DOI: https://doi.org/10.54393/pbmj.v5i1.236

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

Volume 5, Issue 1 (January 2022)

Orignal Article

Sonographic Findings in Patients with an Acute Pain in Right Upper Quadrant

Muzamil Ali[1*], Sadaf Ayesha[2], Muhammad Uzair[3], Syed Muhammad Yousaf Farooq[1], Mariam Majeed[1], Abdur-Rehman Tuaha Mansoor[1], Rida Tahir[1], Zeenat Asmat[1], Zukhruf Sohail[1], Rabia Zulfiqar[1], Mariam Ahsan[1], Hafiza Iqra Farooq[1], Tabasum Shehzadi[1]

[1]University Institute of Radiological Sciences and Medical Imaging Technology, Faculty of allied Health Sciences, The University of Lahore, Lahore, Pakistan
[2]Riphah International University, Lahore
[3]Sanabil Health Services Hospital, Lahore

ARTICLE INFO

Key Words:
Ultrasonography, Right Upper Quadrant pain, Cholecystitis, Fatty Liver Disease

How to Cite:
Ali, M. ., Ayesha, S. ., Uzair, M. ., Farooq, S. M. Y. ., Majeed, M. ., Mansoor, A.-R. T. ., Tahir, R. K., Asmat, Z. ., Sohail, Z. ., Zulfiqar, R. ., Ahsan, M. ., Farooq, H. I. ., & Shehzadi, T. . (2022). Sonographic findings in patients with an acute pain in Right Upper Quadrant. Pakistan BioMedical Journal, 5(1), 244-248. https://doi.org/10.54393/pbmj.v5i1.236

***Corresponding Author:**
Muzamil Ali
The University of Lahore, Lahore, Pakistan
muzamilsial571@gmail.com

ABSTRACT

Abdominal pain is a common presentation in the outpatient setting. Patients presenting to the emergency department with right upper quadrant (RUQ) pain are often diagnosed with acute cholecystitis. Ultrasound is the first-line imaging modality opted to diagnose the cause of RUQ pain. **Objective:** The objective of this study is to find sonographic findings in patients with acute RUQ pain and establish reasons of using Ultrasound in these circumstances. **Methods:** A total of 385 cases who were presented with RUQ pain in Sanabil Health Services Hospital were included in this descriptive observational study. 190 were female and 195 were male with a mean age of 44.7±13.4 years. A thorough scan of complete abdomen was done and results were analyzed through IBM SPSS statistics 28.0 version 2021. **Results:** Out of total 385 patients, 91 patients (23.6%) were suffering from cholelithiasis and only 19 (5.0%) of them had cholecystitis which are major causes of right upper quadrant pain. Majority of patients (26.8%) were diagnosed with Fatty liver disease, Obstructive kidney disease (17.4%) and a significant number of patients (14.5%) were also normal on Ultrasound scan. **Conclusions:** The Ultrasonographic diagnosis of majority of patients who are presented with right upper quadrant pain is fatty liver disease and other pathologies which are known to not cause any pain in right upper quadrant.

INTRODUCTION

Abdominal pain is a typical occurrence in outpatient settings; however, it is difficult to accurately identify. The primary complaint in 1.5% of office visits and 5% of visits to the emergency room is abdominal pain [1]. Most people with abdominal discomfort does not need surgery, but 10% of those who go to the ER and a smaller percentage of those who go to an outpatient facility do because their condition is severe or life-threatening [2]. In result of this, a detailed and logical stance for the diagnosis of abdominal pain is imperative. Acute cholecystitis is a primary diagnostic concern in patients who report to the ER with abdominal discomfort that is located in the right upper quadrant. When it comes to diagnosing a patient with hepatobiliary disease, particularly acute cholecystitis, imaging is often suggested early on since the clinical presentation can be ambiguous [3]. Laparoscopic cholecystectomy is the primary treatment for acute cholecystitis. Many surgeons choose early cholecystectomy because of evidence that surgery in acute cholecystitis improves results [4]. Upper abdomen pain is frequently caused by acute or chronic inflammatory gallbladder disorders. The prognosis is often favorable with early detection and treatment of many of these illnesses, even though they may cause severe morbidity and mortality if left untreated. Patients with gallbladder inflammatory disease are frequently evaluated using imaging. It is extremely rare for a gallstone to dislodge from the gallbladder and enter the intestines. Intestinal

DOI: https://doi.org/10.54393/pbmj.v5i1.236

obstruction secondary to the displacement of a stone from the gall bladder into the intestinal tract is relatively uncommon [5]. The ileocecal valve is the most prevalent location of calculus impaction. It is possible that in rare cases, a gallstone may pass through or puncture the transverse colon and enter into the distal colon [6]. On plain radiographs, the extruded calculus may be difficult to distinguish [7]. About 40% to 50% of patients diagnosed with gallstone ileus had a history of recent biliary colic, acute cholecystitis or jaundice according to the literature [8-10]. Acute right upper quadrant stomach discomfort, nausea, fever, emesis, as well as focal tenderness right on the position of gallbladder, are signs of gallbladder disease. On examination of the RUQ costal margin, the patient might demonstrate a positive "Murphy's sign." When testing in this environment, results can be normal or aberrant and they're sometimes difficult to interpret. The levels of ALT, AST, ALP, and bilirubin may be excessively high, indicating hepatobiliary disorder. There may or may not be leukocytosis (usually with a left shift) [11]. When there is a suspicion of acute cholecystitis on the basis of clinical exam, sonography is the preferred first imaging tool. In this case, sonography's sensitivity varies from 80 to 100 percent, and its specificity from 60 to 100 percent. Gallbladder wall thickness (> 3–5 mm), cholelithiasis, pericholecystic fluid, presence of a positive sonographic Murphy's sign are all possible findings when imaging is done. Abnormally enlarged gallbladder distention and echogenic bile are less specific imaging findings (sludge). The gallbladder neck or the cystic duct may or may not contain a gallstone. Gallstones alone provided an 88% positive predictive value in patients with the suspicion of acute cholecystitis. Gallstones with a positive Murphy's sign enhanced the positive predictive value to 92 percent in patients, in one study. The positive predictive value was 94% in individuals with gallstones, gallbladder wall thickness, and a positive sonographic Murphy's sign [12].

Abdominal discomfort so acute that it necessitates immediate medical attention. There are numerous possible causes. Investigating an acute abdomen necessitates the use of advanced imaging tools. To reduce mortality and morbidity, an accurate and prompt diagnosis is required. Imaging patients at an early stage is recommended since physical examination and laboratory tests are inherently inconclusive [2-4]. Acquired discomfort in the right upper quadrant can be evaluated using ultrasound (US). These patients can be studied using this imaging modality, which is accurate, safe, affordable, and easily accessible. For the diagnosis of upper quadrant diseases most likely gallstones and biliary dilatation, it is very sensitive and specific [13]. In one study, 91 patients suspected of having acute cholecystitis, the accuracy of US (88 percent) was shown to be comparable to that of HIDA (85 percent) scintigraphy. Scintigraphy for these individuals is no longer used in many clinics in the US [14, 15]. For one thing, it is far easier to show gangrene and anemia in patients with an abnormal gallbladder in the US than it is to show these consequences in patients with an abnormal gallbladder, both of which are more commonly seen in patients with an abnormal gallbladder. For the most part, a scintigraphy procedure can take up to four hours to distinguish between acute and chronic cholecystitis. As a result, many experts recommend saving nuclear imaging for cases of acute cholecystitis in which the ultrasonography is ambiguous [15-18].

METHODS

A total of 385 patients were included in this study who were presented in Sanabil Health Services Hospital, Lahore for Ultrasound scan from April 2021 to August 2021. There were 190 women and 195 men whose ages ranged between 4 to 90 years, mean age 44.7±13.4 years. All patients underwent physical examination and history was taken. They were all mentally stable and alert when they informed about the location of the pain. Ultrasound Toshiba Xario machine with 3.5 MHz probe was used and a thorough scan of complete abdomen was done. Results were analyzed through IBM SPSS statistics 28.0 version 2021.

RESULTS

Out of total 385 patients (Table 1), 91 patients (23.6%) were suffering from cholelithiasis and only 19 (5.0%) of them had cholecystitis which are major causes of right upper quadrant pain. Majority of patients (26.8%) were diagnosed with Fatty liver disease, Obstructive kidney disease (17.4%) and a significant number of patients (14.5%) were also normal on Ultrasound scan (Table 2).

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	190	49.4	49.4	49.4
	M	195	50.6	50.6	100.0
	Total	385	100.0	100.0	

Table 1: Gender distribution

DOI: https://doi.org/10.54393/pbmj.v5i1.236

Sr. No.	Pathologies	No. of Patients	Percentage
1	Normal study	56	14.5%
2	Pleural Effusion	19	4.9%
3	Ascites	12	3.1%
4	Hepatomegaly	49	12.7%
5	Fatty Liver Disease	103	26.8%
6	Hemangioma	13	3.4%
7	Other Liver Lesions	14	3.9%
8	Liver Metastasis	9	2.3%
9	Hepatocellular Carcinoma	6	1.6%
10	Chronic Liver Disease	12	3.1%
11	Cirrhosis	3	0.8%
12	Portal Hypertension	3	0.8%
13	Cholelithiasis	91	23.6%
14	Cholecystitis	19	5.0%
15	Choledocholithiasis	1	0.3%
16	Dilated CBD	3	0.8%
17	Gallbladder Sepsis	1	0.3%
18	Gallbladder Sludge	5	1.3%
19	Obstructive Kidney Disease	67	17.4%
20	Hydronephrosis	20	5.2%
21	Appendicitis	17	4.4%
22	Pancreatic Mass	1	0.3%
23	Pancreatitis	2	0.5%

Table 2: Pathologies of patients

Sr. No.	Pathologies	Female ratio	Male Ratio
1	Normal study	22	34
2	Pleural Effusion	10	9
3	Ascites	6	6
4	Hepatomegaly	38	11
5	Fatty Liver Disease	70	33
6	Hemangioma	4	9
7	Other Liver Lesions	8	6
8	Liver Metastasis	4	5
9	Hepatocellular Carcinoma	1	5
10	Chronic Liver Disease	2	10
11	Cirrhosis	2	1
12	Portal Hypertension	2	1
13	Cholelithiasis	55	36
14	Cholecystitis	9	10
15	Choledocholithiasis	1	0
16	Dilated CBD	1	2
17	Gallbladder Sepsis	0	1
18	Gallbladder Sludge	1	4
19	Obstructive Kidney Disease	24	43
20	Hydronephrosis	4	16
21	Appendicitis	2	15
22	Pancreatic Mass	0	1
23	Pancreatitis	1	1

Table 3: Ratio of male and female with pathologies

The female ratio with abdominal pathologies were greater than male ratio. Especially in the case of cholelithiasis, 55 females had gallbladder stones compared to 36 males. Fatty Liver disease was also seen to be dominant in female patients where 70 females had fatty liver disease where only 33 males were diagnosed with Fatty liver disease. In other less prevalent diseases, male ratio was greater, such as in Chronic Liver Disease, Hemangiomas, Obstructive kidney disease and Hydronephrosis. There were 34 male patients who were normal on Ultrasound scan as compared to 22 female patients (Table 3).

DISCUSSION

Abdominal pain is a common presentation and constitute about 1.5% of the total patients who approach clinicians and 5% of those patients who are enrolled in emergency department all over the world. The localized pain in right upper quadrant may present itself due to a number of reasons, but the most frequent pathology that causes pain in right upper quadrant is cholelithiasis. Other pathologies that were frequent in our study were Fatty Liver Disease and Hepatomegaly. These are not known to cause any pain generally, therefore, it can be assumed that the reason of the pain was not diagnosed on Ultrasonography. Most of the disease that were diagnosed in patients with Right Upper Quadrant pain through Ultrasonography in our study are generally not known to cause pain in Right Upper Quadrant or were not prominently frequent in our sample population. Nephrolithiasis was frequent in our study as well, as a total of 67 (17.4%) patients had Nephrolithiasis in our study. Furthermore, there were a total of 56 (14.5%) patients who were normal on Ultrasound scan. Faye C. et al [19] evaluated patients with right upper quadrant pain through Ultrasonography in 1981, and revealed that majority of patients that were presented with right upper quadrant pain were not diagnosed with any Gallbladder pathology. Out of total 52 patients dissimilar to our sample size of 385 patients, they found 18 patients with acute cholecystitis, similar to our result of 18 patients with acute cholecystitis, and 17 patients with chronic cholecystitis while our study only present 1 patient with chronic cholecystitis. They deduced that only 13-34% of patients have acute cholecystitis out of those who present with right upper quadrant pain, however, in our study, only 4.7% people had acute cholecystitis. The sensitivity, specificity and accuracy in diagnosing acute cholecystitis through ultrasonography came out to be 94%, 85% and 88% in their study. Margarita V. Revzin et al [20] discussed the causes of right upper quadrant pain and the modalities to be chosen for the accurate and speedy diagnosis of the pathology in 2016. They presented acute cholecystitis to be the most likely diagnosis of right upper quadrant pain, however, they discussed that cholelithiasis, choledocholithiasis, peptic ulcer, pyelonephritis and liver diseases could also be the cause of RUQ pain and therefore, must be ruled out. They discussed that Ultrasound had a sensitivity of 80-100% and

DOI: https://doi.org/10.54393/pbmj.v5i1.236

specificity of 60-100%, so it should be the first line imaging modality. In our study, 23.6% patients had biliary colic, 4.7% had acute cholecystitis, 0.3% had choledocholithiasis, no patient had peptic ulcer, pyelonephritis and renal abscesses, 17.4% patients had obstructive kidney disease, 2.3% had metastatic liver and 7.3% had other liver lesions. A collective analysis of all those patients did not provide a significant number to consider the pain in RUQ is due to pathologies of this particular region. Gayatri Joshi et al [21] also present a number of causes in 2018 which can cause right upper quadrant pain. They include hepatic causes such as acute hepatitis, liver abscesses and non-traumatic hemorrhagic liver lesions, pancreatic causes such as acute pancreatitis, pancreatic cysts and neoplasms, renal causes such as nephrolithiasis, renal infections and renal neoplasms, and adrenal, thoracic and gastrointestinal causes. They discussed that these all causes can be reliably diagnosed on initial Ultrasonography examinations and therefore, further costs of examinations can be saved. In our study, most of these causes were not diagnosed, but in fact, patients were diagnosed with diseases that may produce pain in other quadrants or not present pain at all. Jordy J. S. Kiewiet et al [3] evaluated the diagnostic performance of various modalities in imaging of acute cholecystitis in the year 2012 and found the sensitivity and specificity of ultrasound to be 81% and 83%, respectively with a considerable amount of fallacy. They evaluated a total of 5859 patients and only 57 studies were included based on inclusion criteria. Our study demonstrated that majority of patients who were presented with right upper quadrant pain were not suffering from any kind of pathology that most likely causes right upper quadrant pain. Still more, most of the patients were normal on complete Abdominal Ultrasonography.

DISCUSSION

The Ultrasonographic diagnosis of majority of patients who are presented with right upper quadrant pain is fatty liver disease and other pathologies which are known to not cause any pain in right upper quadrant. Furthermore, even more patients demonstrate normal study on Ultrasound.

REFERENCES

[1] Suri S, Muttukrishna S, Jauniaux E. 2D-ultrasound and endocrinologic evaluation of placentation in early pregnancy and its relationship to fetal birthweight in normal pregnancies and pre-eclampsia. Placenta. 2013 Jun 8. doi: 10.1016/j.placenta.2013.05.003.

[2] Park SJ, Yi BH, Lee HK, Kim YH, Kim GJ, Kim HC. Evaluation of patients with suspected ureteral calculi using sonography as an initial diagnostic tool: how can we improve diagnostic accuracy?. Journal of Ultrasound in Medicine. 2008 Oct;27(10):1441-50. doi: 10.7863/jum.2008.27.10.1441

[3] 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 Sep;264(3):708-20. DOI: 10.1148/radiol.12111561

[4] Yang MH, Chen TH, Wang SE, Tsai YF, Su CH, Wu CW, Lui WY, Shyr YM. Biochemical predictors for absence of common bile duct stones in patients undergoing laparoscopic cholecystectomy. Surgical endoscopy. 2008 Jul;22(7):1620-4. doi: 10.1007/s00464-007-9665-2

[5] Bingener J, Richards ML, Schwesinger WH, Strodel WE, Sirinek KR. Laparoscopic cholecystectomy for elderly patients: gold standard for golden years?. Archives of surgery. 2003 May 1;138(5):531-6. doi: 10.1001/archsurg.138.5.531

[6] Chang L, Chang M, Chang HM, Chang AI, Chang F. Clinical and radiological diagnosis of gallstone ileus: a mini review. Emergency radiology. 2018 Apr 1;25(2):189-96. doi: 10.1007/s10140-017-1568-5

[7] Yu CY, Lin CC, Shyu RY, Hsieh CB, Wu HS, Tyan YS, Hwang JI, Liou CH, Chang WC, Chen CY. Value of CT in the diagnosis and management of gallstone ileus. World journal of gastroenterology: WJG. 2005 Apr 14;11(14):2142. doi: 10.3748/wjg.v11.i14.2142

[8] Aldo C, Lorenzo M, Olgerta L, Alberto C, Licia U, Melchiore G. Rolling in the Deep: Imaging Findings and Diagnostic Pearls in Gallstone Ileus. Surgery Research and Practice. 2020, 2020. doi: 10.1155/2020/1421753

[9] Lassandro F, Gagliardi N, Scuderi M, Pinto A, Gatta G, Mazzeo R. Gallstone ileus analysis of radiological findings in 27 patients. European journal of radiology. 2004 Apr 1;50(1):23-9. doi: 10.1016/j.ejrad.2003.11.011

[10] Chang L, Chang M, Chang HM, Chang AI, Chang F. Clinical and radiological diagnosis of gallstone ileus: a mini review. Emergency radiology. 2018 Apr 1;25(2):189-96. doi: 10.1007/s10140-017-1568-5

[11] Osagiede O, Pacurari P, Colibaseanu D, Jrebi N. Unusual Presentation of Recurrent Gallstone Ileus: A Case Report and Literature Review. Case reports in gastrointestinal medicine. 2019 Oct 3;2019. doi: 10.1155/2019/8907068

[12] Meyenberger C, Michel C, Metzger U, Koelz HR. Gallstone ileus treated by extracorporeal shockwave lithotripsy. Gastrointestinal endoscopy. 1996 May 1;43(5):508-11. doi: 10.1016/S0016-5107(96)70297-3

[13] Bennett GL. Evaluating patients with right upper quadrant pain. Radiologic Clinics. 2015 Nov

DOI: https://doi.org/10.54393/pbmj.v5i1.236

1;53(6):1093-130. doi: 10.1016/j.rcl.2015.06.002
[14] Johnson Jr H, Cooper B. The value of HIDA scans in the initial evaluation of patients for cholecystitis. Journal of the National Medical Association. 1995 Jan;87(1):27.
[15] Hanbidge AE, Buckler PM, O'Malley ME, Wilson SR. From the RSNA refresher courses: imaging evaluation for acute pain in the right upper quadrant. Radiographics. 2004 Jul;24(4):1117-35.
[16] Kendall JL, Moreira ME. Evaluation of the adult with abdominal pain in the emergency department. UpToDate.(level 5). 2017.
[17] Miranda A. Abdominal pain. Nelson Pediatric Symptom-Based Diagnosis E-Book. 2022 Jun 3:222.
[18] Ford B, Dore M, Moullet P. Diagnostic Imaging: Appropriate and Safe Use. American family physician. 2021 Jan 1;103(1):42-50.
[19] Laing FC, Federle MP, Jeffrey RB, Brown TW. Ultrasonic evaluation of patients with acute right upper quadrant pain. Radiology. 1981 Aug;140(2):449-55. doi: 10.1148/radiology.140.2.7255722
[20] Revzin MV, Scoutt LM, Garner JG, Moore CL. Right upper quadrant pain: ultrasound first!. Journal of Ultrasound in Medicine. 2017 Oct;36(10):1975-85. doi: 10.1002/jum.14274
[21] Joshi G, Crawford KA, Hanna TN, Herr KD, Dahiya N, Menias CO. US of right upper quadrant pain in the emergency department: diagnosing beyond gallbladder and biliary disease. Radiographics. 2018 May;38(3):766-93. doi: 10.1148/rg.2018170149