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Research Article

DIAGNOSIS OF NONTRAUMATIC ABDOMINAL PAINBY MDCT

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INTRODUCTION

Acute non traumatic abdominal pain was one of the most common symptoms in patients presenting to the emergency department or admitted to general hospitals. Differential diagnosis of an acute abdomen includes broad spectrum of causes ranging from self limiting benign causes for which surgery is not mandatory [1,2] Few causes needed prompt and emergent surgical interventions otherwise leading to high morbidity and mortality. Since many causes may present with similar early clinical presentations. Imaging modalities like ultrasound and computed tomography (CT) are frequently being used to identify specific causes wherever possible and to prevent delay in diagnosing the emergent surgical conditions since conventional radiography has got its own limitations[3]. Early and precise diagnosis alters patient management there by reducing morbidity and mortality in patients presenting with acute non traumatic abdominal pain to emergency department. CT has been shown to be useful in the emergency department, particularly in patients with bowel obstruction, inflammatory bowel disease, renal calculi, and appendicitis .Location of pain in particular quadrant or area of abdomen helps in narrowing the differential diagnosis. Patients history is also equally important in narrowing down the differential diagnosis[4]

MATERIALS AND METHODS

All of the CT examinations were performed in the emergency department radiology suite and interpreted by certified radiologists. Pediatric patients (<18 years old) and patients with acute abdominal trauma were excluded from this study. This is a prospective study. Data for the study will be collected from a sample size of 50 patients referred to the Department of Radio-diagnosis, Father Muller Medical College using purposive sampling techniques based on inclusion and exclusion criterion, done over a period of 1 year from September 2014 to September 2015.

Patients will be evaluated with CT (using GE bright speed 16 slice). IV and rectal contrast will be administered as per department protocol

Aim of the study was to determine the various causes of non traumatic abdominal pain detected by CT and to compare the sensitivity and specificity of CT in diagnosing non traumatic abdominal painful conditions.

Inclusion Criteria

Patients above 18 years presenting with non traumatic abdominal pain who undergoes CT examination.

Exclusion Criteria

1. Patients with history of trauma.
2. Routine pregnancies
3. Ectopic Gestations

REVIEW OF LITERATURE

Van Randen A *et al* (2009) study showed that although CT was the most sensitive imaging modality for detecting emergent conditions in patients with abdominal pain. Initial ultrasonography followed by CT scan in cases which yielded negative or inconclusive results on ultrasonography, increased the sensitivity and prevented unnecessary exposure to radiation. Frequent final diagnoses in the 1,021 patients (mean age 47; 55% female) were appendicitis (284; 28%), diverticulitis (118; 12%) and cholecystitis (52; 5%). The sensitivity of CT in detecting appendicitis and diverticulitis was significantly higher than that of ultrasound 94% versus 76% ($p < 0.01$) and 81% versus 61% ($p = 0.048$), respectively. For cholecystitis, the sensitivity of both ultrasound and CT was 73% ($p = 1.00$). Positive predictive values did not differ significantly between ultrasound and CT for these conditions. Ultrasound sensitivity in detecting appendicitis and diverticulitis was not significantly negatively affected by patient characteristics or reader experience[5]

Study done by Prasad H *et al* (2007) showed, out of 148 patients definite clinical diagnosis was made in 105 patients (70.9%) and ultrasound made a correct diagnosis of 116 cases (78.4%) hence with the help of ultrasound, accuracy of diagnosing pain abdomen increased by 8% . In diagnosing hepato biliary and gynecological disease, USG was highly sensitive and specific, and was seen to be more accurate than

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clinical diagnosis. Whereas in diagnosing acute appendicitis, it was less accurate than clinical diagnosis. In diagnosing retroperitoneal conditions, the sensitivity and specificity was almost same for the clinical and USG diagnosis. In diagnosing acute appendicitis, ureteric colic and acute pancreatitis USG had high specificity but low sensitivity. In non specific pain abdomen (28 patients) and acid peptic disease (10 patients), USG helped in ruling out other acute abdominal conditions for the cause of pain. In seven cases of hollow viscus perforation, pneumoperitoneum was not detected even in a single case. However indirect evidence of peritonitis such as free fluid and decreased peristalsis was detected in five out of seven cases[6]

Observations and results

Fifty patients (32 men, 18 women; age range, 19–70 years; mean age, 52 years) underwent abdominal CT performed in the radiology department during the study period. CT was performed with use of orally and intravenously administered contrast material unless patients were suspected of having renal calculi, and 5–-mm section thickness was used All patients had retrievable radiology reports and admission and discharge records available for review. For the purpose of the study CT interpretations were grouped into the following discrete categories: bowel obstruction, ileus, urolithiasis, appendicitis, diverticulitis, Crohn disease, intraabdominal abscess, abdominal aortic aneurysm, hepatobiliary disease, ischemic bowel, pyelonephritis, gynecologic disease, splenic disease, adrenal masses, pancreatic disease, intraabdominal foreign body, and others

Clinical Diagnoses

Final clinical diagnoses were defined as the discharge diagnoses from either the patient records, for patients who were admitted to the hospital, the discharge diagnoses obtained from the hospital information system. These diagnoses were accepted as the reference standard for each case. Interpretations from the CT scans were then compared with the final discharge diagnoses.

CT in diagnosis of nontraumatic abdominal conditions

Results in 10 (20%) of 50 CT examinations were normal, and 40 (80%) patients had a specific diagnosis. The distribution of CT diagnoses was as follows: urolithiasis, 9 (18%); hepatobiliary disease,6 (13%); Crohn disease, 2 (4%); pancreatic disease, 2 (4%); gynecologic disease, 2 (4%); abdominal aortic aneurysm, 2 (4%); bowel obstruction, one (2%); diverticulitis, one (2%); abscess, one (2%); pyelonephritis, one (2%); appendicitis, one (2%); ischemic bowel, one (2%); splenic disease, one (2%); and adrenal disease, one (2%). Nine (18%) patients with CT scans had other diagnoses.

Of the 50 patients who underwent abdominal CT, 32 (64%) initially underwent radiography, whereas 18 (36%) underwent only CT. The distribution of hospital discharge diagnoses for patients examined with CT is illustrated in shown in Table1.The calculated sensitivity, specificity and accuracy of CT in diagnosis is shown in Table 2.

Table 1 Discharge Diagnosis in Patients examined with CT

Urolithiasis	**9(7)**
Hepatobiliary Disease	6(3)
Crohns disease	2(1)
Diverticulitis	1(0)
Pyelonephritis	1(1)
Gynecological disease	2(1)
Pancreatic disease	2(2)
Appendicitis	1(1)
Bowel Obstruction	1(1)
Adrenal disease	1(0)
Splenic disease	1(0)
Ischaemic Bowel	1(1)
Abdominal aortic aneurysm	2(1)
Abscess	1(0)
Non abdominal related	9(5)

***Number in brackets reveals the number of cases that were clinically diagnosed.**

Table 2 Sensitivity, Specificity and Accuracy of CT in 50 patients

Final Diagnosis	**Sensititvity(%)**	**Specificity(%)**	**Accuracy(%)**
Bowel obstruction	**67**	**99**	**98**
Urolithiasis	**68**	**91**	**86**
Appendicitis	**33**	**100**	**98**
Pyelonephritis	**50**	**99**	**98**
Pancreatitis	**67**	**99**	**98**
Diverticulitis	**33**	**98**	**93**

DISCUSSION

Abdominal radiography has historically been the first imaging examination performed in the emergency department in evaluating abdominal pain. We found the diagnostic yield of abdominal radiography in patients in the emergency department to be low. This is in part because most of the interpretations were nonspecific and thus by definition could not be diagnostic. The most common interpretations in the nonspecific category were the various descriptions of bowel gas pattern other than normal, such as “nonspecific bowel gas pattern.”[15] Results of abdominal radiography were also not a predictor of who would undergo CT because the diagnosis at abdominal radiography was normal in 20%, nonspecific in 76% and abnormal in 4% of patients who underwent abdominal radiography and subsequently CT. This finding suggests that clinical history was more important than the results of abdominal radiography in determining who would undergo CT CT has been shown to be accurate in helping to diagnose bowel obstruction, inflammatory bowel disease, renal calculi, and appendicitis. Although abdominal CT outperformed abdominal radiography as expected, sensitivities for appendicitis, urolithiasis, and bowel obstruction were lower than those reported [18-27]. In a prospective evaluation in 100 patients suspected of having appendicitis, helical CT evaluation of the abdomen with orally and rectally administered contrast material demonstrated sensitivity of 100%, specificity of 95%, and accuracy of 98% [18]. In our study, CT sensitivity for appendicitis (50%) was markedly lower. Lower sensitivity for appendicitis in our study was likely due to using transverse acquisition with 5–10-mm section thickness. Likewise, the sensitivity for renal calculi was low in this study, most likely because of CT technique.

This study has limitations. It was a retrospective study, and the CT technique was limited as described. We had a small sample size for each diagnosis when comparing our results with those of previous studies. They affect patient care and can improve diagnostic yield in patients in the emergency department. Our study results suggest that abdominal radiography has a low sensitivity in the examination of adult patients with abdominal pain in the emergency department setting; therefore, abdominal CT should be performed initially in patients with a high clinical index of suspicion of intraabdominal disease.

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