

Original Research

Assessment of cases of acute appendicitis using Multi-detector Computed tomography

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ABSTRACT:

Background: The present study was conducted to determine cases of acute appendicitis using MDCT. **Materials & Methods:** 126 cases of suspected acute appendicitis underwent CT using multi-detector helical CT scanners (MDCT) with intravenous contrast medium starting from diaphragm to the symphysis pubis. **Results:** Appendiceal diameter found to be 8.7 mm, mild to moderate inflammation was seen in 62, severe inflammation in 50 and free fluid in 14 cases. Sensitivity of CT found to be 94.2%, specificity 81.4%, positive predictive value 88.4% and negative predictive value 90.1%. **Conclusion:** Maximum cases showed mild to moderate inflammation. CT had high positive predictive value.

Key words: Acute appendicitis, Multi-detector Computed tomography, intravenous contrast

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INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdominal pain, the most common condition that requires abdominal surgery in childhood and the most common condition associated with lawsuits against emergency physicians.¹ Acute appendicitis occurs when the appendiceal lumen is obstructed, leading to fluid accumulation, luminal distention, inflammation, and, finally, perforation. Classic symptoms of appendicitis are well described. However, up to one third of patients with acute appendicitis have atypical presentations. Moreover, patients with alternative abdominal conditions may present with clinical findings indistinguishable from acute appendicitis.² Thus,

although appendicitis traditionally has been a clinical diagnosis, many patients are found to have normal appendixes at surgery. The misdiagnosis of this acute condition has led to the inappropriate removal of a normal appendix in 8–30% of patients. A rate of unnecessary removal as high as 20% has been considered acceptable in the surgery literature. However, negative laparotomy can be avoided in many patients if modern diagnostic methods are used to confirm or exclude acute appendicitis.³ Routine contrast-enhanced computed tomography (CECT) has been described as an accurate diagnostic imaging modality in patients with acute appendicitis. However, most patients with acute appendicitis can be

diagnosed by clinical findings and physical exam alone.⁴CT has high accuracy for the noninvasive assessment of patients with suspected appendicitis, with reported sensitivities of 88–100%, specificities of 91–99%, positive predictive values of 92–98%, negative predictive values of 95–100%, and accuracies of 94–98% and has emerged as the technique of choice in many centers for imaging evaluation of these patients.⁵ The present study was conducted to determine cases of acute appendicitis using CT.

MATERIALS & METHODS

The present study was conducted on 126 cases of suspected acute appendicitis of both genders reported to

Department of Radio-diagnosis, MKCG Medical College and Hospital, Brahmapur, Odisha, India. All were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. All patients underwent CT using multi-detector helical CT scanners (MDCT) with intravenous contrast medium starting from diaphragm to the symphysis pubis. A number of different CT scanners were used and axial section thickness evolved from 0.625 to 2.5 mm. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 126		
Gender	Males	Females
Number	72	54

Table I, graph I shows that out of 126 patients, males were 72 and females were 54.

Graph I Distribution of patients

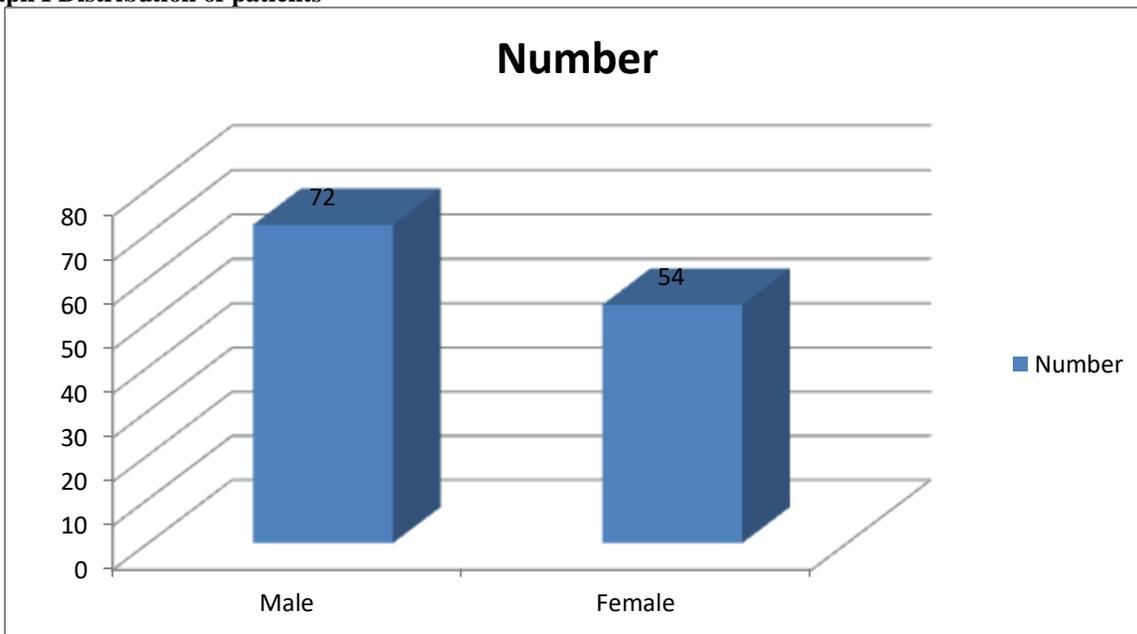


Table II Assessment of cases using CT

Features	Value
Appendiceal diameter	8.7 mm
Mild to moderate inflammation	62
Severe inflammation	50
Free fluid	14

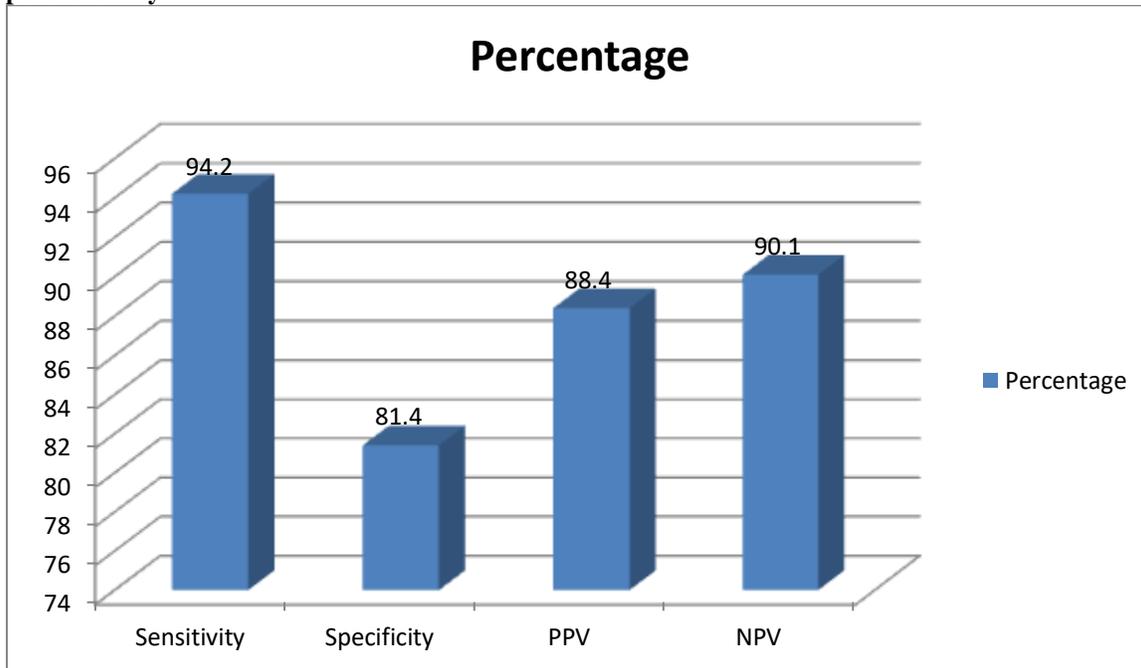
Table II shows that appendiceal diameter found to be 8.7 mm, mild to moderate inflammation was seen in 62, severe inflammation in 50 and free fluid in 14 cases.

Table III Efficacy of CT

Parameters	Percentage
Sensitivity	94.2
Specificity	81.4
PPV	88.4
NPV	90.1

Table II shows that sensitivity of CT found to be 94.2%, specificity 81.4%, positive predictive value 88.4% and negative predictive value 90.1%.

Graph II Efficacy of CT



DISCUSSION

Computed tomography (CT) has been frequently used as an imaging modality in the evaluation of acute appendicitis and has improved the diagnostic ability leading to a significant reduction in the number of negative appendectomies. With a reported sensitivity of up to 96.5% and specificity of about 98%, CT plays a major role in the clinical decision-making process in acute appendicitis and is considered as a first-line imaging modality in the diagnostic workup for suspected acute appendicitis.⁶ In 1986, Alvarado presented a clinical scoring system on the basis of eight predictive clinical factors to improve the accuracy of physicians' clinical assessments in diagnosing acute appendicitis. This scoring system produces a maximum total score of 10 points and includes clinical symptoms (nausea and anorexia), signs (fever, shifting pain, right lower quadrant pain, and rebound tenderness), and laboratory findings. Right lower quadrant pain and leukocytosis contribute 2 points each while the rest contributes 1 point.⁷ The present study was conducted to determine cases of acute appendicitis using CT.

In present study, out of 126 patients, males were 72 and females were 54. Lietzen et al⁸ found that out of the 1065 patients, 714 had acute appendicitis and 351 had other or no diagnosis on computed tomography. There were 700 true-positive, 327 true-negative, 14 false-positive, and 24 false-negative cases. The sensitivity and the specificity of computed tomography were 96.7% respectively. The rate of false computed tomography diagnosis was 4.2% for experienced consultant radiologists and 2.2% for inexperienced resident radiologists. Thus, the experience of the radiologist had no effect on the accuracy of computed tomography diagnosis.

We found that appendiceal diameter found to be 8.7 mm, mild to moderate inflammation was seen in 62, severe inflammation in 50 and free fluid in 14 cases. In early acute appendicitis (catarrhal stage) five layers can be identified- central, thin hyperechoic line representing the collapsed lumen and superficial lining of the mucosa of the appendix, hypoechoic layer (2-3mms) representing edematous lamina propria and muscularis mucosa, hyperechoic submucosa (2-3 mms),

hypoechoic muscular layer (2-3-mms), outer thin hyperechoic line representing the serosa.⁸ In late (suppurative) stage the lumen of the appendix is distended with pus/ fluid and there is increased thickening of the submucosa and muscular wall in the range of 3-6 mms. Circumferential color in the wall of the inflamed appendix on color Doppler US images is strongly supportive evidence of active inflammation.¹⁰ We found that sensitivity of CT found to be 94.2%, specificity 81.4%, positive predictive value 88.4% and negative predictive value 90.1%. Wagner et al¹¹ conducted a study in which eighty-eight of the 96 patients (91.6%) with acute appendicitis were correctly diagnosed by CT, 26 of the 28 patients (93%) without acute appendicitis were correctly diagnosed. Prospective interpretation of CT images yielded a sensitivity of 92 per cent and a specificity of 93 per cent for the diagnosis of acute appendicitis. There were eight false-negative scans. Of the total there were 88 true positives, 26 true negatives, 8 false negatives and no false positives.

The main CT criteria for the diagnosis of acute appendicitis include identification of a thickened appendix with a two-wall diameter greater than 6.0-7.0 mm, periappendiceal inflammatory changes, and a calcified appendicolith. Alobaidi et al¹² has recommended the use of bone window settings for detecting appendicoliths when evaluating patients for acute appendicitis, particularly patients in whom evidence of appendicitis is equivocal.

CONCLUSION

Authors found that maximum cases showed mild to moderate inflammation. CT had high positive predictive value.

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