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Research Article

**ANALYSIS OF DIAGNOSTIC ACCURACY OF COMPUTED
TOMOGRAPHY IN THE DIAGNOSIS OF ACUTE
APPENDICITIS PATIENTS**Waseem Baqir¹, Shahid Iqbal¹, Nauman Akhtar¹¹Allied Hospital Faisalabad

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Abstract:

Introduction: Appendix is a small pouch attached to the beginning of large intestine. Appendicitis, an inflammation of the appendix, is the most common acute surgical condition of the abdomen.

Objective: To analyse the diagnostic accuracy of computed tomography in the diagnosis of acute appendicitis patients.

Materials and Methods: This study was conducted in Allied hospital, Faisalabad during March 2019 to July 2019. Through a descriptive cross-sectional study design, a total of 191 patients suspected of having acute appendicitis were included in the study in a consecutive manner and subjected to CT pre operatively and histopathology post operatively for the acute appendicitis.

Results: The mean age of the patients was 29.5 ± 6.7 years. We had 53.4% males & 46.6% females. On CT we observed that the acute appendicitis was recorded in 58.1% of patients compared to 47.6% on histopathology. On applying the formulae for calculation, sensitivity of CT was found to be 89% and specificity 70%. The positive predictive value of the CT is 72.9% and negative predictive value is 87.5%.

Conclusion: CT is a highly sensitive and specific tool for the detection of acute appendicitis. As such, it is a useful radiological marker for diagnosis of acute appendicitis in adults and further studies are recommended to confirm its usefulness.

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INTRODUCTION:

Appendix is a small pouch attached to the beginning of large intestine. Appendicitis, an inflammation of the appendix, is the most common acute surgical condition of the abdomen. Almost 10% of the general population develops acute appendicitis with maximal incidence in the second and third decades of life. Surgical removal of such inflamed appendix is the most commonly performed emergency operation in the world and has long been considered the standard procedure of treatment of appendicitis. Its peak incidence is between the ages of 10 and 30 years [1]. Differential diagnosis of appendicitis is often a clinical challenge because appendicitis can mimic several abdominal conditions.

The appendix develops from the caecal bud which appears at about 6th week of intrauterine life, as a small conical dilatation of the caudal limb of the primary intestinal loop, forms a narrow diverticulum which gives rise to appendix [2]. This diverticulum which develops into appendix appears during the descent of the Colon, Its final position is posterior to the Caecum or Colon [3]. The apex of the caecal diverticulum does not grow as rapidly as the rest of it, thus the appendix is initially a small diverticulum of the Caecum. Thereafter the appendix increases rapidly in length so that by birth it is a long worm shaped tube arising from the distal end of the caecum [4].

OBJECTIVES OF THE STUDY:

The main objective of the study is to analyse the diagnostic accuracy of computed tomography in the diagnosis of acute appendicitis patients.

MATERIAL AND METHODS:

This cross-sectional study was conducted in Allied hospital, Faisalabad during March 2019 to July 2019. All patients presenting to OPD with high suspicion of acute appendicitis was included in the study. All patients having suspected acute appendicitis clinically with symptoms as defined in the operational definition and fulfilling the inclusion criteria was subjected to CT scan examination which was performed in the Hospital using a multi-slice CT scanner. Serial 3-mm axial images was obtained from the diaphragm through the perineum. Additional delayed images were obtained through the lower abdomen after the patient asked to lay on the right side for 10 min. Once done with CT, all the patients were subjected to appendectomy and biopsy was obtained.

Statistical analysis: The collected data was entered in SPSS version 20 and analyse through it, study variable was CT findings and Histopathology report. Frequency and percentage were calculated for categorical variables like gender. Mean \pm SD was calculated for continuous variables like age.

RESULTS:

The study was conducted on 191 patients suspected of having acute appendicitis. The mean age of the sample was 29.5 ± 6.7 years. The range of age in our study was 23 years with minimum age of 19 years and maximum age of 42 years. On grouping the sample in different age groups, we observed that 26.2% of patients were in the age group up to 25.00 years, 47.1% were in the age group 25.01 to 35.00 years and 26.7% of patients were in the age group 35.01 to 45.00 years.

Table 01: AGE-WISE DISTRIBUTION OF SAMPLE (n=191)

	n	Range	Minimum	Maximum	Mean	Std. Deviation
Age of the patient	191	23.00	19.00	42.00	29.5136	6.73198
Age Groups			Frequency		Percent	
	Up to 25.00 years		50		26.2	
	25.01 to 35.00 years		90		47.1	
	35.01 to 45.00 years		51		26.7	
	Total		191		100.0	

Table 02: CT & HISTOPATHOLOGY 2 x2 TABLE (n = 191)

		Acute Appendicitis on Histopathology		Total
		Positive	Negative	
Acute Appendicitis on CT	Positive	81 TP	30 FP	111
	Negative	10 FN	70 TN	80
Total		91	100	191

Sensitivity of CT: $TP/TP + FN = 89\%$; Specificity of CT: $TN/TN + FP = 70\%$

Positive Predictive Value CT: $TP/TP + FP = 72.9\%$; Negative Predictive Value CT: $TN/TN + FN = 87.5\%$

DISCUSSION:

The clinical appreciation of a patient with suspected appendicitis remains challenging as it is complicated by nonsurgical diseases that mimic appendicitis. The accuracy of the clinical diagnosis is approximately 80%, which corresponds to a negative appendectomy rate of around 20% [5]. This flaw in diagnostic accuracy has traditionally been accepted as it was considered most important to perform an early operation. Quality assurance focused on perforated appendicitis rather than negative appendectomy rates [6].

This practice has become less accepted for several reasons: the morbidity and costs associated with a negative appendectomy are substantial, and there is ample evidence that preoperative imaging can reduce the negative appendectomy rate and lessen the use of hospital resources. Even though some institutions have reported contradictory results, preoperative imaging for all patients with suspected appendicitis is gaining support [7]. Another reason for abandoning indiscriminate explorations for suspected appendicitis is new insights into the natural history of appendicitis. These challenge the belief that the perforated appendicitis rate is inversely related to the negative appendectomy rate and thus avoidable by urgent appendectomy [8]. Perforated appendicitis rates are not influenced by in-hospital delay and have not decreased with the increasing use of CT imaging. Evidence suggesting that resolving appendicitis is common can clarify this phenomenon. Quality assurance should therefore focus on the accuracy of the preoperative diagnosis, and not on the urgency with which it is made [9]. Negative appendectomy rates and false negative diagnoses for patients who present with perforated appendicitis should be kept to an absolute minimum.

A previous evaluation of diagnostic strategies for unselected patients with acute abdominal pain favoured a conditional CT strategy for the detection of urgent conditions, with ultrasound first and CT after a negative or inconclusive ultrasound [10]. For common diagnoses causing acute abdominal pain, such as appendicitis literature suggests CT in the diagnostic work-up of these patients suspected with appendicitis. Primarily usage of CT in patients suspected with diverticulitis is not supported by literature, as accuracy of US and CT were comparable in a recent published meta-analysis [11].

CONCLUSION:

It is concluded that CT is a highly sensitive and specific tool for the detection of acute appendicitis. As such, it is a useful radiological marker for diagnosis of acute appendicitis in adults and further studies are recommended to confirm its usefulness.

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