



EVALUATION OF GALLBLADDER DISEASES USING ULTRASONOGRAPHY

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ABSTRACT Patients who have gallbladder disease may commonly present with acute right upper quadrant pain, nausea or vomiting, mid-epigastric pain, and/or jaundice. Etiologies include inflammation with or without infection, noninflammatory disorders, and benign or malignant neoplasms of the gallbladder or bile ducts. Ultrasound (US) is now accepted as the initial imaging modality of choice for the work-up of suspected gallbladder disease. A retrospective study was carried out at King Fahad Hospital (KFH) and Buraidah Central Hospital, to discuss the protocol of ultrasound scanning in demonstrating incidence and complication of Gall-bladder (GB) pathologies. Known cases of GB pathologies (150 patients) were surveyed by ultrasound using spatial digital iU22 Philips Convex probe 3.5 MHz. All patients were evaluated with ultrasonography following the international scanning guidelines and protocols. The age of the patients is between (26 - 89) years, 76 Patients (50.60%) were males and 74 patients (49.40%) were females. Range of age group of accumulation for gallstone presence was (26 - 58) years and most common in females than males. Incidence of gallstone are 88% (58.7%) patients (female 34.7% and 24% male). And ratio of incidence is between female to males 13:9. Other pathologies of gallbladder were found to be cholecystitis 16.60%, polyp with sludge 16.60%, benign tumor 1.30%, normal 6.70% Ultrasonography is a single imaging modality sufficient for evaluation of patient with suspected gallbladder pathologies which can provide information about the presence of gallstone and more over about site and cause of biliary tract obstruction. Ultrasound is highly sensitive and specific means for diagnosis of the gallbladder stones. Sensitivity and specificity of ultrasound in evaluation of gallstones high (97.7%,95. 6%) respectively. Confirmation of gallbladder stones in this study is done by cholecystectomy and CT scan.

KEYWORDS : ultrasound, Cholecystitis, Gallbladder

1. INTRODUCTION

Abdominal pain can result from abnormalities in gall bladder, kidneys, pancreas, stomach, duodenum, spleen... etc. ⁽¹⁾. All these conditions can be diagnosed easily via sonographic procedure. Other cases cannot be properly diagnosed with ultrasound such as uncomplicated peptic ulcer disease, acute myocardial infarction and basal pneumonitis ⁽²⁾. Ultrasound is the first imaging test used for detection of gallbladder and bile duct abnormalities. This test is non-invasive, uses no dyes, and is not painful. Ultrasound produces good images of the small ducts in the liver and the higher part of the major bile duct⁽³⁾. Ultrasonography is the most helpful imaging modalities used for the diagnosis of gallstone disease. It is safe, rapid, and relatively inexpensive and involves no radiation exposure. It is the image of choice for patients with suspected biliary colic. Positive findings include stones, thickening of the gallbladder wall, pericholecystic⁽⁴⁾. A common disorder is Gallbladder stones and is usually asymptomatic. Some patients show biliary colic, and often severe pain in the epigastrium or right upper quadrant, and sometimes between the scapula due to temporary obstruction of the cystic duct with a gallstone. In case the cystic duct obstruction persists, the patient may develop cholecystitis ⁽⁵⁾. The presence of cholecystitis was best diagnosed by ultrasound; images normally indicate the presence of gallstones, pericholecystic fluid and a thickened wall of gallbladder. Ninety to ninety-five percent of all cases of acute cholecystitis are caused by obstruction of either the cystic duct or the neck of the gallbladder by gallstones ⁽⁶⁾. Acute cholecystitis, however, occurs in only approximately 20% of patients who have gallstones ⁽⁷⁾. This means that most gallstones are asymptomatic. Thus, right upper quadrant pain in a patient who has gallstones often is caused by something other than acute cholecystitis ⁽⁸⁾. Furthermore, studies have shown that only 20%–35% of patients presenting with right upper quadrant pain are subsequently shown to have acute cholecystitis ^(6,7). In cases with symptomatic gallstones and a negative ultrasound examination, endoscopic ultrasound may be helpful ⁽⁹⁾. Tumors occurring in gallbladder are either benign or malignant. Papillomas, adenomyomas, or cholesterol polyps are associated with benign tumors. Whereas malignant tumors are uncommon, cholecystectomy for patients with polyps larger than 10 mm seems warranted ⁽¹⁰⁾. If gallbladder is not detected, scan with high resolution and frequency linear or linear array transducers is mandatory. This minimizes missing tiny gallstones, especially in the funds of the superficial Gallbladder ⁽¹⁰⁾.

This measurement includes the mucosa, smooth muscle of its wall, liver capsule and any tissue between the liver and Gall-bladder. The normal measurements are taken in the transverse rather than longitudinal plane to avoid any possibility of thickening due to measuring in an off-axis plane. The normal appearing wall is not routinely measured ^(11,12). The present study was designed to see the frequency and occurrence of different types of GB pathologies and to evaluate the accuracy of ultrasonography for diagnosis of different gallbladder disorders.

1.2 Materials and methodology

A retrospective observation study done at the diagnostic radiology department at King Fahad Hospital (KFH) and Buraidah Central Hospital. We collected data of patients subjective to US of gallbladder. 150 patients referred to the ultrasound departments for abdominal ultrasound either symptomatic or asymptomatic subjected to ultrasound using different types of ultrasound units with 3.5 MHz and 5 MHz curve linear probes. Spatial digital iU22 Philips Convex probe 3.5. Toshiba Sonolayer SSA-90A, with digital control panel and two-channel digital scan. Data analysis performed using the tables and computerized systems.

1.2.1 Hospital protocol:

- The patient must fast 8 hours before the exam, when patient come will lie on an exam table.
- Patient move his clothing away from abdomen and then apply a warm gel to the area. The gel will help the transducer make secure contact with the body and eliminate air between the transducer and the skin. Once the imaging is complete, the clear ultrasound gel will be wiped off skin. Any portions that are not wiped off will dry quickly. The ultrasound gel does not usually stain or discolor clothing. The exam usually takes less than 40 minutes.

1.2.2 Technique:

With the patient in the supine position, then applied gel then start scan with the probe in longitudinal plane, the probe orientate cephalic and asking patient holding breath Once the gallbladder is clearly identified, obtain longitudinal and transverse views of the gallbladder. Use the liver as an acoustic window.

I.3 RESULT AND DISCUSSION:
I.3.1 RESULT:

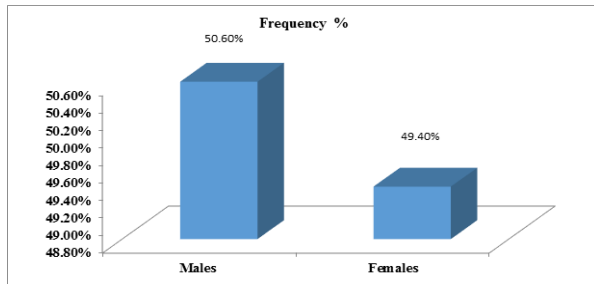


Figure.1 show distribution of 150 patients of gallbladder diseases according to sex

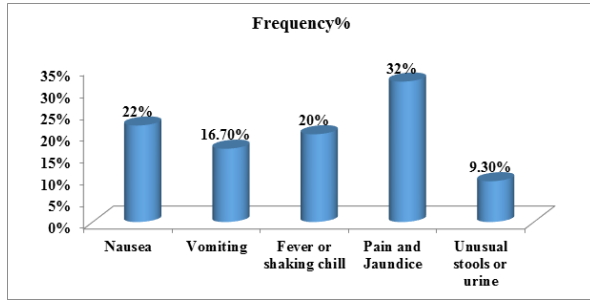


Figure.2 symptom's distribution of gallbladder diseases for 150 patients.

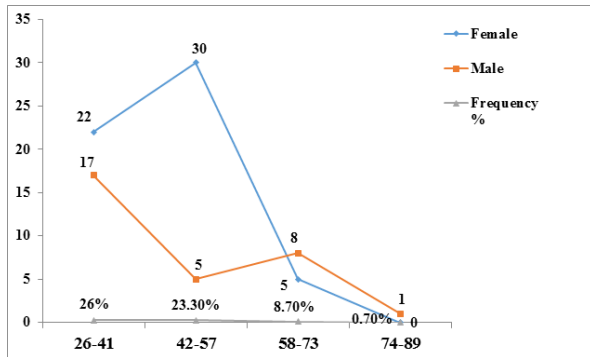


Figure.3 Distribution of gallbladder stones according to range of age in males and females.

Table.1 showing distribution of confirmation according to type of investigation.

Gall stones number	Positive on Ultrasound	Positive on CT scan	Positive on cholecystectomy	Confirmed cases.
52	52	50	-	50
36	36	-	36	36
Total	88	50	36	86



Figure. 4 show thickness (cholecystitis) in wall of gallbladder with stone

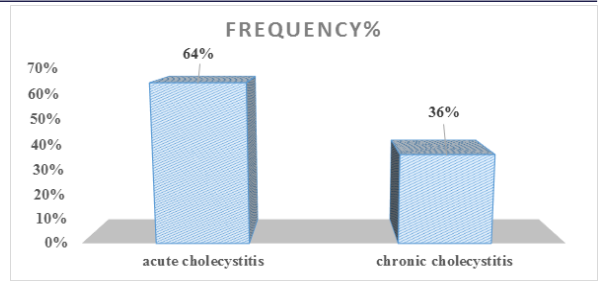


Figure .5 Distribution of Acute and chronic cholecystitis out (N 25)



Figure.6 show polyp with sludge of gallbladder

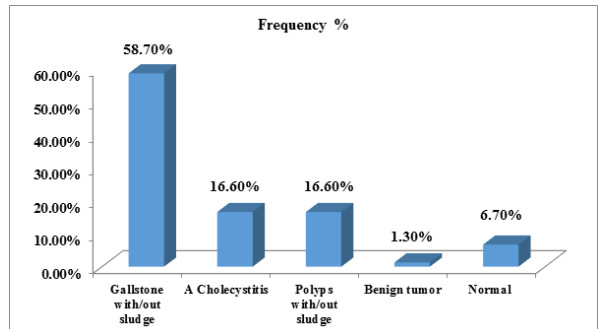


Figure.7 Distribution of gallbladder pathology out of 150 patients

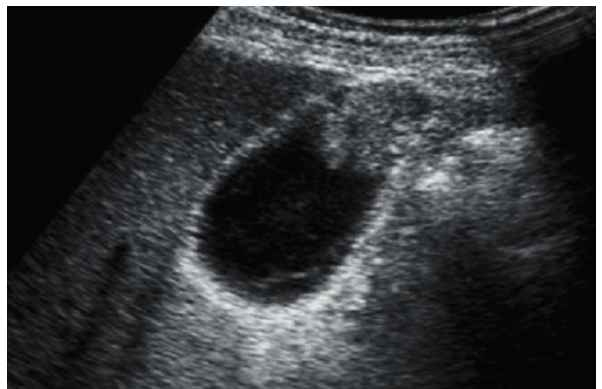


Figure.8 show benign tumor in gallbladder.

I.3.2 DISCUSSION:

A retrospective study was carried out at King Fahad Hospital (KFH) and Buraidah Central Hospital, to discuss the protocol of ultrasound scanning in demonstrating incidence and complication of Gall-bladder (GB) pathologies. Known cases of GB pathologies (150 patients) were surveyed by ultrasound. The study was conducted at the Radio Diagnosis Department 150 patients 76 (50.60%) males and 74 (49.40%) females, ratio of males to females is 1.027:1 presented for examination, the mean age of the patients was 45.30years (Range

26–89 years) (Fig.1). In the present study the patients have the following symptoms, Pain and Jaundice 48 (32%), Nausea 33 (22%), Fever or shaking chill 30 (20%), Vomiting 25 (16.7%) and Unusual stools or urine 14 (9.3%), (Fig. 2). Gallstones are diagnosed on US by the presence of gravity-dependent, mobile, echogenic foci within the gallbladder lumen that cast a posterior shadow. Gallstones have presented in 88 (58.7%) patients in this study, most of them females, age range 26-73 years, females 52 (34.7%) and males 36 (24%) (Fig. 3). Although ultrasound has been demonstrated to have an accuracy (>95%) for the identification of gallstones, stones that are too small, (usually <1mm to cast a posterior shadow soft stones lacking strong internal echoes⁽¹⁰⁾, or gallstones impacted in the gallbladder neck or in the cystic duct that may not be as readily detectable on US examination as they silhouette with the surrounding echogenic bowel gas or intraperitoneal fat⁽¹³⁾. Harmonic imaging significantly improves visualization of small gallstones. Sensitivity and specificity of ultrasound in evaluation of gallstones is high respectively (97.7%,95.6%). Confirmation of gallbladder stones in this study is done by cholecystectomy and CT scan (Table. 1). In the study done by Janes et al, 1998⁽¹⁾ range of age group of accumulation for gallstone presence was 35 - 50 years in females and more than 50 years in male that are readily visible with ultrasonography. Ultrasonography plays a key role in the diagnosis of gall bladder and biliary diseases. In acute cholecystitis, the gall bladder is distended, thick walled and tender, may show calculi and pericholecystic fluid collection⁽¹⁴⁾. Whereas, in chronic cholecystitis the gall bladder is smaller than usual, with many stones and has thick fibrous echogenic wall (Fig.4). In present study cholecystitis a count 25 (16.60%) patients, acute cholecystitis more than chronic cholecystitis (Fig.5). Previous study is done by Laing et al, 1983⁽¹⁵⁾ They found, the gallbladder disease affects 8% of men and 17% of women in the United States resulting in over 600,000 surgeries each year. Cholecystitis, the most common emergent surgical condition of the gallbladder, is diagnosed in up to 10% of total patients and 21% of elderly patients presenting to the emergency department with acute abdominal pain. Sludge in present study constitutes with gallbladder stones and with polyp's dependent layer of non-shadowing echogenicity in the gallbladder is characteristic of sludge, which often contains stones (Fig.6). Gallbladder tumors are recognized with increasing frequency, as a consequence of improvements in imaging techniques and increased utilization of these studies. Approximately 5% of patients evaluated with ultrasonography for abdominal pain will have a gallbladder polyp. Cancer of the gallbladder is uncommon, though it is the fifth most common gastrointestinal (GI) malignancy. In the present study benign tumor account only two cases (1.30%) ultrasound can differentiate between cystic and solid tumor not benign and malignant tumor (Fig.7&8).

1.4 CONCLUSION:

In the study we found the Ultrasound which is non-invasive and the least expensive imaging modality that is highly sensitive and specific in the assessment of the gallbladder wall and luminal content. It can provide information about the presence of GB pathologies such as G. stone cholecystitis, differentiate between cystic and solid tumor, Gallbladder Polyps and moreover about the site and cause of biliary tract obstruction. The most commonly affected group of gallbladder pathology was between 36 to 45 years 50 (33.3 % of patients). In our study gallstones have presented in 88 (58.7%) patients most of them females, age range 36-45 years in females and 45-60 males. Ultrasonography was founded the technique of choice for diagnosing gallbladder calculi and it was the gold standard test for the demonstration of gallstones with sensitivity of 94% and a specificity of 92%⁽¹³⁾. Ultrasound is painless and relatively inexpensive, and has several advantages over oral cholecystography; it doesn't need contrast material, causes no side-effects, and safe during pregnancy.

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