


Figure 2: Distribution by sex

In our study, 72,2% had antecedents and comorbidities dominated by cholecystectomy and acute pancreatitis. However, 27,8% of our patients had no medical or surgical history.

60,5% of our patients presented at least one episode of symptoms such as cholestatic jaundice in 26%, hepatic colic in 21,7% of cases and epigastralgia in 12,1% of cases (Figure 3).

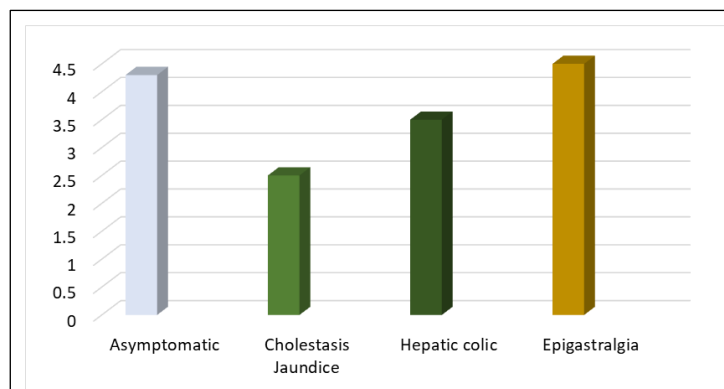


Figure 3: Distribution of patients according to clinical symptomatology

In our series, 44,4% of patients had liver test disturbances. 13,9% of patients had an isolated cholestasis, 3,5% of patients presented an isolated

cytolysis and 26,9% of patients both cytolysis and cholestasis (Figure 4).

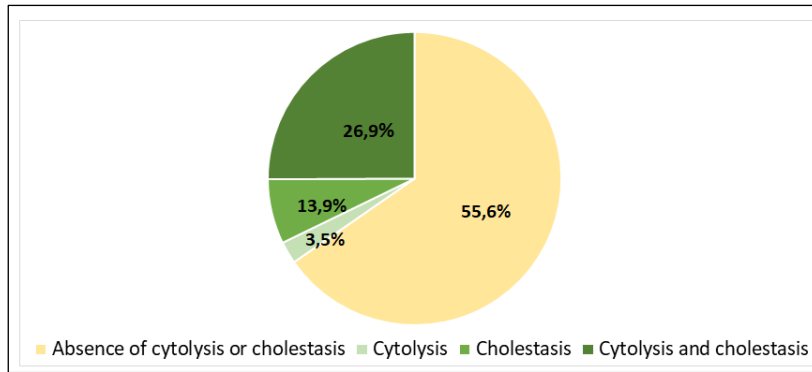


Figure 4: Distribution of patients according to liver test abnormalities

34,7% of patients benefited from an ultrasound, 26% of patients from a scanner and 60% of patients from bili-MRI (Figure 5).

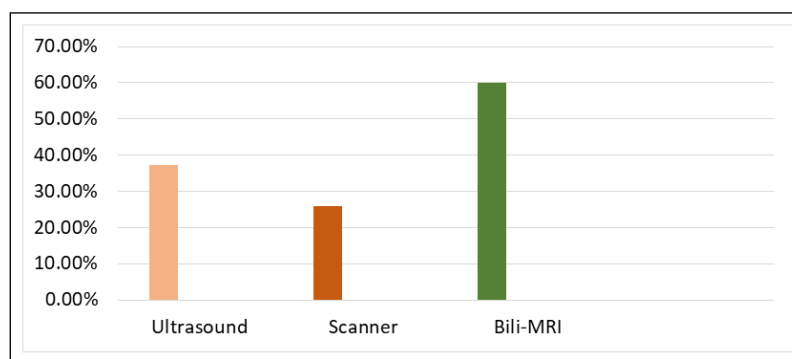


Figure 5: Distribution of patients according to the type of radiological examination

Echoendoscopy confirmed the presence of a dilation of the common bile duct in 67% of cases. The mean diameter of the bile duct dilation was 12,2mm with extremes ranging from 8,7mm to 24mm.

However, the dilation of the common bile duct found on imaging could be ruled out in 33% of cases by echoendoscopy.

Echo-endoscopy made it possible to establish an etiological diagnosis for the dilation of the bile ducts of our patients in 82% of cases (Figure 6).

The most common diagnosis retained was a lithiasis of the common bile duct in 42,9% of cases (Figure 7). Cystic dilation were found in 12,9% of cases. Sphincter odditis was found in 12,9% of cases. The diagnosis of chronic pancreatitis was made in 5,2% of cases. A pancreatic head tumor was found in 3,8% of cases (Figure 8).

A vaterian ampulloma was diagnosed in 3,8% of cases (Figure 9). However, 18% of echo-endoscopic examination has found no cause of the dilation.

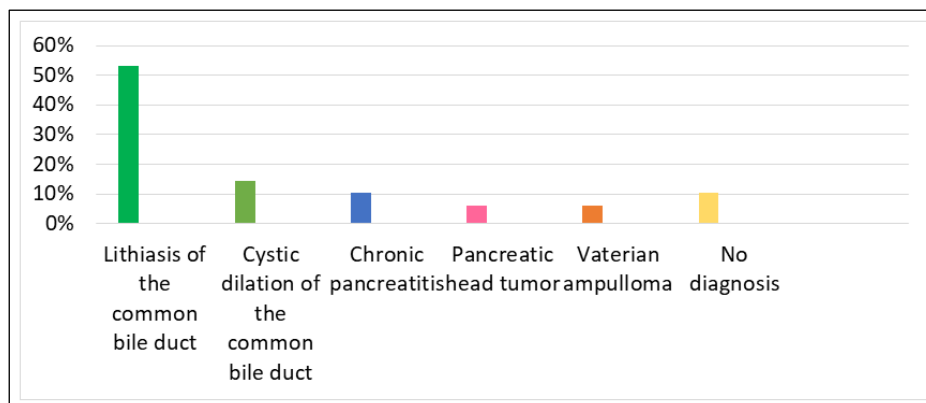


Figure 6: Distribution of patients according to the diagnosis made on ultrasound endoscopy

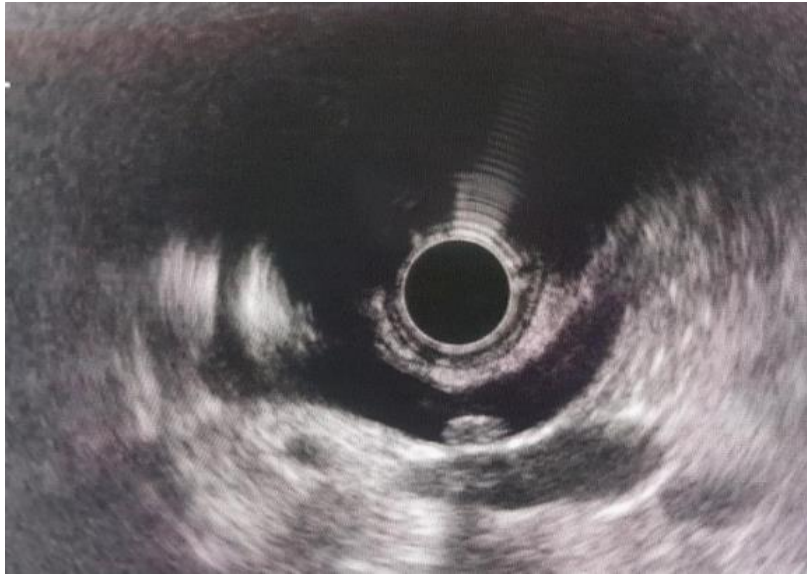


Figure 7: Echoendoscopic image of lithiasis of the common bile duct

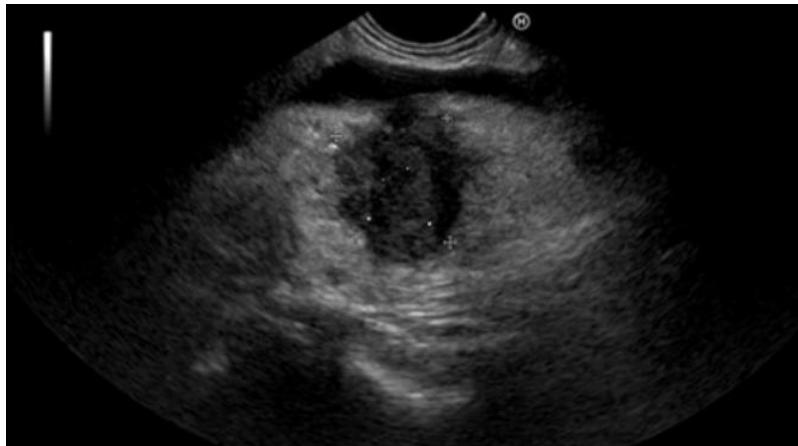


Figure 8: Echoendoscopic image of a pancreatic head tumor

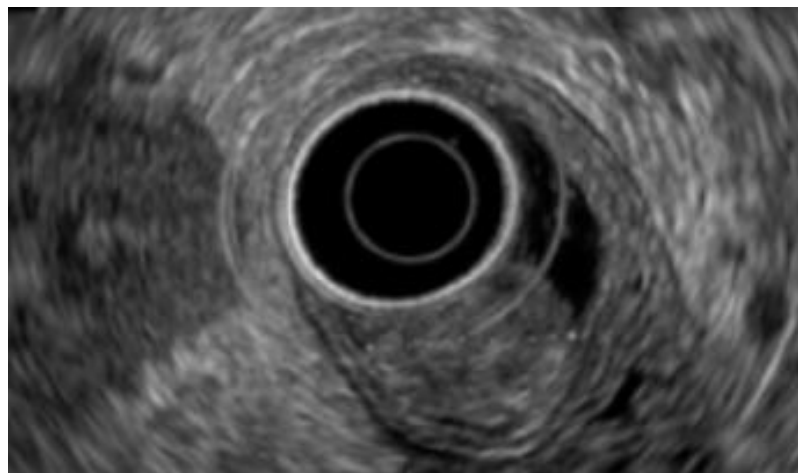


Figure 9: Echoendoscopic image of an Vaterian ampulloma

DISCUSSION

The dilation of the main bile duct with no visible obstacle in conventional imaging is a relatively frequent indication for carrying out a biliopancreatic echoendoscopy examination reaching 17,7% in our

study. However, its frequency varies according to different studies. It would be 16% in the study conducted by Sotoudehmanesh *et al.*, [1] and 6% in the study of Joshua C and *et al.*, [2] (Table 1).

Table 1: Comparison of the frequency of indication of echoendoscopy in dilated bile ducts without visible obstacles at imaging with other international studies

Author	Frequency
Our study	17,7%
Rasoul Sotoudehmanesh <i>et al.</i> , [1]	16%
Joshua C <i>et al.</i> , [2]	6%

In our series, the average age of our patients was 61,2 years. It is close to the average age found in the literature, 60,4 years according to the study conducted

by the team of Sotoudehmanesh *et al.*, [1] and 64,6 years in the study of Jennifer Phan *et al.*, [3].

Table 2: Comparison of the average age of patients with international studies

Author	Mean age
Our study	61,2 years
Sotoudehmanesh <i>et al.</i> , [1]	60,4 years
Jennifer Phan <i>et al.</i> , [3]	64,6 years

A clear female predominance was noted in our patients with a sex-ratio F/M of 2,7 which is similar to the study of Jennifer Phan *et al.*, [3] with a percentage of women of 64,6% and to the study of Mauro *et al.*, [4] with a rate of 75,4%.

In our study, cholecystectomy was the most common history in our patients, with a rate of 48,1%. It's similar to the other international studies, with a percentage of 50,9% in the study of Mauro B *et al.*, [4].

47,8% of our patients were symptomatic. The two most frequently reported symptoms were cholestatic-like jaundice in 26% of cases and abdominal

pain in 33,8% of cases. In other studies, a large number of patients were symptomatic, as in the study of Sousa M *et al.*, [5] where 50% of their patients had symptoms. In addition, jaundice and abdominal pain are the most frequently reported symptoms in various international studies [3, 4].

Also, 44,4% of our patients presented a disturbance of liver function test in association with the dilation of bile ducts. By comparing our results with those of the literature, we find that the rate of abnormal liver function tests varies considerably, from 11% in the study conducted by Malik S *et al.*, [5] and 59% according to the study by Phan J *et al.*, [3] (Table 3).

Table 3: Comparison of liver test disturbance rate between different international studies

Author	Abnormal liver test
Our study	44,4%
Malik S <i>et al.</i> , [5]	11%
Phan J <i>et al.</i> , [3]	59%

Several studies as Malik *et al.*, have revealed a correlation between elevated liver enzymes and the diagnostic yield of ultrasound-endoscopy, rising up to 53%, in contrast to the absence of enzyme abnormalities, where the yield was low at less than 6% [5].

Abdominal ultrasound is considered to be the first-line examination in the diagnosis of biliary duct dilation with a sensitivity varying from 85% to 95% [6, 7]. In our series, abdominal ultrasound is one of the most performed examinations after bili-MRI in the diagnosis of the bile duct dilation in more than 34,7% of cases. According to some authors, the contribution of abdominal ultrasound in the diagnosis of lithiasis pathology would vary from 37% to 90% depending on the experience of the operator [8]. Regarding the pancreatic tumor pathology, the ultrasound can participate both in the positive diagnosis and in its assessment of locoregional extension. Its sensitivity

varies between 55% and 90% depending essentially on the size and location of the lesion [9].

In our series, 26% of our patients had an abdominal scanner. Its performance is clearly superior to the ultrasound in the diagnosis of lithiasis pathology [10], and is a fundamental examination for the diagnosis and staging of pancreatic cancer with an excellent sensitivity exceeding 90%. However its sensitivity can drop with small tumor of less than 20mm [9, 12].

60% of our patients were able to benefit from a bili-MRI. It's a reliable and non invasive technique allowing the diagnosis of lithiasis in 81% to 100% of cases according to the studies. It also reveals the different anatomical variants of the structures of the bilio-pancreatic junction [9]. However, its sensitivity decreases in the case of micro-lithiasis and small ampullary tumors [13].

In our series, the dilation of the common bile duct was confirmed in 67% of cases. Its mean diameter was 12,2mm with extremes ranging from 8,7mm to 24mm. These values join the study of Mauro Bruno *et al.*, with an average of 12,5mm [4]. However, Eric M Nelsen *et al.*, had an average of 9,7mm [14].

In our study, the echoendoscopy examination made it possible to establish an etiological diagnosis for the dilation of the bile duct in 82% of the cases, reflecting its performance. It varies in the literature as shown in the table below (Table 4).

Table 4: Comparison of the diagnostic yield of echoendoscopy with different studies

Author	Echo-endoscopy yield
Our study	82%
Mafalda Sousa <i>et al.</i> , [15]	30%
Naveed Krishna <i>et al.</i> , [16]	50,5%
Yildiran Songur <i>et al.</i> , [17]	71%
Rasoul Sotoudehmanesh <i>et al.</i> , [1]	90%

The diagnosis retained in our study were the following: lithiasis of the bile duct, cystic dilation of bile duct, odditis, chronic pancreatitis, pancreatic head tumor and vaterian ampulloma.

Echoendoscopy allows the diagnosis of lithiasis of the common bile duct in 42,9% of cases. The

results of international studies varies between 49% and 84% [18].

Pancreatic head tumor was diagnosed by echoendoscopy in 3,8% of case joining other studies (Table 5).

Table 5: Comparison of the diagnosis yield of echoendoscopy in pancreatic head tumor with international studies

Author	Diagnosis of pancreatic head tumor by echoendoscopy
Our study	3,8%
Mauro B <i>et al.</i> , [4]	1,8%
Eric M Nelsen <i>et al.</i> , [14]	2,6%
Rasoul Sotoudehmanesh <i>et al.</i> , [1]	5,9%
Jennifer Phan <i>et al.</i> , [3]	16,2%

Our rate diagnosis of vaterian ampulloma was 3,8%. The table below compare this rate with other international series (Table 6).

Table 6: Comparison of the diagnosis yield of echoendoscopy in vaterian ampulloma with international studies

Author	Diagnosis of vaterian ampulloma by echoendoscopy
Our study	3,8%
Mauro B <i>et al.</i> , [4]	3,5%
Eric M Nelsen <i>et al.</i> , [14]	0,9%
Rasoul Sotoudehmanesh <i>et al.</i> , [1]	9,8%

In our study, chronic pancreatitis was responsible of bile duct dilation in 5,2% of cases. The

table below compare this rate with other international series (Table 6).

Table 7: Comparison of the diagnosis yield of echoendoscopy in chronic pancreatitis with international studies

Author	Diagnosis of chronic pancreatitis by echoendoscopy
Our study	5,2%
Yadegar <i>et al.</i> , [19]	3%
Wisloff <i>et al.</i> , [20]	46%

Cystic dilations are an uncommon cause of bile duct dilation. In our series, we suspected a cystic dilation in 12,9% of cases. Its incidence varies by region, ranging from 1/13500 in United states to 1/1000 in eastern countries, more particularly in Japan [21, 22].

Odditis dysfunction is a diagnosis requiring the prior performance of an echoendoscopy of a bili-MRI. Its positive diagnosis is based on the practice of a manometry. However, manometry is less performed due to pancreatic morbidity reaching 10% which is not acceptable for a diagnostic procedure [23]. Biliary

scintigraphy can replace it. In our series sphincter odditis has been suggested in 12,9% of cases.

CONCLUSION

The dilation of the bile duct is a daily challenge in the practice of any gastroenterologist. This is mainly due to the lack of well-defined consensus in the diagnostic management of the bile duct dilations especially those whose etiology could not be determined by conventional imaging.

In our study, biliopancreatic echoendoscopy made it possible to establish an etiological diagnosis of dilation of the common bile duct in 82% of cases dominated by lithiasis, followed by cystic dilation and sphincter odditis.

Echoendoscopy is therefore the examination of choice to perform in the event of any common bile duct dilation whose cause could not be visualized by the other imaging methods.

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