

Comparison of Ultrasound Findings Versus Operative Findings in Patients with Biliary Pathology

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ABSTRACT

Objective: To determine the accuracy of ultrasound in detecting pathology of the biliary tract and also to know different biliary anomalies detected by ultrasound and compare this with operative findings.

Methodology: This observational cross-sectional study was conducted at the General surgery department of Liaquat University of Medical and Health Sciences, one year after approval of proposal. Patients underwent biliary surgeries following ultrasound findings, with biliary pathology, of both gender and aged >15 years were included. Applicable treatment was employed which involved operative intervention. The data along with ultrasound of the abdomen and Operative findings were recorded on a proforma. Results were formulated using SPSS 20.

Results: Out of 100 patients, male and female patients were 13% and 87% respectively. The mean age was 42.0±6.4 years. 90% of patients had epigastrium pain, 40% of patients had anorexia, 35% had vomiting and nausea, 25% had fatigue and 16% had fever. Laparoscopic cholecystectomy was performed in 60% of patients, while 40% of patients experienced open surgery. A single stone was recorded in 22% of cases. On ultrasound, 68% of cases were found to have multiple calculi in the Gallbladder. Although, a total of 100(100%) cases underwent surgical procedure and 70% of the patients, following surgical intervention, were found to have multiple calculi. Notably, operated cases were found to have a significantly lesser frequency of acalculus cholecystitis than those of the ultrasound findings (p-value 0.04). However, no significant variance was observed between operative and ultrasound findings in patients with chronic cholecystitis, CBD stone, benign polyp and gall bladder perforation.

Conclusion: It is concluded that ultrasonography contributes significantly as an initial screening technique for the detection of gallbladder/biliary pathology, with significant benefits such as easy accessibility, low costs, no contrast material needed and no ionizing radiation.

Keywords: biliary disease, operative findings, ultrasound findings

INTRODUCTION

Ultrasound, in biliary pathology, is the first-line benchmark diagnostic investigation ^{1,2,3}. In biliary pathology diagnosis, ERCP ultrasound is a readily available, sensitive, specific and less expensive diagnostic modality in comparison to other modalities such as MRCP and CT scan; however, ERCP ultrasound is operator dependent.^{4,5} Several abnormalities in the pancreatic biliary site may be missed by the ultrasound operator, the particularly early stage of gallbladder malignancy, CBD stone malignancy of the head of the pancreas because of gas or fat shadow interposition.⁶ In addition, the ultrasound abdomen may not provide the operating surgeon with precise details of this region, which thus poses considerable challenges and problems. Such inadequate information given by ultrasound can also enhance the rates of mortality and morbidity among patients undergoing a surgical procedure for biliary pathology. Because of inaccurate data supplied by abdominal ultrasound, per operative, iatrogenic injury to the biliary tree may occur.⁷ Patients must be thoroughly investigated before the surgery to prevent postoperative complications. Ultrasound findings should be compared with surgical findings within all patients experiencing the biliary surgical procedure. Ultrasound is a common daily practice procedure and is a first-line screening approach of

preference in several clinical presentations (– for example abdominal pain) and as a diagnostic tool in asymptomatic cases. It is an effective, secure, non-invasive, affordable, readily accessible, replicable screening approach that is highly specific and sensitive to the identification of several biliary tree pathologies and when the biliary process is normal, may often suggest another possible choice as an explanation of symptoms in a patient. Yet it is a particularly operator-dependent screening modality and its diagnostic performance is often affected by the circumstance, like obesity, non-fasting, involvement of surgical dressings and distended abdomen induced by intestinal gas. This study is based on biliary pathology ^{8,9} associated ultrasound findings and these findings were contrasted with operative findings in our setup.

MATERIAL AND METHODS

Study design: Prospective observational study

Setting of study: All the department of general surgery, Liaquat University Hospital

Duration of study: One year after approval of synopsis

Inclusion criteria: Patients underwent biliary surgeries following ultrasound findings, with biliary pathology, of both gender and aged >15 years were included.

Exclusion criteria: All the biliary pathology in patients aged less than 15 years, not fit for anaesthesia and those who have not given consent for the study were excluded

Data Collection Procedure: All the biliary pathology patients were admitted. These patients underwent detailed medical history including age, gender, jaundice, fever, vomiting, pain, the colour of urine and stool, itching, and weight loss. A detailed clinical investigation was carried out based on jaundice and anaemia, standard diagnostic investigations such as ESR, LFT, urea, blood CP, sugar, Anti HCV, HBsAg, Ultrasound abdomen, and ECG and CXR if needed. Appropriate management, including operative intervention, was applied and surgical findings were recorded. All this information was documented using a pre-constructed proforma. In particular, the results were finalized with respect to ultrasound findings versus operative findings in biliary pathology. The data analysis was performed using SPSS 20.

RESULTS

This study involved 100 patients in total. The mean age was found to be 42 ± 6.4 years, with an age ranging from 24 to 60 years. 20% of patients were in the 15-30 years of age group, 35% in the 31-45 years of age group and 45% of patients were in the 46-60 years of age group. Out of 100 cases, males were 13.0% and females were 87.0%. In terms of residential status, 30% out of 100 patients were rural residents, while 70% of the patients were residing in the urban region. In terms of occupational status, 35% of the patients were housewives, 25% teachers, 10% drivers, 9% laborers and 21% of patients were performing multiple works. In terms of socioeconomic status, 60% of the patients were belonging to the poor class, 30% were belonging to the middle class, whereas 10% were belonging to the upper class. **Table.1**

As per clinical presentation, 90% of the patients had epigastric pain, 20% presented with abdominal pain, 40% had anorexia, 35% had vomiting and nausea 25% were presented with tiredness and 16% of the patients had fever (as reported in the table.2)

Table 1: Demographic information of patients (n=100)

Variables	Mean±SD	No. of patients/(%)
AGE	Mean±SD	42.6±6.4 years
	15-30	20/20.0%
	31-45	35/35.0%
	46-60	45/45.0%
Gender	Male	13/13.0%
	Female	87/87.0%
Residence	Rural	30(30.0%)
	Urban	70(70.0%)
Occupation	House wife	35(35.0%)
	Teacher	25(25.0%)
	Driver	10(10.0%)
	Laborer	09(09.0%)
	Multiple work performer	21(21.0%)
Socioeconomic status	Poor	60(60.0%)
	Middle	30(30.0%)
	Upper	10(10.0%)

Table 2: Clinical presentation of the cases n=100

Clinical presentation	No. of patients/(%)
Epigastrium pain	90 (90.0%)
Abdominal pain (radiating to back)	20 (20.0%)
Anorexia	40 (40.0%)
Nausea, vomiting	35 (35.0%)
Tiredness	25 (25.0%)
Fever	16 (16.0%)

The difference between operative findings and ultrasound findings were statistically insignificant (p-value 0.401). In terms of ultrasound findings, 22% of the patients had a single gallstone and 68% of cases were found to have multiple calculi. In terms of operative findings, 19% of cases were found to have single calculus, while 70% of patients had multiple calculi when operated. There was only one case of acalculous cholecystitis in each of the operative and the ultrasound findings. However, only in operative findings, Gall bladder perforation was detected in 2 patients. In both the ultrasound findings and the operative findings, CBD stone and benign polyp was found to be almost the same. Table.3

Table 3: Ultrasound findings VS operative findings (n=100)

Pathology	U/S and operative findings		
	U/S	Operative	p-value
Cholelithiasis			0.401
Single	22	19	
Multiple	68	70	
Acalculous cholecystitis	01	01	
Gall bladder perforation	00	02	
CBD Stone	06	05	
Benign polyp	03	03	
Total	100	100	

U/S= Ultrasound

DISCUSSION

Ultrasound is utilized as an initial procedure for screening the patients of suspected biliary pathology.¹⁰ Even though this modality of imaging is cost-effective, it is readily accessible but mostly operator-dependent. In our research, the efficacy of ultrasound findings was determined by contrasting them with surgical findings among patients who experienced surgical procedures for biliary pathologies and biliary conditions including cholelithiasis, acalculous cholecystitis and calculus cholecystitis. Ultrasound-based evaluation was performed for benign polyp and CBD Stone and contrasted with intraoperative outcomes. The mean age of study participants was 42 ± 6.4 years, with an age range of 24 to 60 years. However most of the patients 45% were aged between 46 and 60 years. Out of 100 cases, males were 13.0% and females were 87.0%. Similarly, Hinduja TK et al¹¹ documented that the mean age in their study was 45.62 ± 11.99 years, most of the patients were females, and the male to female ratio was 1:4.5. Comparable finding were documented in other studies of Kolla SB et al¹² and Catani M et al¹³.

In our study, in terms of clinical presentation, 90% of the patients had epigastric pain, 20% presented with abdominal pain, 40% had anorexia, 35% had vomiting and nausea 25% were presented with tiredness and 16% of the patients had a fever.

In our study, 90% of the cases were found with cholelithiasis. Similarly Zeman RK et al¹⁴ and Bortoff GA et al¹⁴ reported cholelithiasis in 80% of patients on ultrasonography. However, their findings were less prevalent than the findings of our study.

In the treatment of patients with suspected cholelithiasis and cholecystitis, ultrasound seems to be an appropriate diagnostic technique. In our study, only 1 case of acalculous cholecystitis was found in both the ultrasound findings and the operative findings respectively. Similarly, Lorusso F et al¹⁶ documented that a few ultrasonography findings are further closely correlated with acute cholecystitis as compared to others: the positive Murphy's sign (pain is induced by either the palpation of the sonographer under instruction or the transducer, exactly at gallbladder) is stated to have high sensitivity of around 88%.^{17,18} Ralls et al.¹⁹ documented that the potential to evaluate Murphy's sign on sonography, which is a strong predictor of acute cholecystitis with 92% of sensitivity, is among the most pertinent advantages of ultrasound as compared to other imaging techniques against acute cholecystitis. The gallbladder wall thickness of > 3.5 mm is an independent and reliable indicator of acute cholecystitis. We propose the recommendations similar to the study of Imhof M. et al²⁰.

In our study, 60% of patients experienced laparoscopy, whereas open surgery was performed in 40.0% of patients. Similarly, several different studies reported Laparoscopic cholecystectomy as a most frequently undertaken abdominal surgical procedure in developed countries, with around 0.9 million procedures undertaken each year in the United States and Europe.^{21,22}

In differentiating cholelithiasis from cholecystitis, physical investigation and laboratory tests lack adequate precision.²³ Therefore, imaging studies mostly require the safe disposal of patients with epigastric or right upper quadrant pain. In most of these cases, ultrasound is a primary procedure of preference and usually depends on a wide range of findings (thickening of the anterior gallbladder wall, hydrops, pericholecystic wall/fluid edema, or the ultrasonographic Murphy' sign) for definitive diagnosis.²³ In our study, the difference between operative findings and ultrasound findings were statistically insignificant (p-value 0.401). Moreover, on ultrasound, 22% of the patients had single gallstone and 68% of cases were found to have multiple calculi, while in terms of operative findings, 19% of cases were found to have single calculus, and 70% of patients had multiple calculi. There was only one case of acalculous cholecystitis in each of the operative and the ultrasound findings. Gall bladder perforation was detected in 2 patients. In both the ultrasound findings and the operative findings, CBD stone and benign polyp was found to be almost same. Our findings occurred in line with the findings of other studies that documented ultrasonography as an excellent diagnostic procedure for cholelithiasis however less accurate in cases of acute cholecystitis.²⁴⁻²⁶ Alkarboly TA et al²⁷ documented that ultrasonography may contribute significantly as an initial procedure of screening for biliary pathology and CBD stone due to various benefits including prompt availability and low cost.

CONCLUSION

It is concluded that ultrasonography, in cases of basic biliary pathology, is a reliable and non-invasive diagnostic procedure. However during surgical procedure for biliary disease, we must look critically for the anatomy as well as other pathologies to avoid any complication as ultrasound is primarily operator-dependent and also operative findings can vary from ultrasound findings.

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