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Case Report

Study of Acute Appendicitis with Normal Total Leukocyte Count : A Tertiary Care Study

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Abstract

Acute appendicitis is one of the most common surgical emergencies. It involves 10 to 20% patients in causality. The aim of the study is to predict the credibility of clinical, radiological and laboratory findings in acute appendicitis with normal leukocyte counts. ***Material & Methods:*** This study was carried in our tertiary care hospital over a period of one year by retrieving the data from hospital records to access the diagnostic factors in acute appendicitis with normal leukocyte counts. ***Results:*** The median age was 16 years. 228 were males and 149 females. Alvarado scores ranged from 5 to 10, with a median score of 8. Temperature at time of presentation ranged from 36.8°C to 38.33 °C. The duration of symptoms was less than 24 hours in 134 patients and more than 24 hours in 243 patients. Total WBC count was found to be normal in 55 patients (14.58%) as compared to elevated total WBC counts found in 322 patients (85.41%). Polymorph nuclear leucocytes were more than 75% in 52 of the Group B patients (94.54 %). The same was found in 306 (95.03 %) patients of Group A.

Keywords: Alvaradro score, appendicitis, WBC Counts, appendicular diameter.

INTRODUCTION

The most common surgical emergency a general surgeon comes across is acute appendicitis [1]. Most of the times it presents with typical clinical features and laboratory findings. Historically the diagnosis of appendicitis would rest on clinical evaluation. A combination of clinical evaluation, laboratory investigations and imaging is often used [2]. However at times the condition presents with atypical symptoms and signs. Also there may be variations in the laboratory parameters. That is when the diagnosis becomes difficult and the role of radiological investigations sets in. Despite the widespread use of USG and of late CT as well, it can still be quite an exercise to elicit the diagnosis. There are numerous scoring systems in use as of today. One of the features that is common to most of the scoring systems is the WBC count, absolute and differential. The total WBC count is increased in almost 70% of the patients with acute appendicitis [3], A normal total WBC count however does not rule out the diagnosis of acute appendicitis. However the differential WBC count depicting polymorph nuclear leucocytosis is more consistent. The consequences of delayed diagnosis are well documented. Thus it becomes imperative to clinch the diagnosis of acute appendicitis early, especially when confounding features are present.

MATERIALS AND METHODS

A retrospective study of patients who underwent emergency appendectomy at our hospital for suspected acute appendicitis between January 2018 and December 2018 was carried out. Patients who underwent elective interval or negative appendectomy were excluded from the study. Patients' case files were retrieved from the medical records department and were analyzed with respect to patients preoperative complaints, clinical examination findings, laboratory and imaging results. The presence of typical clinical features of migratory RIF pain, anorexia, nausea, vomiting, RIF tenderness, rebound tenderness and

elevated temperature was noted. Elevated temperature was defined as more than 37.5 C. imaging features suggestive of the diagnosis of acute appendicitis included Appendiceal diameter more than 6mm, peri-appendiceal fat stranding and fluid in the RIF. Patients were specifically analyzed with respect to total and differential WBC counts. A total WBC count of 11,000/uL or less was considered normal. Where ever possible Alvarado score was determined. Intraoperative findings were recorded and correlated with the histopathological examination. Results were tabulated and analyzed. Patients with histopathologically confirmed appendicitis were dividing into two groups. Group A included patients with acute appendicitis and elevated total WBC counts. Group B included patients with acute appendicitis and normal total WBC counts. The two groups were analyzed with respect to clinical, laboratory and imaging characteristics for statistical significance by determining the p-value.

RESULTS

A total of 386 patients presented to our department and underwent an emergency appendectomy for presumed appendicitis between January 2018 and December 2018. 377 patients were found to have acute appendicitis, simple or complicated on exploration, subsequently verified on histopathology. Age of the patients varied from 4 to 65 years. The median age was 16 years. 228 were males and 149 females. Alvarado scores ranged from 5 to 10, with a median score of 8. Temperature at time of presentation ranged from 36.8°C to 38.33 °C. The duration of symptoms was less than 24 hours in 134 patients and more than 24 hours in 243 patients. All patients underwent imaging (either CT or Ultrasonography or both). A white blood cell (WBC) count both total and differential was obtained in all patients who underwent appendectomies. Elevated total WBC count was defined as more than 11,000 per ml (Figure-1). For the purpose of statistical analysis, the two groups namely Group A and B were compared with respect to clinical features, laboratory and imaging findings, specifically WBC counts, as documented (Table-1). The total WBC count was found to be normal in 55 patients (14.58%) as compared to elevated total WBC counts found in 322 patients (85.41%). Polymorphonuclear leucocytes were more than 75% in 52 of the Group B patients (94.54 %). The same was found in 306 (95.03 %) patients of Group A. Out of these 55 patients in Group B, 34 were males and 21 females. Age of these patients with normal WBC counts varied from 11 to 60 years and was comparable to Group A. The median age being 17 years. The duration of symptoms was more than 24 hours in 18 of these patients and less than 24 hours in 37. The temperature ranged from 37 to 38 C. Alvarado score ranged from 7 to 8. Imaging was suggestive of acute appendicitis in 309 patients in Group A and 49 patients of Group B. Appendiceal diameter was more than 6 mm in 304 patients of Group A and 45 patients of Group B. In Group A, periappendial fat stranding was found in 309 patients as compared to 49 patients in Group B. 214 patients in Group A had fluid in RIF in comparison to 35 patients in Group B. This was also the case with Group A patients wherein patients had polymorphonuclear leucocytes more than 75%. P- Value was determined for the characterisctics analysed. Statistical significance was determined there of.

Table-1:

ALVARADO SCORE	Males			Females			Total p value				
	228			149			0.002				
Laboratory findings	MALES			FEMALES			TOTAL P VALUE				
	A	B	P-value	A	B	P-value					
Total Leukocyte count >11000	194	0	2.23	128	0	0.67	322	100	0	0	1.53
Polymorphonuclear leukocytes more than 75%	188	32	0.03	118	20	0.002	306	95.03	52	94.54	0.01
USG or CT											
Appendiceal diameter more than 6mm	185	27	0.04	119	18	0.012	304	94.40	45	81.81	0.004
Periappendiceal fat stranding	189	30	0.05	120	19	0.016	309	95.96	49	89.09	0.013
Fluid in RIF	125	23	0.05	89	12	0.04	214	66.45	35	63.63	0.011

Group A: Acute appendicitis with elevated total WBC count (≧11000/uL)
Group B: Acute appendicitis with normal total WBC count (>11000/uL)

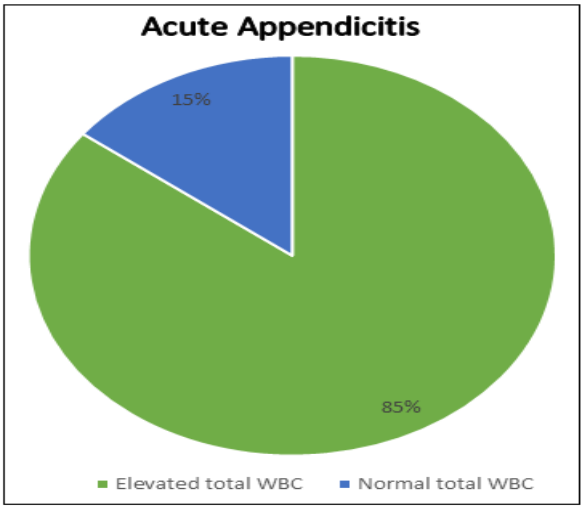

Fig-1: Showed relation between appendicitis and leukocyte count

DISCUSSION

Acute appendicitis being the most common general surgical emergency is something that every general surgeon comes across almost on a daily basis. It typically presents with the characteristic symptoms of pain, anorexia, nausea or vomiting and fever. Pain typicall starts in the periumblical area and localises to RIF (ALVARADO score) was found to be significant as per the study. Apart from these typical presentations patients at times present with atypical features including atypical pain which is localized to RIF from the start, flank or diffuse. Other atypical presentations include tenesmus, diarrhoea, constipation, dysuria, increased frequency of micturition. The clinical examination reveals RIF tenderness and rebound pain in most patients. With the widespread of availability of USG and CT, the accuracy of diagnosis has increased. The radiological features suggestive of appendicitis include maximum diameter more than 6 mm, non-compressibility, periappendiceal fat stranding and fluid in RIF was found to be significant p-value of 0.004, 0.013 and 0.011 respectively. Various studies have reported that radiological examination can decrease the negative appendectomy rate from 20% to 2-14% [4]. Even though acute appendicits is so common; diagnosis is at times not easy. And the differential diagnoses of acute appendicitis comprise a huge list encompassing different systems. Ortega-Deballon *et al*., [5] suggested that patients with a normal WBC Count should not undergo appendectomy. Similarly, Atema *et al*., [6] showed that WBCC and C-reactive protein were important parameters to rule out AA.Although nowadays the diagnosis is made by considering clinical, laboratory and imaging characteristics, clinical evaluation continues to be of paramount importance in eliciting the diagnosis. Adam *et al*., [7] showed that appendiceal mucosa can ulcerate secondary to viral infections, and non-complicated viral appendicitis cases can subside without antibiotics [8]. This becomes all the more important when there are confounding laboratory or imaging features. One of the basic diagnostic laboratory investigations is WBC count both total and differential. A normal total WBC count is present in upto 30% of patients with acute appendicitis. About 14.58 % patients had acute appendicitis with normal total WBC count in our study. Thus a normal total WBC count does not rule out the diagnosis of acute appendicitis straightaway. Interestingly, in our study, polymorphonuclear leucocytosis was found in 94.54 % patients with a normal total WBC count. This was also documented in 95.03% of patients who had elevated WBC counts. This implies that only 5.46% had both normal total and differential counts. This is in concordance with the available literature. Thus differential WBC count is a more important predictor of acute appendicits than the total WBC count. In some recent studies a normal WBC count has been attributed as an independent factor predicting negative appendectomy [9]. In our study it is evident that the typical clinical findings were present in almost all the patients with appendicitis and normal total WBC counts, thus emphasing the importance of clinical evaluation and its precedence over the laboratory findings when these are at variance. So a normal total WBC count necessitates a more aggressive

clinical evaluation in addition to the determination of differential WBC count and use of imaging modalities at times.

CONCLUSION

Acute appendicitis can be seen with normal leukocyte count, we recommend appendectomy with diameter of 6 mm on radiological investigations.

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