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EFFICIENCY OF ULTRASONOGRAPHY IN DIAGNOSIS OF CHOLECYSTITIS, AND OBSTRUCTED JAUNDICE

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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.

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].

DISCSUUSION:

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.

	Indirect			**Direct**		
Imaging modality	**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.

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