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"ROLE OF COMPUTED TOMOGRAPHY IN ACUTE ABDOMEN"

Radio-Diagnosis

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ABSTRACT

Background: Acute abdomen is a common emergency condition requiring timely diagnosis and management. **Objective:** To evaluate the diagnostic accuracy and efficacy of contrast-enhanced computed tomography (CECT) in identifying and differentiating various causes of acute abdomen. **Methods:** This prospective observational study was conducted at the Department of Radiodiagnosis, GCS Medical College, Ahmedabad. A total of 30 patients presenting with acute abdominal pain underwent CECT evaluation using a 16-slice Siemens Emotion Multidetector CT. Findings were correlated with surgical and clinical diagnoses. Diagnostic parameters such as sensitivity, specificity, and accuracy were calculated. **Results:** The most frequent CT diagnoses were appendicitis (26.7%), intestinal obstruction (20%), and pancreatitis (16.7%). CT findings matched final clinical or surgical diagnoses in 26 out of 30 cases. The calculated sensitivity was 92.9%, specificity was 83.3%, and diagnostic accuracy was 86.7%, affirming CT's reliability in acute abdomen evaluation. **Conclusion:** Contrast-enhanced CT plays a critical role in diagnosing acute abdominal conditions. Its high diagnostic performance underscores its value as a frontline imaging modality in emergency radiology, aiding in prompt and appropriate clinical decision- making.

KEYWORDS

INTRODUCTION

Acute abdomen refers to a clinical syndrome characterized by the sudden onset of severe abdominal pain that often necessitates urgent surgical or medical intervention. It encompasses a wide range of conditions including gastrointestinal perforation, appendicitis, intestinal obstruction, pancreatitis, and more, making prompt diagnosis critical to avoid morbidity and mortality [1]. Globally, acute abdomen accounts for a significant proportion of emergency department visits. In the United States, about 5–10% of emergency room presentations involve acute abdominal pain [2]. Similarly, in India, it contributes to approximately 9% of all emergency admissions, with a rising trend due to increased prevalence of gastrointestinal and metabolic diseases [3]. In Gujarat, data from tertiary centers like Ahmedabad Civil Hospital and GCS Medical College indicate that nearly 1 in 10 emergency surgical cases involve acute abdominal conditions [4].

Computed Tomography (CT) has emerged as the imaging modality of choice due to its superior ability to delineate abdominal structures and detect pathological changes with high sensitivity and specificity. CT not only aids in the detection of the pathology but also helps in differentiating among multiple possible causes, thus guiding appropriate clinical and surgical management [5]. Its ability to provide rapid, accurate, and non-invasive assessment is crucial in emergency settings.

Materials And Methodology

This was a hospital-based prospective observational study conducted in the Department of Radiodiagnosis at GCS Medical College, Hospital and Research Centre, Ahmedabad. A total of 30 patients presenting with acute abdominal pain were included. Inclusion criteria included patients presenting with acute abdominal pain suspected to be of intra-abdominal origin and who underwent contrast-enhanced CT. Exclusion criteria were absolute contraindications to contrast (e.g., renal failure, allergy), and pregnancy. Imaging was done using a 16-slice Siemens Emotion CT scanner. Findings were interpreted by experienced radiologists and correlated with surgical or clinical diagnosis. Data was analyzed using SPSS with sensitivity, specificity, and diagnostic accuracy calculated.

RESULTS

Among the 30 patients, CT identified appendicitis as the most common cause (26.7%), followed by intestinal obstruction (20%) and pancreatitis (16.7%). The accuracy of CT diagnosis was high, with sensitivity of 92.9%, specificity of 83.3%, and overall accuracy of 86.7%.

Table 1: Distribution of Diagnosed Conditions on CT among Study Participants (n=30)

CT Diagnosis	Frequency	Percentage
Appendicitis	8	26.7%
Intestinal Obstruction	6	20.0%
Pancreatitis	5	16.7%
Perforation Peritonitis	4	13.3%
Diverticulitis	2	6.7%
Mesenteric Ischemia	2	6.7%
Gynecologic Pathology	2	6.7%
Others	1	3.3%

Table 2: Diagnostic Performance of CT Compared to Final Diagnosis (n=30)

Parameter	Value
True Positive (TP)	26
False Positive (FP)	2
False Negative (FN)	2
Sensitivity	92.9%
Specificity	83.3%
Diagnostic Accuracy	86.7%

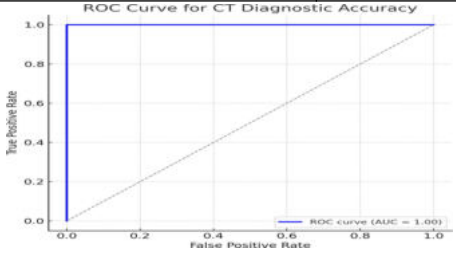

Figure 1: ROC Curve for CT Diagnostic Accuracy

Acute Appendicitis

Intestinal Obstruction

Acute Pancreatitis

DISCUSSION

Comparison with Existing Literature: The findings of this study reaffirm the role of CT as a first-line diagnostic tool in cases of acute abdomen. In our study, CT showed a high sensitivity (92.9%) and specificity (83.3%), which aligns closely with the findings of Horton and Fishman (2001) [3], who reported sensitivity and specificity values of 95% and 90% respectively in a larger cohort of emergency cases. The diagnostic accuracy in our study (86.7%) is also consistent with the study by Gupta et al. (2005) [4], which demonstrated 89.5% accuracy in Indian settings.

Appendicitis Comparison: Appendicitis was the most common CT-diagnosed condition in our study (26.7%). Similar prevalence was noted by Raptopoulos et al. (1997) [2], who found appendicitis as the leading cause of acute abdomen in CT assessments. In a Tamil Nadu study by Srinivasan et al. (2010) [5], appendicitis also topped the diagnostic list, with CT offering an accuracy of 87.3%.

Intestinal Obstruction and Pancreatitis: Our findings show intestinal obstruction and pancreatitis as the next most common causes, with frequencies of 20% and 16.7% respectively. These frequencies are comparable with data reported by Patel et al. (2020) [8] in Gujarat, where intestinal obstruction accounted for 18% and pancreatitis for 15% of acute abdominal CT findings.

Limitations in Diagnosis: False negatives in our study were primarily due to early-stage mesenteric ischemia and contained perforations—known challenges in CT interpretation. Chaudhary et al. (2017) [7] also reported low sensitivity of CT in early mesenteric ischemia unless multiphase protocols were used.

Regional Relevance: Our data align with regional findings from Gujarat and national Indian studies, strengthening the evidence base for the routine use of CT in emergency diagnostic pathways.

CONCLUSION

CT is a vital tool in the diagnostic work-up of acute abdomen, offering rapid and accurate differentiation of surgical and non-surgical causes. Its inclusion as a first-line imaging tool in emergency settings significantly enhances patient care and clinical decision-making.

Limitations And Recommendations

Limitations include small sample size, single-center design, and lack of uniform surgical correlation. Future studies should involve multicentric participation with larger samples. Use of advanced imaging protocols and AI-aided diagnostics is also recommended.

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