ACUTE APPENDICITIS: CAN WBC COUNT AGE AND DURATION OF SYMPTOMS PREDICT SEVERITY OF DISEASE

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ABSTRACT
Objective: *To determine the association of WBC counts, age and duration of symptoms with severity of acute appendicitis.*
Study Design: *Cross sectional study.*
Setting & Duration: *Conducted from November 2006 to November 2008 in department of surgery, Unit IV Civil Hospital Karachi.*
Methodolgy: *A total of 242 patients with clinical and histological diagnosis of acute appendicitis were included in the study. Patients who were found to have simple acute appendicitis, suppurative appendicitis, perforated appendicitis or gangrenous appendicitis were included. A histological confirmation was performed on all the samples.*
Results: *Out of a total of 242 patients, 174 were males and 68 females. The mean age at presentation for males was 22.68±6.88 while that of females was 18.97±5.37 days. The mean duration of symptoms was 1.98±1.83days in males and 1.52±0.81 days in females. The mean duration of symptoms for simple acute appendicitis (group 1) was 1.92±1.71, for suppurative appendicitis (group 2) was 1.38±0.5 and for perforated appendicitis (group 3) was 1.38±0.69. The mean WBC counts for simple acute appendicitis, suppurative appendicitis and perforated appendicitis were 10907.11± 3029.56, 10300±2401.38 and 12461.11±3643.22 respectively. No case of gangrenous appendicitis was observed. Patients in the age range of 25-35 years were found to have the highest WBC counts in different groups of severity of acute appendicitis (P=.004). No case of gangrenous appendicitis was observed. No significant association between WBC count and severity of findings in appendicitis was found. A significant correlation was present between different age groups and severity of disease (P=.042).*
Conclusion: *WBC counts and duration of symptoms are not good predictors of severity of disease in appendicitis. Increasing age in the adult population even under the age of 45 years increases the risk of development of complications in appendicitis.*

KEY WORDS: *Appendicits, Complications*

INTRODUCTION

Acue appendictis is one of the most common surgical emergencies of the abdomen.[1] Due to the higher morbidity and mortality associated with complications of simple appendicitis, surgeons have been prompted to operate on the patients and not wait for the definitive diagnosis. This has lead to the removal of normal appendix in 15 to 30% of patients.[2] Diagnosis is made predominantly clinically since many patients present with typical history and examination findings. Etiology is multifactorial; luminal obstruction, dietary and familial factors all contribute.[3] The diagnosis of acute appendix still remians a dilemma due to the variety of history and examination findings an individual patient can present with. Late presentation or failure of clinician to make accurate diagnosis can both lead to serious outcomes in cases of appendicitis.[4] Leukocyte count has been shown to give valuable information in diagnosis of acute appendicitis.[5] Salman[6] in their study also observed an increase in WBC count with an increase in the severity of disease. Age of the patient plays an important role in determining the likelihood of developing complications of appendicitis like perforation and patients above the age of 50 years have been shown to have a definite increased risk.[7]

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The authors conducted this study to determine if white blood cell counts, age of the patients and duration of symptoms were associated with severity of disease in cases of acute appendicitis.

METHODOLOGY

This was a cross sectional study and included those patients who underwent appendectomy from November 2006 to November 2008. A total of 242 patients were included in the study. Only those patients were included whose operative and histological findings were completely consistent with each other. These patients had histology proven simple acute appendicitis or one of it's complications like suppuration, perforation or gangrene. Patients were divided into 3 patient groups.

1. Simple acute appendicitis
2. Suppurative appendicitis
3. Perforated/Gangrenous appendicitis

No case of gangrenous appendicitis was noticed on operation or histology. The parameters included in the study were patients' demographic details, duration of symptoms, WBC counts and histological findings of appendicular sample. A WBC count of 10,000 or more was taken as positive for leukocytosis. Patients were divided into age groups of 12-25 (Age group 1) 26-35 (age group 2) and 36-45 (age group 3). All analysis was performed using a SPSS 11.0 production facility. For statistical analysis, we used One Way ANOVA and Spearman's correlation. A probability value of <0.05 was assigned to show significance.

RESULTS

A total of 242 patients were included in the study .There were 174 males (71.9%) and 68 females (28.1%). The mean age at presentation for males was 22.68±6.88 while that of females was 18.97±5.37. The mean duration of symptoms was 1.98±1.83 days in males and 1.52±0.81 days in females. The mean duration of symptoms for simple acute appendicitis (group 1) was 1.92±1.71, for suppurative appendicitis (group 2) was 1.38±0.5 and for perforated appendicitis (group 3) was 1.38±0.69. Leukocytosis was present in 176(72.72%) of the total cases with 123(69.88%) males and 53(30.11%) females.

The mean WBC counts for simple acute appendicitis were found to be 10907.11±3029.56 in a total of 211 patients. The mean was 10300±2401.38 for suppurative appendicitis in a total of 13 patients. In perforated appendicitis, the mean was 12461.11±3643.22 for 18 patients. Table I shows the number of patients belonging to different age groups. No significant association between severity of acute appendicitis and WBC count was found (P=0.08). Mean duration of symptoms in patients with different severities of acute appendicitis was also not found significant (P=0.227). A significant difference was present between mean WBC counts and different age groups (P=0.004). A positive correlation (r=+0.131) between severity of acute appendicitis in different age groups was also present (P=0.042).

DISCUSSION

Appendiceal rupture accounts for the majority of complications of acute appendicitis. Various factors have been found to play a role like delayed presentation to seek medical care[8] the very young and the old[9] and variable locations of appendix[10] are recognized factors. Complication rates, duration of hospital stay, and resource usage are all significantly increased when perforation exists.[11] Patients above the age of 50 years have been shown to be at a definite increased risk of complications.[7] The authors have observed a significant (p=0.04) positive correlation (+0.131) between severity of appendicitis and increasing age in different age groups. A limitation to this study is the absence of any patients >45 years of age (Table I). However this at the same time suggests that severity of disease increases even in patients in 12 to 45 years age group with increasing age and not only in extremes of age.

Imaging tests like ultrasound have not proven to be of much help in diagnosing severity of acute appendicitis.[12]

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**

In the past, a substantial number of scoring systems had quoted WBC count as an inflammatory marker for the evaluation of acute appendicitis.[13,14,15] Initial demargination of peripheral WBC's caused by catecholamine and cytokine release accounts for leukocytosis in most patients with acute appendicitis.[6] In this study the authors have determined no association between WBC count and severity of disease in acute appendicitis (p 0.08). On the other hand the authors have observed a significant difference in the mean WBC counts of patients in different age groups (p=0.004) under 45 years of age (Figure III).

The debate surrounding emergent appendectomy for acute appendicitis is more active than ever.[16] Studies have demonstrated that the severity of appendicitis is time dependant and a delay in appendectomy is unsafe.[7] Another study has shown that the risk of increase in complications is negligible in the first 24 hours but then increases gradually over time.[17] The authors observed that mean duration of symptoms in patients with different severities of acute appendicitis was not significantly different (p 0.227) suggesting duration of symptoms might not play a very important role in determining the likelihood of severity in patients of appendicitis. Prompt appendectomy has traditionally been the standard of care in order to minimize the risk of complications associated with progression of the disease process to gangrene and perforation.[11] Complete absence of gangrenous appendicitis in patients with a wide range of duration of symptoms in this study might represent the rarity of this complication of acute appendicitis in our population.

CONCLUSION

To conclude, this study showed that WBC counts and mean duration of symptoms were not independently useful markers to predict the risk of a patient developing severe disease in acute appendicitis. Decisions for early operation can not be based on WBC counts and durations of symptoms alone. Like the elderly, the middle age patients are also more likely to have severe types of appendicitis compared to adolescence and young adults, so decision should be prompt. Due to variable results in studies conducted in different parts of the world, there is a need to conduct multicenter data analysis with large and variable population groups in an attempt to settle the diagnostic and operative dilemmas of acute appendicitis.

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