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ORIGINAL ARTICLE

Endosonography for suspected obstructive jaundice with no definite pathology on ultrasonography

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ultrasonography

Background/Purpose: Ultrasonography (US) cannot demonstrate all the etiologies of biliary tract dilatation in patients with jaundice. Thus, we evaluated the etiologic yield of endosonography (EUS) for suspected obstructive jaundice when no definite pathology was found on US. Additionally, we sought to identify the predictors of the most common etiologies.
Methods: We performed a retrospective review of 123 consecutive patients who had undergone EUS for suspected obstructive jaundice when no definite pathology was identified on US.
Results: The most common diagnoses included no pathological obstruction ($n = 43$), pancreatobiliary malignancy ($n = 41$), and choledocholithiasis ($n = 28$). Pancreatobiliary malignancy was associated with common bile duct (CBD) dilatation, and fever and elevated alanine aminotransferase were predictors of choledocholithiasis ($p < 0.05$). The accuracy of EUS was 95.9% (118/123) for overall cause of suspected obstructive jaundice, 100% (40/40) for no pathological finding, 100% (23/23) for ampullary cancer, 100% (13/13) for pancreatic cancer, 75% (3/4) for CBD cancer, and 92.9% (26/28) for choledocholithiasis, respectively. Besides the two patients with focal chronic pancreatitis misdiagnosed as with pancreatic cancer, EUS missed the lesions in one CBD cancer patient and two patients with choledocholithiasis. The overall accuracy of EUS in ascertaining pancreatobiliary malignancy and choledocholithiasis was comparable (97.6%, 40/41 vs. 92.9%, 26/28; $p > 0.05$).
Conclusion: Marked CBD dilatation (≥12 mm) should remind us of the high risk of malignancy, and the presence of CBD dilatation and fever is suggestive of choledocholithiasis. Negative

Conflicts of interest: The authors have no conflicts of interest relevant to this article.

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EUS findings cannot assure any pathological obstruction in patients with clinically suspected obstructive jaundice.

Introduction

Clinical history, physical examination, and laboratory tests may identify up to 90% of patients with possible obstructive jaundice, but no pathological obstruction of the biliary tract sometimes can be encountered in patients with suspected obstructive jaundice.[1] Pancreatobiliary malignancy and choledocholithiasis are the most common causes of obstructive jaundice, and imaging modalities are required for demonstrating the level and the etiology of biliary tract obstruction to aid further management.

Ultrasonography (US) is a noninvasive, inexpensive, and easily accessible diagnostic tool, and it is crucial for the identification and evaluation of the cause of suspected obstructive jaundice. Nonetheless, it is hard to visualize both the distal part of the common bile duct (CBD) and the papillary area clearly with US because bowel gas and abdominal fat often interfere with the transmission of the ultrasound beam. It is reported by some authors that the accuracy of US in demonstrating the level and the etiology of biliary tract obstruction is 27–60% and 23–38%, respectively.[2,3]

Endoscopic retrograde cholangiopancreatography (ERCP) is best reserved as a therapeutic tool for the risks of pancreatitis, cholangitis, hemorrhage, perforation, and fatality. Computed tomography (CT) can be used to evaluate the extrahepatic biliary tree and has the advantages of noninvasiveness, operator independence, and high technical achievement rate. Nonetheless, CT carries the risks of radiation exposure and the use of contrast agents can lead to kidney injury or allergic reaction. Magnetic resonance imaging (MRI) is useful for assessing the extrahepatic biliary tree, but its accuracy decreases in the case of scanty fat planes or little fluid contained in the CBD. In addition, MRI cannot be applied to patients with claustrophobia or implanted electronic devices.

Similar to ERCP, endosonography (EUS) provides a direct endoscopic view of the periampullary area. With additional high-frequency ultrasound, EUS provides an excellent sonographic evaluation of the extrahepatic biliary tree, pancreas, and the duodenal wall. However, the disadvantages of EUS include its operator dependence, equipment inaccessibility, and patient discomfort during endoscopic study.

The best diagnostic studies for suspected obstructive jaundice of unknown cause remain uncertain.[4] We undertook this study to evaluate the etiologic yield of EUS for suspected obstructive jaundice with no definite pathology identified during US. We also determined the predictors of the most common etiologies of obstructive jaundice, including pancreatobiliary malignancy and choledocholithiasis.

Table 1 Characteristics of patients undergoing endosonography for jaundice without definite pathology on ultrasound.

Findings	Mean ± SD or proportion
Age (y)	61.3 ± 14.4 (n = 123)
Sex (M/F)	88/35 (n = 123)
Mean CBD diameter (mm)	11.9 ± 4.8 (n = 123)
Mean pancreatic duct diameter (mm)	2.6 ± 1.6 (n = 123)
Body mass index (kg/m^2)	22.3 ± 3.5 (n = 88)
Symptoms	
Fever	16.9 (21/123)
Abdominal pain	69.4 (86/123)
Weight loss	15.3 (19/123)
Serum ALT > 40 IU/L	76.3 (90/118)
Elevated ALK-P (>338 U/L)	67.0 (61/91)
Serum amylase > 116 U/L	34.4 (22/64)
Elevated CA19-9 (>37 U/mL)	75.0 (54/72)
Elevated CEA (>5 ng/mL)	20.6 (14/68)
Diagnosis	
No pathologic obstruction	32.5 (40/123)
Ampullary cancer	18.6 (23/123)
Pancreatic cancer	10.6 (13/123)
CBD cancer	3.3 (4/123)
Choledocholithiasis	22.8 (28/123)
Mirizzi's syndrome	0.8 (1/123)
Gall bladder cancer	0.8 (1/123)
Chronic pancreatitis	9.8 (12/123)
Mucinous cystoadenocarcinoma of the pancreas	0.8 (1/123)

Data are presented as % (n/N) unless otherwise indicated.
ALK-P = alkaline phosphatase; ALT = alanine aminotransferase; CA = carbohydrate antigen; CBD = common bile duct; CEA = serum carcinoembryonic antigen.

Materials and methods

Patients

Patients who met the following criteria were included in the study: (1) serum total bilirubin >1.2 mg/dL; (2) abdominal US showing the diameter of the CBD >7 mm; (3) the etiology of potential obstruction in the biliary tract was not obvious on abdominal US; and (4) had been referred for EUS. The definition of suspected obstructive jaundice included the first three criteria. Patients with a history of choledocholithiasis prior to undergoing abdominal US were excluded.

From March 1998 to March 2010, we retrospectively enrolled 123 patients who underwent EUS for suspected obstructive jaundice and for whom a definite pathology was not found during the initial US (Table 1). Among the 123 patients, 66 underwent CT and 45 underwent MRI (Fig. 1). EUS, MRI, CT, and ERCP were performed within 48 hours of finding no visible pathology on US. It was unusual for