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**Original Research Article**

# White blood cell (WBC) as a diagnostic parameter in acute appendicitis in pediatric patients - A retrospective study

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## Abstract

**Background:** Diagnosis of acute appendicitis is challenging particularly in pediatric age group even in the hands of experienced surgeons. Acute appendicitis can be atypically presented in children with non specific abdominal symptoms. In addition, there is increased incidence of perforation within pediatric age group of about 20-50%. Hence, finding cheap, quick and reliable investigatory tool is mandatory. White blood cell count (WBC) is elevated in an inflammatory conditions including appendicitis. Therefore it can be used to support the clinical diagnosis of acute appendicitis. Therefore Gronroos, et al. suggested that we can totally avoid 25% 0f negative appendicitis by measuring WBC level in patient clinically suspected appendicitis.

**Material and methods:** The present study was conducted in 50 pediatric age patients at the hospital who have been clinically diagnosed by surgeons as having acute appendicitis and posted for emergency appendicectomy. Pre-operatively blood was sent for WBC estimation, after operation all specimen were sent for histopathological examination (HPE), results of WBC were correlated with HPE reports to evaluate their role in diagnosis of acute appendicitis.

**Results**: In present study, WBC has highest sensitivity and specificity of 90% and 85% with positive predictive value of 90%. Hence, it has proved that WBC level can be used to rule out negative appendicitis, so that surgery can be deferred in them and to reduce the rate of negative appendicectomies.

**Conclusion**: WBC can support the clinical diagnosis of acute appendicitis especially in pediatric age in reducing the negative appendicectomy rate drastically. Hence it is recommended to get WBC level done in all pediatric age patients with suspected appendicitis.

## Key words

White blood cell (WBC), Histopathological examination (HPE), Acute appendicitis, Pediatric age.

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## Introduction

Diagnosis of acute appendicitis is challenging particularly in the pediatric age group even in the hands of experienced surgeons [1]. Acute appendicitis represents the most common abdominal emergencies in India. Acute appendicitis can be atypically presented in children with non specific abdominal symptoms. In addition, there is increased incidence of perforation in pediatric age group [2]. White blood cell count (WBC) is elevated in an inflammatory conditions including appendicitis [3]. Therefore, it can be used to support the clinical diagnosis of acute appendicitis. Therefore, Gronroos, et al. suggested that we can totally avoid 25% of negative appendicitis by measuring WBC level in patient clinically suspected appendicitis [4].

The classic triad of history compatible with acute appendicitis, pain at MC Burney's point has diagnostic accuracy rate of less than 80%. This resulted in relatively high rate of about 15-30% of negative explorations for acute appendicitis and post operative morbidity associated with their negative explorations is 5-15%. Traditionally surgeons have accepted a higher incidence of unnecessary appendicectomies in order to decrease the incidence of perforation. This approach is being increasingly questioned in today's era of evidence based medicine. Hence finding cheap, quick and reliable investigatory tool is mandatory. So, the goal of surgical treatment in removal of inflamed appendix is before perforation with a minimal number of negative appendicectomies.

## Material and methods

In this study, all pediatric patients who were diagnosed clinically as to have acute appendicitis form the source of study were included. Pediatric patients with history of acute abdominal pain were examined by a surgeon, for establishing the diagnosis, complete patient history was obtained followed by examination by surgeon and decided for emergency appendicectomy.

Blood samples were sent for histopathological examination (HPE), comparing WBC with HPE report, specificity and sensitivity of WBC calculated.

## Results

In our study, 50 pediatric cases were included who were diagnosed as having acute appendicitis clinically by surgeon. In our study, according to age of patient two groups were noted: Children younger than 12 years, and teenagers between 12 to 16 years. Maximum number of pediatric patients was within the age of 10-12 years, i.e., 40% of study group which included male to female ratio of 1: 1.

All the patients in our study presented with pain abdomen, with most common site of pain being right iliac fossa (RIF) (80%). In 80% of patients MC Burney's point tenderness was noted. Only 10% showed shifting tenderness.

Peroperatively, most common position of appendix was found to be retrocecal. Out of 50 patients, 6 patients had normal HPE. So our negative appendicectomy rate was 12%. Histopathologically, 50% of patients had acute suppurative appendicitis, remaining showed acute gangrenous or catarrhal type.

In present study, 43 patients had elevated WBC which was 86% of total study group. 76 patients had normal WBC level i.e., 14% of patients. Therefore, total WBC count had sensitivity of 97.7% with specificity of 85.7% and positive predictive value of 97.7%.

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## Discussion

Acute appendicitis by definition is characterized by a local inflammatory reaction that will in turn progress to a systemic inflammatory response. Detecting this inflammatory response through an easy minimally invasive, widely available and most effective method is always desirable. Several inflammatory markers have been utilized to increase diagnostic accuracy in acute appendicitis and WBC is one such important laboratory method.

The clinical diagnosis will remain the corner stone in diagnosis of acute appendicitis; nevertheless, laboratory investigations provide significant complimentary aid in diagnosis. So, in our study, WBC count proved as a diagnostic parameter in acute appendicitis in pediatric patients. The diagnostic value of WBC was studied and after the study negative appendicectomy rate was 14% which was comparable to study done by Khan MN, et al. (2004) [5] with negative rate of 14.3% and with Vinoth Kumar, et al. (2011) [6] with negative rate of 10%.

In our study, sensitivity of 97.7% specificity of 85.7% was compared with study by Dueholm, et al. [7] in which he demonstrated that WBC had the best sensitivity of 83% negative predictive value of 88%. Khan MN, et al. showed sensitivity of 83% and negative predictive value of 92% hence, serum WBC estimation does not undermine the importance of clinical diagnosis of skilled surgeon but compliments it.

## Conclusion

Elevated WBC supports the surgeons' diagnosis, and hence avoids chances of error in diagnosis due to atypical presentations. Hence WBC stands as best laboratory test in pediatric patients, which can be used to reduce negative appendicectomy rate drastically.

## References

1. Stefanutti G., Ghirardo V, Gamba P. Inflamatory markers for acute appendicitis in children. Are they helpful? J padiatric surgery, 2007; 42: 773-6.
2. Ganal R., Moore JC. Appendicitis in children aged 13 years and younger. Am J Surg., 1990; 159: 589-92.
3. Pearl RH, Hale DA, Molloy M, Schott DC, Jaques DP. Padeatric appendicectomy. J. Padiatric Surg., 1995; 30: 173-8.
4. Gronroos JM, Gronroos P. Leukocyte count and CRP in diagnosis of acute appendicitis. Br. J Surg, 1999; 86: 50-4.
5. Khan MN, Davie E, Irshad K. The role of White cell count and c-reactive protein in the diagnosis of acute appendicitis. J Ayub Med Coll Abbottabad, 2004; 16: 17-9.
6. Vinoth kumar, et al. Study of diagnostic value of WBC and CRP in suspected acute appendicitis prospective study. Indian J Med Sci, 2011; 65(9): 399-405.
7. Dueholm S, et al. study of diagnostic value of leucocyte count and C-reactive protein. Dis colon Rectum, 1989; 31(10): 855-9.

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