



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

EFFICIENCY OF ULTRASONOGRAPHY IN DIAGNOSIS OF CHOLECYSTITIS, AND OBSTRUCTED JAUNDICE

¹Abdulkarim Munif Alotaibi, ²Feras Mzahem A Alshehri, ³Saeed Saleh Barakat,
⁴MOHAMMAD HAMAD ALSHALAWY, ⁵Abdulrhman Mohamed Hafiz, ⁶Majed Saud
Alharbi, ⁷Basel Fahad Almutairi, ⁸Fahad Sulaiman Alharbi, ⁹Khaled Salem Alsaadoun,

¹⁰Abdulrahman Abdulkhaliq Alghamdi,

¹Radiographer Specialist, ALIMAN GENERAL HOSPITAL

²Cardiac Radiographer Technologist, King Abdullah bin Abdul-Aziz University Hospital,
(KAAUH)

³Medical imaging Technologist, King Abdullah bin Abdul-Aziz University Hospital, (KAAUH)

⁴Echocardiography Technologist, King Fahad Medical City

⁵Cardiac Radiographer Technologist, King Fahad Medical City

⁶Radiographer Technologist, Huraymila Hospital

⁷Radiographer Technologist, Alwadi Health Centre

⁸Radiographer Specialist, Health Affairs in Riyadh

⁹Radiographer Specialist, Health Affairs in Riyadh,

¹⁰Cardiac Radiographer Technologist, King Fahad Medical City

Article Received: November 2022 **Accepted:** November 2022 **Published:** December 2022

Abstract:

Determine the sensitivity and specificity of ultrasonography in diagnosing obstructive jaundice and acute cholecystitis. Using MEDLINE and PUBMED, relevant papers published in English up until June 2022 were systematically searched. Cholestasis, choledocholithiasis, cholangiography, endoscopic, and obstructive jaundice were included in the search approach. Ultrasonography is a trustworthy imaging tool for determining the etiology and severity of blockage in postoperative jaundice. The sensitivity is sufficient to provide early surgical intervention, hence avoiding morbidity and mortality associated with late operations.

Corresponding author:

Abdulkarim Munif Alotaibi,
Radiographer Specialist, ALIMAN GENERAL HOSPITAL

QR code



Please cite this article in press Abdulkarim Munif Alotaibi et al, *Efficiency Of Ultrasonography In Diagnosis Of Cholecystitis, And Obstructed Jaundice.*, Indo Am. J. P. Sci, 2022; 09(12).

INTRODUCTION:

Obstructive jaundice, often known as surgical jaundice, is a prevalent illness worldwide [1]. Choledocholithiasis, chronic pancreatitis, and neoplasms of the pancreas, gallbladder, biliary system, or ampulla of Vater are frequent causes of obstruction of the extrahepatic biliary tree in adult patients. Other less common causes include metastasis to the porta hepatis, hepatocellular carcinoma close to the hilum, perihepatic lymphadenopathy, sclerosing cholangitis, and other types of cholangitis [2,3,4].

Numerous patients report with advanced postoperative jaundice, necessitating a battery of tests to evaluate the source and degree of blockage. The array of invasive and noninvasive radiological techniques commonly used to investigate hepatobiliary lesions consists of computed tomography (CT), percutaneous transhepatic cholangiography (PTC), endoscopic ultrasound (EUS), endoscopic retrograde cholangiopancreatography (ERCP), helical CT cholangiography, Magnetic Resonance Cholangiopancreatography (MRCP), radionuclide imaging, and ultrasonography [5]. In varied degrees, these investigations are effective for determining both the reason and location of obstruction. Nevertheless, ultrasonography is the least intrusive initial imaging technique for evaluating jaundiced patients [6, 7].

10 to 20% of the normal population in the United States has biliary stones, but only 1% to 2% of them develop symptoms [7]. Acute cholecystitis is the most important complication of gallbladder stones. Acute cholecystitis is characterized by right upper quadrant (RUQ) discomfort, fever, and the Murphy sign [8]. These findings direct physicians to the correct diagnosis, however they are insufficient and do not provide sufficient diagnostic yield [8]. Ultrasonography, hepatobiliary iminodiacetic with scintigraphy (HIDA) scan, and abdominal computed tomography scan are effective diagnostic techniques with varying accuracies for the diagnosis of acute cholecystitis [9].

Ultrasound has been one of the most sensitive and specific diagnostic modalities for acute cholecystitis and has become the modality of first choice in many guidelines [10]. Important sonographic findings of acute cholecystitis include gallbladder stones, increased wall thickness, wall edema, and fluid surrounding the gallbladder [10].

One study [11] demonstrated the excellent positive predictive value of ultrasonography of the right upper quadrant (RUQ) in emergency settings for the diagnosis of acute cholecystitis. Kendall et al. assessed that the sonographic Murphy sign has a sensitivity of 96% and a specificity of 88% for the diagnosis of acute cholecystitis in an emergency context [12].

DISCUSSION:

As less costly, portable ultrasound devices were accessible in the mid-1980s, emergency departments (EDs) began using ultrasonography as a diagnostic tool [13]. Ultrasound is currently accepted by emergency physicians in the ED (EPs). 96% of emergency medicine (EM) residencies include ultrasound training, and there are an increasing number of fellowships in emergency ultrasonography for EM-trained physicians [14].

Approximately 20 million Americans have gallstones, with an additional million being diagnosed each [15]. Traditionally, evaluation comprises an ultrasound of the right upper quadrant (RUQ) performed by a technician and interpreted by a radiologist. However, ultrasonography radiology is not universally accessible to ED patients. Ultrasonography of the RUQ in the ED can lead to shorter hospital stays, cheaper expenditures, and increased patient satisfaction [16].

There are numerous causes of biliary blockage, including benign and malignant illnesses. Malignant biliary obstruction (MBO) is typically caused by cholangiocarcinoma, gall bladder and pancreatic cancers, metastatic lymphadenopathy, and rarely by hepatic and advanced gastric and duodenal cancers. Frequently, cancers are incurable at the time of diagnosis, and only palliative care can enhance patients' quality of life [15,16]. The primary objective of biliary treatments in these patients is to decompress the obstructed biliary system and, if possible, to create a connection between the biliary tree and the intestine to allow for normal bile flow. This reduces pain, jaundice, and the likelihood of cholangitis by removing the obstruction. As hepatic insufficiency is a risk factor for major hepatectomy, biliary drainage improves liver function prior to surgery or neoadjuvant chemotherapy [16].

The potential treatment options for the therapy of MBO can be classified as surgical, endoscopic, and percutaneous. Each strategy has its own advantages and disadvantages. The technique of therapy is determined by local procedures and experience, the type of biliary stricture, the patient's state, and the

patient's preference. Surgical palliation includes a biliary bypass (often hepatico-jejunostomy) and a gastric bypass (gastrojejunostomy), which are typically performed for advanced pancreatic head cancers [13,15]. This method is associated with a lengthier hospital stay [16]. Due to the advent of less invasive procedures and duodenal and biliary stents, elective surgical palliation is performed less frequently today. Endoscopic drainage and stenting are highly efficient in the treatment of intermediate and distal malignant biliary strictures [17]. The benefits of this method include less pain, the absence of discomfort produced by an external catheter, and a decreased incidence of biliary peritonitis [18]. Pancreatitis is the most significant complication. Cholangitis is more prevalent as compared to percutaneous therapy (PCT) due to non-drainage of certain segments, particularly in hilar blockages [20]. However, when obstructions are too low or too high, the endoscopic method has a lower success rate, and percutaneous techniques are preferred [21]. Recently, endoscopic ultrasonography has been utilized to aid biliary drainage in cases when endoscopic retrograde cholangiopancreatography has failed [22]. Endoscopic ultrasonography facilitates intrahepatic (hepatogastrostomy) and extrahepatic (choledochododenostomy, choledochojejunostomy) drainage procedures with success rates greater than 90 percent, but is linked with severe complications [22]. The importance of ultrasound cannot be overstated [23]. As a screening method prior to percutaneous intervention, it is extremely beneficial. It aids in the evaluation of biliary dilatation, the presence of ascites, the volume of the liver lobes/segments, and the patency of the primary and secondary biliary confluences, since this determines the surgical approach, the lobe to be drained, and the necessary equipment.

Before performing percutaneous intervention, the patient's coagulation profile must be evaluated. Prothrombin time (PT) and international normalized ratio (INR) are often adequate. For the surgery to be free of substantial bleeding problems, PT values

should ideally be fewer than four seconds above the control level and INR should be less than 1.5 [24].

The evaluation of obstructive jaundice is a typical clinical issue. Frequently, the initial issue is distinguishing intrahepatic from extrahepatic biliary blockage. The most prevalent causes of extrahepatic blockage are choledocholithiasis and pancreaticobiliary malignancies (pancreatic head cancer, ampullary cancer, and cholangiocarcinoma). Less frequent causes include benign strictures, chronic pancreatitis, nodes metastatic to the porta hepatis, and primary sclerosing cholangitis. Numerous studies have demonstrated that clinical data such as the patient's medical history, physical examination, and laboratory testing can accurately identify up to 90% of individuals whose jaundice is due to extrahepatic blockage [25,26,27].

The various imaging techniques can be categorized as either direct or indirect [28]. These invasive procedures include ERCP and PTC. They carry a greater risk, but also have the ability to collect tissue samples and execute therapeutic operations, such as biliary drainage with stent placement or stone removal. The primary danger associated with these methods is pancreatitis and cholangitis due to opacification of a clogged biliary tree that cannot be drained, with uncommon complications such as perforation, hemorrhage, or bile leakage [29,30,31]. In addition, direct approaches are confined to evaluating the intrinsic biliary tract and are incapable of determining the presence of extrinsic compression of the biliary tree by surrounding structures. Indirect approaches offer a reduced risk of procedure and may permit staging of cancers. New indirect modalities, including as MRCP (with solid organ MR), EUS, and hCTC (with hCT), provide enhanced imaging quality with a low risk profile. In addition to the opportunity for biopsy and cytology, EUS has some therapeutic potential, but because it needs conscious sedation, it is the most invasive of the indirect imaging technologies. **Table I** outlines the pros and cons of the primary strategies addressed [32].

Table I. Comparison of advantages and disadvantages of the main biliary imaging techniques.

Imaging modality	Indirect			Direct		
	US	hCTC*	MRCP [†]	EUS	ERCP	PTC
Portability	+++	—	—	++	+	—
Safety	+++	++	+++	++	+	+
Operator dependence	+++	+	++	+++	++	++
Low cost	+++	+	+	+	+	++
Staging of malignancy	+	+++	+++	+++	—	—
Tissue sampling	+	+	—	+++	+++	++
Therapy	—	—	—	+	+++	+++

CONCLUSION:

Ultrasonography is useful for evaluating patients with postoperative jaundice in situations with limited resources. It can reveal both benign and malignant obstructive jaundice causes. In the largest sample size to date in emergency medicine ultrasound literature, emergency physicians are accurate at diagnosing cholelithiasis using bedside ultrasound. Cholecystosonography is the first imaging technique utilized to diagnose cholelithiasis. In experienced hands, ultrasound is noninvasive, very affordable, radiation-free, and extremely precise.

REFERENCES:

1. Chalya PL, Kanumba ES, McHembe M: Etiological spectrum and treatment outcome of obstructive jaundice at a University teaching Hospital in northwestern Tanzania: a diagnostic and therapeutic challenges. *BMC Res Notes* 2011; 4: 147.
2. Singh A, Mann HS, Thukral CL, Singh NR: Diagnostic accuracy of MRCP as compared to ultrasound/CT in patients with obstructive jaundice. *J Clin Diagn Res* 2014; 8: 103–107.
3. Dodiya-Manuel A, Jebbin N: Management of obstructive jaundice: experience in a tertiary centre in Nigeria. *Asian J Med Clin Sci* 2013; 2: 21–23.
4. Gameraddin M, Omer S, Salih S, Elsayed SA, Alshaikh A: Sonographic evaluation of obstructive jaundice. *Open J Med Imaging* 2015; 5: 24–29.
5. Bhargava S, Thingujam U, Bhatt S, Kumari R, Bhargava S: Imaging in obstructive jaundice: a review with our experience. *JIMSA* 2013; 26: 43–46.
6. Tse F, Barkun JS, Romagnuolo J, Friedman G, Bornstein JD, Barkun AN: Nonoperative imaging techniques in suspected biliary tract obstruction. *HPB* 2006; 8: 409–425.
7. Idowu BM, Onigbinde SO, Ebie IU, Adeyemi MT: Gallbladder diseases in pregnancy: sonographic findings in an indigenous African population. *J Ultrason* 2019; 19: 269–275.
8. Trowbridge RL, Rutkowski NK, Shojania KG. Does this patient have acute cholecystitis? *JAMA*. 2003;289(1):80–6.
9. Miura F, Takada T, Strasberg SM, Solomkin JS, Pitt HA, Gouma DJ, et al. TG13 flowchart for the management of acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Sci*. 2013;20(1):47–54.
10. Kiewiet JJ, Leeuwenburgh MM, Bipat S, Bossuyt PM, Stoker J, Boermeester MA. A systematic review and meta-analysis of diagnostic performance of imaging in acute cholecystitis. *Radiology*. 2012;264(3):708–20.

11. Zenobii MF, Accogli E, Domanico A, Arienti V. Update on bedside ultrasound (US) diagnosis of acute cholecystitis (AC) *Intern Emerg Med.* 2016;11(2):261–4.
12. Scruggs W, Fox JC, Potts B, Zlidenny A, McDonough J, Anderson CL, et al. Accuracy of ED Bedside Ultrasound for Identification of gallstones: retrospective analysis of 575 studies. *West J Emerg Med.* 2008;9(1):1–5.
13. Schlager D, et al. A prospective study of ultrasonography in the ED by emergency physicians. *Am J Emerg Med.* 1994;12:185–189.
14. Jehle D, Guarino J, Karamanoukian H. Emergency department ultrasound in the evaluation of blunt abdominal trauma. *Am J Emerg Med.* 1993;11:342–346.
15. Lanoix R, et al. A preliminary evaluation of emergency ultrasound in the setting of an emergency medicine training program. *Am J Emerg Med.* 2000;18:41–45.
16. Kimura A, Otsuka T. Emergency center ultrasonography in the evaluation of hemoperitoneum: a prospective study. *J Trauma.* 1991;31:20–23.
17. Kim KM, Park JW, Lee JK, Lee KH, Lee KT, Shim SG. A Comparison of Preoperative Biliary Drainage Methods for Perihilar Cholangiocarcinoma: Endoscopic versus Percutaneous Transhepatic Biliary Drainage. *Gut Liver.* 2015;9:791–799.
18. Indar AA, Lobo DN, Gilliam AD, Gregson R, Davidson I, Whittaker S, Doran J, Rowlands BJ, Beckingham IJ. Percutaneous biliary metal wall stenting in malignant obstructive jaundice. *Eur J Gastroenterol Hepatol.* 2003;15:915–919.
19. De Palma GD, Galloro G, Siciliano S, Iovino P, Catanzano C. Unilateral versus bilateral endoscopic hepatic duct drainage in patients with malignant hilar biliary obstruction: results of a prospective, randomized, and controlled study. *Gastrointest Endosc.* 2001;53:547–553.
20. Poincloux L, Rouquette O, Buc E, Privat J, Pezet D, Dapigny M, Bommelaer G, Abergel A. Endoscopic ultrasound-guided biliary drainage after failed ERCP: cumulative experience of 101 procedures at a single center. *Endoscopy.* 2015;47:794–801.
21. Cowling MG, Adam AN. Internal stenting in malignant biliary obstruction. *World J Surg.* 2001;25:355–359; discussion 359–361.
22. Rerknimitr R, Kladcharoen N, Mahachai V, Kullavanijaya P. Result of endoscopic biliary drainage in hilar cholangiocarcinoma. *J Clin Gastroenterol.* 2004;38:518–523.
23. Madhusudhan KS, Gamanagatti S, Gupta AK. Imaging and interventions in hilar cholangiocarcinoma: A review. *World J Radiol.* 2015;7:28–44.
24. Patel IJ, Davidson JC, Nikolic B, Salazar GM, Schwartzberg MS, Walker TG, Saad WA. Consensus guidelines for periprocedural management of coagulation status and hemostasis risk in percutaneous image-guided interventions. *J Vasc Interv Radiol.* 2012;23:727–736.
25. Weber A, Gaa J, Rosca B, Born P, Neu B, Schmid RM, Prinz C. Complications of percutaneous transhepatic biliary drainage in patients with dilated and nondilated intrahepatic bile ducts. *Eur J Radiol.* 2009;72:412–417.
26. Kim KH, Kim W, Lee HI, Sung CK. Prediction of common bile duct stones: its validation in laparoscopic cholecystectomy. *Hepatogastroenterology.* 1997;44:1574–9.
27. Liu TH, Consorti ET, Kawashima A, Tamm EP, Kwong KL, Gill BS, et al. Patient evaluation and management with selective use of magnetic resonance cholangiography and endoscopic retrograde cholangiopancreatography before laparoscopic cholecystectomy. *Ann Surg.* 2001;234:33–40.
28. Lacaine F, Corlette MB, Bismuth H. Preoperative evaluation of the risk of common bile duct stones. *Arch Surg.* 1980;115:1114–16.
29. Tse F, Barkun JS, Barkun AN. The elective evaluation of patients with suspected choledocholithiasis undergoing laparoscopic cholecystectomy. *Gastrointest Endosc.* 2004;60:437–48.
30. Loperfido S, Angelini G, Benedetti G, Chilovi F, Costan F, De Berardinis F, et al. Major early complications from diagnostic and therapeutic ERCP: a prospective multicenter study. *Gastrointest Endosc.* 1998;48:1–10.
31. Freeman ML, Nelson DB, Sherman S, Haber GB, Herman ME, Dorsher PJ, et al. Complications of endoscopic biliary sphincterotomy. *N Engl J Med.* 1996;335:909–18.
32. Masci E, Toti G, Mariani A, Curioni S, Lomazzi A, Dinelli M, et al. Complications of diagnostic and therapeutic ERCP: a prospective multicenter study. *Am J Gastroenterol.* 2001;96:417–23.
33. Cotton PB, Lehman G, Vennes J, Geenen JE, Russell RC, Meyers WC, et al. Endoscopic sphincterotomy complications and their management: an attempt at consensus. *Gastrointest Endosc.* 1991;37:383–93.

