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**Research Article** 

# EVALUATION OF PREDICTIVE VALUES, SPECIFICITY AND SENSITIVITY OF ULTRA-SOUND AND LABORATORY FINDINGS IN APPENDICITIS

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# ABSTRACT

The diagnosis is specially challenging for women of fertile age. Acute appendicitis is the most common indication for emergency surgery worldwide, with incidence of 1.17 per\1000 and lifetime risk of 8.6% in men and 6.7% in women. The incidence is highest in adolescents and young adults, but the incidence of complicated appendicitis shows little variance between different age groups. Clinical diagnosis of acute appendicitis is based primarily on symptoms and physical findings. However, this diagnosis is often difficult, and up to 50% of patients hospitalized for possible appendicitis do not actually have this disorder. Authors of large prospective studies report a 22%–30% removal rate of normal appendices at surgery. It was a prospective study which included regular laboratory tests like WBC count and CRP assay. And the participants also have been undergone for US examination to diagnose appendicitis. From the study, we finally conclude that the use of laboratory tests does not exclude the need for US examinations in patients with normal laboratory values.

#### Keywords :- Radiological Findings, Appendicitis, Ultra sound, Laboratory Findings.



## INTRODUCTION

Early surgical intervention is the traditional golden standard for preventing appendicular perforation. High rate of unnecessary negative appendectomies, however, leads to unnecessary morbidity and even mortality [1]. Although a very common and long-known phenomenon, appendicitis remains a diagnostic challenge for surgeons and emergency physicians. Clinical diagnosis alone leads to a negative appendectomy rate of 15 to 30% [2]. The diagnosis is specially challenging for women of fertile age. Acute appendicitis is the most common indication for emergency surgery worldwide, with incidence of 1.17 per\1000 and lifetime risk of 8.6% in men and 6.7% in women [3, 4]. The incidence is highest in adolescents and young adults, but the incidence of

complicated appendicitis shows little variance between different age groups [5]. Clinical diagnosis of acute appendicitis is based primarily on symptoms and physical findings. However, this diagnosis is often difficult, and up to 50% of patients hospitalized for possible appendicitis do not actually have this disorder [6, 7]. Authors of large prospective studies report a 22%–30% removal rate of normal appendices at surgery [8]. To reduce the frequency of unnecessary appendectomy, the importance of laboratory findings that include both white blood cell (WBC) counts and C-reactive protein (CRP) values has been stressed, and the use of ultrasonography (US) as a diagnostic tool for appendicitis has been widely evaluated [9-11].

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Reported US signs of appendicitis can be grouped into the two categories of

(a) appendiceal findings and

(b) periappendiceal findings, which mainly include inflammatory changes in the right lower abdominal quadrant [12, 13].

Many laboratory findings or US signs are present in most suspected cases of appendicitis. Some of these signs, however, are also present in alternative conditions that can clinically mimic appendicitis. To our knowledge, the frequencies of laboratory and US findings in both appendicitis and alternative conditions have not been compared [14, 15].

#### Aims & Objectives:

- To evaluate the sensitivity of Ultra sound (US) in revealing the positive cases with appendicitis.
- To estimate the specificity of US.
- To evaluate the negative predictive values of US test results.
- To study the laboratory findings in the patients with appendicitis.

#### **MATERIALS & METHODS**

Study was carried out over a period of 8 months in the radiology department of the study site hospital. 120 patients of consecutive suspects of appendicitis have been evaluated. The study population included both the genders, with > 12 years of age. It was a prospective study which included regular laboratory tests like WBC count and CRP assay. And the participants also have been undergone for US examination to diagnose appendicitis. Ethical approval was obtained from the institutional review board of the study hospital and all the participants are provided with informed consent forms with keen explanation.

#### **Data Analysis:**

IBM SPSS Statistics 20 software package was used for statistical analysis. Two-sided tests at  $\alpha$ =0.05 level of significance were used for hypothesis controls.

## **RESULTS & DISCUSSION:**

All the general demographics and presenting symptoms and complaints from the patients included in the study were collected with all the available data as presented in the Table 1.

#### **US Findings**

Of the 120 patients clinically suspected of having appendicitis, 58 had acute appendicitis and 62 did not (prevalence, 44%). In all 57 patients with acute appendicitis, the diagnosis was confirmed with surgery and histologic evaluation. In the appendicitis group, the surgical and histologic findings showed perforation of the appendix in 15 patients. Among the 62 patients without acute appendicitis.

The diagnosis was confirmed at surgery in four patients, at endoscopy with biopsy in two patients, and at clinical follow-up in 62 patients. Table 2 lists the final diagnoses established in the non-appendicitis group. According to the final diagnosis, all patients who did not undergo surgery had resolution of symptoms in a period ranging from 2 hours to 1 month after inclusion in the study.

STUDY COHORT	Appendicitis	No appendicitis	
(n = 120)	( <b>n</b> = 58)	( <b>n</b> = 62)	
Age (mean years $\pm$ SD)	$31.4 \pm 4.1$	$25.9 \pm 4.7$	
Male	38	41	
Duration of pain (median-hours)	22	9	
Fever	39	26	
Migration of pain	24	13	
Anorexia	38	10	
Nausea or vomiting	51	37	
Tenderness in RLQ	50	44	
Rebound /pain with cough or	40	20	
hopping			
WBC >10000/mm <sup>3</sup>	36	11	
>75% neutrophils	50	19	
Appendicitis assessment Score	$8.1 \pm 0.2$	3.2 ± 1.9	
(AAS), Mean (SD)			
Low risk (≤4)	2	33	
Medium risk (5-7)	38	12	
High Risk (8-10)	18	0	

Table 1. Patient features for study population and final diagnosis

	Appendicitis $(n - 58)$	No Appendicitis $(n - 62)$	<i>P</i> value
Leukocyte count(/ mm <sup>3</sup> )	17031±5350	13001±5760	<0.001
ANS (/ mm <sup>3</sup> )	14075±4970	10035±5730	< 0.001
(mean± SD) CRP(mg/dl)	1.8 (0-20)	0.2 (0-10.2)	<0.001
(mean)(min-max) Non-compressed tubular structures	26	6	<0.001
Appendiceal wall thickening	24	5	<0.001
Free fluid in the abdominal cavity	35	9	<0.001
Mesenteric thickening Periappendiceal echogenicity	11	0	0.01
Mesenteric lymphadenopathy	23	1	0.96
Appendicholith	16	0	< 0.001

 Table 2. Comparison of patients' US findings and laboratory values between the group with appendicitis and without appendicitis

There were 79 men. The mean age of the patients was  $31.4 \pm 4.1$ , median duration of abdominal pain before hospital admission was 15 hours. Majority patients (n=58, 48.3%) presented to the ED at out of working hours.

No significant difference was found in age and sex among patients with and without appendicitis (p = 0.08 and 0.27, respectively). Median duration of abdominal pain in the group diagnosed as appendicitis was significantly longer.

The mean AAS in the group with and without appendicitis were respectively low.

# CONCLUSION

From the study, we finally conclude that the use of laboratory tests does not exclude the need for US examinations in patients with normal laboratory values.

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