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Research Article

**STUDY TO DETERMINE THE RELATION OF WBC COUNT
AND DURATION OF SYMPTOM TO PREDICT DISEASE
SEVERITY IN PATIENTS OF ACUTE APPENDICITIS**¹Dr Aayan Asghar, ²Dr. Muhammad Arif, ³Dr. Irfan Mureed¹ Shandong University, China² International Higher School of Medicine, Kyrgyzstan³ Fatima Memorial College of Medicine and Dentistry, Lahore

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Abstract:

Aim: To determine the relationship between the severity of acute appendicitis and the number of white blood cells, age and duration of symptoms.

Study design: cross-sectional study.

Place and duration: In the Surgical Unit II of Jinnah Hospital Lahore for one year duration from March 2019 to March 2020.

Method: The study involved 242 patients with clinical and histological diagnosis of acute appendicitis. Patients with simple acute appendicitis, purulent appendicitis, perforated appendicitis, or gangrenous appendicitis were included. Histological verification was performed on all samples.

Results: Of the 242 patients, 174 are men and 68 women. The mean duration of symptoms was 1.98 ± 1.83 days in men and 1.52 ± 0.81 days in women. The mean duration of symptoms for simple acute appendicitis (Group 1) was 1.92 ± 1.71 , 1.38 ± 0.5 for purulent appendicitis (Group 2) and 1.38 ± 0.69 for perforated appendicitis (group 3). Average white blood cell counts for simple acute appendicitis, purulent appendicitis, and perforated appendicitis were $10,907.11 \pm 3029.56$, 10300 ± 2401.38 and 12461.11 ± 3643.22 respectively. No gangrenous cases of appendicitis were observed. Patients aged 25 to 35 years had the highest number of white blood cells in various groups of acute appendicitis ($P = 0.004$). No gangrenous cases of appendicitis were observed. There was no significant correlation between the number of white blood cells and the severity of appendicitis symptoms. There was a significant relationship between different age groups and the severity of the disease ($p = 0.042$).

Conclusion: WBC numbers and duration of symptoms are not good predictors of disease severity in appendicitis. In the adult population, an increase in age even under 45 years increases the risk of appendicitis complications.

Key words: appendicitis, complications

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INTRODUCTION:

Acute appendicitis is one of the most common surgical emergencies of the abdomen. Due to the increased morbidity and mortality associated with complications of simple appendicitis, surgeons had to operate on patients and did not expect a final diagnosis. This led to the removal of normal appendix in 15 to 30% of patients. Because many patients have a typical history and test results, the diagnosis is clinically established. Etiology is multifactorial; Obstruction of light contributes to diet and family factors. The diagnosis of acute appendix remains a dilemma due to the different history and test results that an individual patient can offer. Delayed arrival of a doctor or incorrect diagnosis can lead to serious consequences in the case of appendicitis. The number of white blood cells has been shown to provide valuable information in the diagnosis of acute appendicitis. In his study, Salman observed an increase in the number of white blood cells as the severity of the disease increased. Patient age plays an important role in determining the likelihood of appendicitis complications such as perforation, and patients over the age of 50 have an increased risk. The authors conducted this study to determine whether the number of white blood cells, the patient's age and duration of symptoms were related to the severity of the disease in cases of acute appendicitis.

METHOD:

This is a cross-sectional study held in the Surgical Unit II of Jinnah Hospital Lahore for one year duration from March 2019 to March 2020. A total of 242 patients were enrolled in the study. Only patients whose surgical and histological results were fully compatible were included in the study. Simple histology of acute appendicitis or one of its complications such as suppuration, perforation or gangrene has been proven in these patients.

Patients were divided into 3 groups of patients.

1. Simple acute appendicitis
2. purulent appendicitis
3. Perforated / gangrenous appendicitis

No cases of gangrenous appendicitis were reported during surgery or histology. The parameters included in the study were patient demographics, duration of symptoms, white blood cell counts, and histological results of the appendix sample. A leukocyte count of 10,000 or more was considered positive for leukocytosis. Patients were divided into 12–25 (group 1) 26–35 (group 2) and 36–45 (group 3) age groups. All analyzes were carried out using the SPSS 18.0 production facility. For statistical analysis, we used the One-Way ANOVA and Spearman correlation. A probability value of <0.05 has been assigned to show significance.

RESULTS:

242 patients were included in the study. There were 174 men (71.9%) and 68 women (28.1%). The average age of applicants for men was 22.68 ± 6.88 , while the average age of women was 18.97 ± 5.37 . The mean duration of symptoms was 1.98 ± 1.83 days in men and 1.52 ± 0.81 days in women. The mean duration of symptoms for simple acute appendicitis (Group 1) was 1.92 ± 1.71 , 1.38 ± 0.5 for purulent appendicitis (Group 2) and 1.38 ± 0.69 for perforated appendicitis (group 3).

Leukocytosis occurred in 123 (69.88%) men and 53 (30.11%) women and 176 (72.72%) of all cases. The average number of white blood cells in simple acute appendicitis was $10,907.11 \pm 3029.56$ in 211 patients and in purulent appendicitis was 10300 ± 2401.38 in 13 patients. The average WBCS in perforated appendicitis was $12,461.11 \pm 3643.22$ for 18 patients. Table I shows the number of patients belonging to different age groups. There was no significant relationship between the severity of acute appendicitis and the number of white blood cells ($p = 0.08$). The mean duration of symptoms was also not significant in patients with varying severity of acute appendicitis ($p = 0.227$). There was a significant difference between the average white blood cell count and different age groups ($p = 0.004$). There was also a positive correlation ($r = + 0.131$) between the severity of acute appendicitis in different age groups ($p = 0.042$).

Table I. Number of patients in different in age and disease groups

	Age Group I (12-25 Years)	Age Group II (26-35 Years)	Age Group III (36-45 Years)	Total
Patient Group I	171	35	5	211
Patient Group II	8	4	1	13
Patient Group III	12	6	0	18
Total	191	45	6	242

DISCUSSION:

Appendicular rupture explains most of the complications of acute appendicitis. Various factors have been found to play a role, such as late presentation of medical care, very young places, and old and variable additional pages. When perforation is present, the percentage of complications, length of hospital stays and resource utilization increases significantly.

It has been shown that the risk of complications in patients over 50 is absolutely higher. The authors observed a significant positive relationship ($p = 0.04$) (+0.131) between the severity of appendicitis and the increase in age in various age groups. The limitation of this study is the absence of patients older than 45 years (Table I). However, this also indicates that the severity of the disease increases not only in extremes, but also in patients between 12 and 45 years of age with increasing age.

Imaging studies, such as ultrasound, have not been very useful in diagnosing the severity of acute appendicitis.

In the past, a significant number of scoring systems have identified white blood cell counts as an inflammatory marker for assessing acute appendicitis. The first deamination of peripheral white blood cells after the release of catecholamine and cytokines explains leukocytosis in most patients with acute appendicitis. In this study, the authors found no relationship between the number of white blood cells and the severity of the disease in acute appendicitis ($p < 0.08$). On the other hand, the authors observed a significant difference in the average number of white blood cells in different age groups ($p = 0.004$) under the age of 45 (Fig. III).

The appendix discussion for acute appendicitis is more active than ever. Studies have shown that the severity of appendicitis is time dependent and the delay in appendicitis is uncertain. Another study showed that the increased risk of complications was low during the first 24 hours, but gradually increased over time. The authors noted that the average duration of symptoms in patients with varying severity of acute appendicitis was not significantly different ($p 0.227$), i.e. the duration of symptoms in patients with appendicitis. Emergency appendectomy has traditionally been the standard treatment method to minimize the risk of complications associated with disease progression to gangrene and perforation.¹¹ Complete absence of gangrenous appendicitis in patients with a wide range of symptoms duration in this study. The study may represent the rarity of this acute inflammatory complication appendicitis in our community.

CONCLUSION:

As a result, this study showed that the number of white blood cells and the average duration of symptoms are not independently useful markers to predict the risk of developing a serious disease in acute appendicitis. Early operational decisions cannot be based solely on the number of white blood cells and the duration of symptoms. Like older people, middle-aged patients are more likely to have severe types of appendicitis than adolescents and young adults, so the decision should be quick. Due to the variable results of research carried out in different parts of the world, to solve the diagnostic and operational dilemmas of acute appendicitis, multicenter data analyzes with large and variable population groups are needed.

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