ORIGINAL RESEARCH

A study to correlate Ultrasonography and Computed Tomography in Diagnosis of Acute Pancreatitis

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ABSTRACT
Background: The pancreas is a difficult organ to evaluate by both clinical and routine radiological methods. An inflammatory pathology involving the pancreas will form part of the differential diagnosis of other conditions presenting with abdominal pain. The present study was conducted to correlate ultrasonography and computed tomography in diagnosis of acute pancreatitis. **Material & Methods:**This study was a prospective study among 40 patients with acute pancreatitis for over a period of 1year. The patient sufferings from acute pancreatitis for CECT were first evaluated with Ultrasonography. Transverse and sagittal scan were performed. Data was collected, entered in MS excel sheet and was analyzed with standard statistical tests using SPSS software version 23. **Results:** 40 patients who were selected for the study were sent for ultrasonography that was having probable acute pancreatitis. Maximum (37.5%) patients belong to age group 31-40 years followed by 21-30years (30%). Males (70%) were more than females (30%). Among 40 patients in whom pancreas was visualized, 100% cases were fair to excellent**,** 90% of the cases showed hypoechogenecity and 15% cases had duct dilatation. In 90% cases pancreas was enlarged. Among 40 patients in whom pancreas was visualized, 90% of the cases were hypodense and 15% cases had duct dilatation. 97.5% cases pancreas was enlarged. 97.5% cases hypoedensity. **Conclusion:**The study concluded thatCT has better sensitivity and specificity than ultrasonography hence for the purpose of diagnosing and staging pancreatic diseases, CT serves as a confirmatory test..
Key words:CT scan, ultrasonography, pancreatic diseases.

INTRODUCTION

Pancreas is a retroperitoneal glandular organ in the upper abdomen, but in reality serves two purposes - an exocrine gland aiding in digestion and an endocrine gland producing hormones.[1] Pancreatitis is defined as the inflammation of the pancreas and considered the most common pancreatic disease in children and adults. It can be acute; representing an acute inflammatory process of the pancreas, or chronic; progressing slowly with continued, permanent inflammatory injury to the pancreas.[2] Diseases of pancreas have a very variable presentation and imaging plays an important role in the diagnosis and management of pancreatic diseases. Modalities for imaging pancreas range from plain x-ray to Ultrasonography (USG), endoscopic ultrasound, Endoscopic Retrograde Cholangiopancreaticography (ERCP), Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Magnetic Resonance Cholangiopancreaticography (MRCP). Computed Tomography (CT) is highly accurate, and sensitive than USG in both diagnosing as well as demonstrating the extent.[3] The revised Atlanta classification system, introduced in 2012, better defined the clinical diagnosis, Computed Tomographic (CT) manifestations and disease course of acute pancreatitis into two morphologic subtypes: Interstitial oedematous pancreatitis and Necrotizing pancreatitis.[4]Although Ultrasound and Percutaneous transhepatic cholangiography (PTC) have a definite role in the evaluation of pancreatic lesions, Computed tomography with its higher sensitivity emerges as the imaging technique of choice for evaluating the nature and extent of pancreatic lesions.[1] The present study was conducted to correlate ultrasonography and computed tomography in diagnosis of acute pancreatitis.

MATERIAL & METHODS

This study was a prospective study among 40 patients with acute pancreatitis for over a period of 1year. Before commencing the study ethical clearance was taken from the Institutional Ethical Committee and informed written consent was obtained from the patients before undergoing USG and CT examination. The patient sufferings from acute pancreatitis for CECT were first evaluated with Ultrasonography. Patients of all age groups were referred for ultrasound abdomen in whom pancreatic pathology was detected on routine protocol were included in the study. Patients who were pregnant or expecting a pregnancy and patient who were not willing to undergo the study, previous history of hypersensitivity reaction, bronchial Asthma, impaired renal functions to undergo contrast examination were excluded from the study. The grey scale real time transabdominal ultrasound was performed using Volusion ge S8 with a 3.5 MHz curvilinear transducer, high frequency linear array transducer and Doppler probe. The TAS examination of the pancreas was performed on patients with overnight fasting, to improve the evaluation of the pancreas, patients were asked to drink 250 - 300 ml of water prior to examination for which provided a sonic window into the pancreas. transverse and sagittal scan were performed. Data was collected, entered in MS excel sheet and was analyzed with standard statistical tests using SPSS software version 23.

RESULTS

40 patients who were selected for the study were sent for ultrasonography that was having probable acute pancreatitis. Maximum (37.5%) patients belong to age group 31-40 years followed by 21-30years (30%). Males (70%) were more than females (30%).

Table 1: Demographic data

Variable	N(%)
Age groups(years)	
21-30	12(30%)
31-40	15(37.5%)
41-50	8(20%)
Above 50	5(12.5%)
Gender	
Male	28(70%)
Female	12(30%)

Among 40 patients in whom pancreas was visualized, 100% cases were fair to excellent, 90% of the cases showed hypoechogenecity and 15% cases had duct dilatation. In 90% cases pancreas was enlarged.

90% of the cases were hypodense and 15% cases had duct dilatation. 97.5% cases pancreas was enlarged. 97.5% cases hypodense. Among 40 patients in whom pancreas was visualized,

Table 2: Ultrasonography appearance of acute pancreatitis

Ultrasonography Appearance	N(%)
Based on visualization	
Fair to excellent	40(100%)
Size	
Normal	4(10%)
Enlarged	36(90%)
Echotexture	
Hyperechoic	2(5%)
Hypoechoic	36(90%)
Mixed	2(5%)
Duct Dilatation	
MPD >2.5mm	6(15%)

Table 3: Computed tomography appearance of acute pancreatitis

Computed tomography appearance	N(%)
Based on visualization	
Normal	4(10%)
Hypodense	36(90%)
Size	
Normal	1(2.5%)
Enlarged	39(97.5%)
Echotexture	
Hyperdense	1(2.5%)
Hypodense	39(97.5%)
Mixed	0(0%)
Duct Dilatation	
MPD >2.5mm	6(15%)

DISCUSSION

Acute pancreatitis results from the exudation of fluid containing activated proteolytic enzymes into the interstitium of the pancreas and leakage of this fluid into surrounding tissue. There is general acceptance that a diagnosis of acute pancreatitis requires two of the following three features: (1) Sudden onset abdominal pain suggestive of acute pancreatitis (epigastric pain radiating to the back); (2) Serum amylase and/or lipase levels at least 3 times greater than the upper limit of normal; and (3) Characteristic imaging findings of acute pancreatitis on contrast-enhanced computerized tomography (CECT), MRI, or transabdominal ultrasonography (US) studies. If abdominal pain is strongly suggestive of acute pancreatitis but the serum amylase and/or lipase activity is less than 3 times the upper limit of normal, characteristic findings on a CECT or MRI are required to confirm the diagnosis.[5]

40 patients who were selected for the study were sent for ultrasonography that was having probable acute pancreatitis. Maximum (37.5%) patients belong to age group 31-40 years followed by 21-30years (30%). Males (70%) were more than females (30%). Among 40 patients in whom pancreas was visualized, 100% cases were fair to excellent, 90% of the cases showed hypoechogenecity and 15% cases had duct dilatation. In 90% cases pancreas was enlarged. Among 40

patients in whom pancreas was visualized, 90% of the cases were hypodense and 12.5% cases had duct dilatation. 97.5% cases pancreas was enlarged. 97.5% cases hypoechogenecity.Bhati V et al (2019) compared the findings on Ultrasound and CT in case of acute pancreatitis. The present study comprised of 83.72% and 16.28% males and females respectively. From the analysis, it was observed that CT was better evaluating the factors of parenchyma, MPD, calcification, pseudocyst collection, ascites, necrosis, complications and adjacent areas of the pancreas in comparison to USG and helped in better to determine the pathological process of pancreas and surrounding extent and involvement. The study concluded that CT is superior and more accurate in staging of acute pancreatitis and thus helps the clinician to understand the prognosis of patient and helps to decide management plan at the time of hospital admission only.[6]Sneha Lalith et al 2019 found that sensitivity of Ultrasonography in detecting acute pancreatitis was 88% in those patients in whom the pancreas was visualized. However, CT had a sensitivity of 100% visualization and better assessment of size. Though Ultrasonography is non-invasive, quick, inexpensive and a safe tool in diagnosis of pancreatic pathologies, it has certain limitations where pancreas may not be visualized. These limitations are overcome with the use of CT which yields more diagnostic information in the evaluation of both acute and chronic pancreatic pathologies.[1]Irum R et al (2021) found thatultrasonography supported the diagnosis of acute pancreatitis in 71(45.51%) patients. Computed tomography findings confirmed acute pancreatitis in 81(41.67%) cases. In USG positive patients, 59 were true positive and 12 were false positive. Among 85 USG negative patients, 06 were false negative whereas 79 were true negative (p=0.0001). Overallsensitivity, specificity, positive & negative predictive value and diagnostic accuracy of ultrasonography in diagnosing acute pancreatitis taking computed tomography as gold standard was 90.77%, 86.81%, 83.10%, 92.94% and 88.46%,respectively.[7]

CONCLUSION

The study concluded thatCT has better sensitivity and specificity than ultrasonography hence for the purpose of diagnosing and staging pancreatic diseases, CT serves as a confirmatory test.

REFERENCES

1. Sneha Lalith, Gurubharath Ilangovan. Comparative study of ultrasonography and computed tomography in diagnosis of acute pancreatitis. International Journal of Contemporary Medicine Surgery and Radiology. 2019;4(3):C28-C33.
2. Busireddy KK, AlObaidy M, Ramalho M, Kalubowila J, Baodong L, Santagostino I, Semelka RC. Pancreatitis-imaging approach. World J Gastrointest Pathophysiol. 2014 Aug 15;5(3):252-70. doi: 10.4291/wjgp.v5.i3.252. PMID: 25133027; PMCID: PMC4133524.
3. Williford ME, Foster Jr WL, Halvorsen RA, Thompson WM. Pancreatic pseudocyst: comparative evaluation by sonography and computed tomography. *American Journal of Roentgenology.* 1983;140(1):53–57.
4. Han J, Kim HG, Jung MK, Cho CM, Cho K, Kim KH, et al. Revised Atlanta classification of acute pancreatitis can predict clinical outcome better: a retrospective, multicenter study. *Pancreatology.* 2014;14(3):S32.
5. Bollen TL. Imaging of acute pancreatitis: update of the revised Atlanta classification. Radiol Clin North Am. 2012;**50**:429–445.
6. Bhati V, Mital M, Verma SR, Sagar S, SharmaY SA. Evaluation of acute pancreatitis by USG and CT. EJPMR. 2019;6(4):496-503.
7. Irum R, Yousaf M. Diagnostic Accuracy of Ultrasonography in Diagnosing Acute Pancreatitis, Taking Computed Tomography as Gold Standard. Journal of Sharif Medical and Dental College Lahore, Pakistan 2021; Vol 7(01):30-36