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ROLE OF SIMPLE INFLAMMATORY MARKERS IN DIAGNOSIS OF ACUTE APPENDICITIS IN CHILDREN

Thesis

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Abstract: Acute appendicitis represents one of the most common abdominal emergencies in children. If untreated can lead to generalized peritonitis. It is often difficult and challenging even for the most experienced surgeon to make a definite diagnosis in pediatric patients. Inflammatory markers like Total Leukocyte count (TLC) and C-reactive protein (CRP) and Neutrophil Ratio (NR) can help in making an early and accurate diagnosis in difficult cases. **Objective:** To evaluate the importance of serum CRP level estimation, TLC and Neutrophils ratio in the accurate diagnosis of acute appendicitis, by comparing with the final histopathological diagnosis. **Study Design:** This study was designed to be a cross-sectional study with non-probability purposive sampling. **Subjects and Methods:** This study was performed on 50 patients who have been clinically diagnosed as acute appendicitis on the basis of presenting symptoms and signs and who were posted for appendectomy in Department of General Surgery of Shibin El-kom Teaching hospital El Menofya, Egypt in the period of 1st January 2013 to 31st July 2014. All patients from 4-18 years of age fulfilling the inclusion criteria were admitted for this study. We estimated pre-operative serum CRP level, TLC and Neutrophil Ratio in all patients. Postoperatively the histological results were differentiated into non-inflammed and inflamed appendix. **Results:** The mean age of the patients was 11.8 ±3.2 years. Histopathology showed that 40(80 %) patients had inflamed appendix. Diagnostic accuracy of WBC count, neutrophil ratio and C-reactive protein was 74%, 72% and 88% respectively. Diagnostic accuracy of combining C-reactive protein, WBC count and neutrophil ratio was 100%. **Conclusion:** TLC and C-reactive protein and neutrophils ratio can provide help in making accurate diagnosis of acute appendicitis. The significance of combining the tests and their role in diagnosing acute appendicitis is found to be very high.

Key Words: Acute appendicitis, Total leukocyte count, C-reactive protein and neutrophils ratio


بسم الله الرحمن الرحيم
فاذكروا الله كما علمكم
ما لم تكونوا تعلمون
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List of Abbreviations

AA	Acute Appendicitis
AIR	Acute appendicitis Response Score
cm	Centimeter
CRP	C-reactive protein
CT	Computerized Tomography
GALT	Gut-Associated Lymphoid Tissue
HPE	Histopathological Examination
NR	Neutrophil Ratio
PAS	pediatric appendicitis score
PPP	primary proliferative polycythaemia
RLQ	Right Lower Quadrant
US	Ultra sonography
TLC	Total Leukocytic Count
UTI	Urinary Tract Infection
WBCC	White Blood Cell Count
WBC	White Blood Count
$\mathbf{X^2}$	Chi square

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Introduction

Acute appendicitis is accounting for 10% of all abdominal surgeries and one third of all pediatrics hospital admissions with acute abdominal pain. It is the most frequent cause of persistent and progressive abdominal pain for all ages. [(1)]

In pediatric patients clinical diagnosis is often challenging even for experienced surgeons. In particular, children may present with different and nonspecific symptoms. Furthermore, the risk of progression to perforation in children is higher than in adults. Despite the introduction of sonography (US) and computed tomography (CT), the accuracy of diagnosis has improved only marginally highlighting the need for better diagnostic tools. [(2)]

It is generally accepted that appendectomy is the therapy of choice in children. Conservative management is not established for children although it is evaluated in some studies of adult patients. Risk of perforation and further complications increases with a delay in diagnosis of acute appendicitis (AA). On the other hand in young children, geriatric patients, and in adolescent females, the negative appendectomy rate may be as high as 50 %. Many attempts have been made to determine ways of decreasing the negative laparotomy rate after a clinical suspicion of AA. [(3)]

Acute right iliac fossa pain accurate diagnosis remains a difficult clinical problem as the differential diagnosis of such a pain is not straight forward. In spite of development of various diagnostic scores and diagnostic aids like C-reactive proteins (CRP), the diagnosis has been confusing for the clinician as no laboratory or radiological test is 100% accurate. [(4)]

Inflammatory markers such as White Blood Count (WBC) or serum CRP concentration are simple and useful tests utilized in diagnosing appendicitis. These markers have been reported to elevate reflecting the severity of appendicitis. [(5)]

Serum CRP concentration is the most widely estimated of the acute phase proteins in pediatric patients. After 6 to 12 hours of inflammation the concentration begins to rise and may increase a hundredfold. In patients whose symptoms had lasted less than 24 hours WBC count had a high sensitivity while in those in whom they had lasted more than 24 hours CRP had a high sensitivity. [(3)]

The combined presence of normal WBCC and CRP in a patient makes the diagnosis of acute appendicitis highly unlikely in spite of the decreased specificity of WBCC (White Blood Cell Count) and CRP in confirming acute appendicitis in children and adults. [(6)]

Total Leukocytic Count (TLC) is easily available test and not very expensive. Almost all laboratories round the clock can do it. Various studies have been published on the evaluation of role of Leukocytosis in the diagnosis of acute appendicitis. The diagnostic accuracy of TLC is increased further if combined with CRP and neutrophil count. **(1)**

To reduce the perforation rate significantly, WBC count, CRP, and Neutrophil count are added to the clinical variables. Body temperature repeated control and laboratory examinations in combination with clinical re-examinations were of benefit in the management of patients with equivocal signs of appendicitis. **(3)**