

## The Role of Conservative Management of Modified Moderate Alvarado Score(4-7) in Acute Appendicitis

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### Abstract

**Background:** Reginald Fitz described appendicitis in 1886. From then the term appendicitis has been used. Acute appendicitis is the Commonest cause of abdominal surgical intervention with a prevalence of nearly 1 in 7 people [2]. It is related to occasional mortality and high morbidity. Regarding conservative management an initial non-operative management for acute appendicitis was tried in the 1950s but was not accepted at that time [16]. Conservative management of acute appendicitis is safe and associated with reduced rate of operation, complication and reduced costs of treatment [17-18]. Treatment include bowel rest, intravenous antibiotic with 3rd generation Cephalosporine and Metronidazole. Data show successful result in 90% of patients in whom appendicitis was confirmed by CT however 1/4 of patients may require surgical intervention within one year [19].

**Objective:** To assess the role of conservative management of acute appendicitis in patients with Modified Moderate Alvarado Score of (4-7).

**Patients and Methods:** This is a prospective study conducted in Sulaymanya Teaching Hospital from December 2017 to December 2018. A total number of 100 cases of acute appendicitis who were admitted in the emergency department with Modified Moderate Alvarado score (4-7) had been included. All the cases of the study were collected and all these patients received treatment and they divided into two groups according to the response and failure of treatment. Group A consist of (59%) patients in whom conservative treatment had been succeeded group B included (41%) patients in whom conservative treatment had been failed. The two groups were comparable according to age, gender and comorbidity. Inclusion criteria include patients with Alvarado score (4-7). Exclusion criteria include patients with high and low Alvarado Score, Appendicular Abscess, Appendicular mass, Fecolith, pregnant ladies, ectopic pregnancy and ovarian cyst.

**Results:** Finally a total 100 patient were included in this study the success rate of conservative treatment of Acute Appendicitis was 59% the failure rate was 41%.

**Conclusion:** in this study the result indicate that Conservative management of acute appendicitis of Modified Moderate Alvarado Score (4-7) is safe and reduces the rate of non-indicated surgery and reduces the rate of morbidity related to operation from those selected patients, and in this study the result also indicates that conservative management is successful in cases with Modified Moderate Alvarado score (4-7).

**Keywords:** Acute Appendicitis, Alvarado.

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**Received:** 21<sup>th</sup> July 2019

**Accepted:** 15<sup>th</sup> December 2019

**DOI:**<https://doi.org/10.26505/DJM.18014820721>

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## Introduction

Reginald Fitz described appendicitis in 1886. From then the term appendicitis has been used. Acute appendicitis is the Commonest cause of abdominal surgical intervention with a prevalence of nearly 1 in 7 people [2]. It is estimated that nearly 6% of the population will have acute appendicitis in their lifetime [3-4]. It is related to occasional mortality and high morbidity, this is due to the failure of diagnosing the condition earlier. Much effort is directed toward diagnosing the condition earlier and intervention [3-4]. Acute appendicitis particularly in male is still diagnosed clinically. Abdominal pain is the commonest presenting symptom. The classical presentation, patient will suffer from pain initially in the epigastric or the periumbilical region and then shifting to right iliac fossa. This pain is associated with nausea, and vomiting, anorexia and fever. This "classic" symptomatology is present in only 50-60% of cases and this makes diagnosing the condition difficult [5]. This condition is difficult to be diagnosed particularly in very young patients, females in reproductive age and elderly patients. In females it is difficult to make the diagnosis

because there are many conditions that may present as acute appendicitis and they may have atypical presentation [6]. In the literature a rate of negative appendectomy of 20-40% has been reported and a lot of surgeons prefer surgical intervention earlier for the treatment of acute appendicitis to avoid complications like perforation [7]. Removal of a normal appendix makes a burden on both the health resources and patients. Complications can occur as a result of misdiagnosing the condition and delaying surgical intervention, these complications include perforation and peritonitis [8]. Ultrasound can be used to aid the diagnosis and decrease the rate of negative appendectomy but it is operator dependent and may eventually mislead surgeons and this is due to patient's body habitus, obesity, anatomical variability [9]. Variable systems of scoring are there for diagnosing acute appendicitis. Recent studies have shown that Alvarado score is simple, easy and cheap and is a diagnostic scoring system that is used to support the diagnosis Table (1) [9], [10].

**Table (1):** Shows the content of Modified Alvarado Score

Symptoms	score
Migratory right iliac fossa pain	1
Nausea/vomiting	1
Anorexia	1
Signs	
Tenderness in the right iliac fossa	2
Rebound tenderness	1
Elevated temperature	1
Laboratory findings	
Leukocytosis > 10.000	2
Total	9

This study Aimed to show the safety and the success of conservative management in patients presented with acute appendicitis with ModifiedModerate Alvarado Score(4-7) in Sulaimanya Teaching Hospital. Biostatistic in this type of study P value has been used

### Patients and Methods

This prospective study was conducted in Sulaimanya TeachingHospital, from December 2017 to December 2018. During the study period , hundred (100) patients were collected. Demographical features of the patients include Age, gender,residence ,occupation, address and phone number recorded.

Data were also collected regardingclinical presentation, duration of symptoms and findings on abdominal examination .Data collected regarding results of Investigation includingCBC , GUE, ultrasonography ,CT-scan and viral screen . All patients who were included in the study suspected to have Acute Appendicitis and these patients were having moderate Alvarado score of (4-7). Exclusion

criteria were Patients with Low and High score , pregnant ladies ,ectopic pregnancy, appendicular abscess , ovarian cyst and patients with cystitis . Patients who were included in the study divided into two groups according to success and failure of conservative treatment.

Group A includes (59%) of patients in whom conservative treatment succeeded according to the parameter like improving of the pain and disappearance of rebound tenderness and leukocytosis and group B includes ( 41%)of patients in whom conservative treatment had been failed in which their pain became more sever and more septic .These patients received intravenous third generation Cephalosporin and Metronidazole for 48 hours then oral antibiotic on Amoxicillin/Clauvunilic acid and metronidazole for one week duration. .Ethical comity approval were obtained in University of Sulaimanya ,College of Medicine . Informed consent were obtained from all patients about the pros and cons of the conservative treatment for acute appendicitis.

All the Clinical data has been recorded on an Excel (Microsoft) spreadsheet and statistical analysis was coded by using a statistical IBM-SPSS social package (SPSS for Windows, version 22, IBM-SPSS). Quantitative variables were expressed as the mean  $\pm$  standard deviation and comparison done between groups using the Student's t-test. Categorical variables were expressed as frequency distributions and single percentages, and the comparison between groups has been done by using Chi-square test .P value of  $< 0.05$  was regarded as statistically significant.

### Statistical analysis

Was done using the SPSS (version 25) The data results are obtained through calculating the number, percentages and P-value using Microsoft office excel 2017.

### Results

The research conducted on December 2017 to December 2018 , a total of 100 cases has been included in the research who clinically werediagnosed with acute appendicitis , of which ( 63% ) were females & (37%) were male.( 47% )were single & (53 % ) were married . The mean age of the responders group were 24.35years with standard deviation of 11.11 years and the mean age of the non-responder group were 24.48 years with standard deviation of 7.65 years .The majority of these patient were living inside Sulaimanya 96% ,the others 4% shown in Figure (1) .Pain was the presenting symptom with the duration of 20.03 hours with standard deviation of 16.68 hours in the responder groups and 17.75 hours with

standard deviation of 14.92 hours in the non-responder groups , of which (99% )of patients presented with right iliac fossa pain &( 1%) presented with central abdominal pain.

Alvarado score ranging from 4 to 7 scores as shown in Table (1) and Figure (1) .The investigation which were done include CBC with the result( 64%) of patients WBC was normal & (36 %) of patients WBC was elevated , GUE done in (89%) of cases the result was normal & (11%) were abnormal with (4%) showed 10 pus cells/HPF , (3%) with 20pus cells/HPF,( 1%) with pus cells/HPF & (3%) with pus cells/HPF.

Imaging techniques like CT and US were used and the US findings in( 77%) of cases were normal appendix , in( 15%) of cases appendix was inflamed & in( 8%) of cases the only finding was mild free fluid. average time of admission was  $4.97 \pm 2.86$ . CT scan was done for 5 cases and the findings were 40% showed mild free fluid, 60% showed air fluid long appendix. In this studt 100 cases were subjected to conservative management and ( 59%) were responder &( 41%) were non-responder. Although the data were variable between the responders and non-responders to the conservative management, the difference did not reach the statistical significant level apart for rebound tenderness which was more common among the non-responders Table (2) and (3). Possibility of perforation increased with increase of Alvarado score and high white blood cell counts Table (4) and(5), again the differences were not significant.

**Table (2):** percentage of Modified Alvarado components among the participants

Variable	Number (%)
Migratory pain	
Yes	52(52%)
No	48(48%)
Anorexia	
Yes	75(75%)
No	25(25%)
Nausea	
Yes	58(58%)
No	42(42%)
Tenderness	
Yes	98(98%)
No	2(2%)
Rebound tenderness	
Yes	77(77%)
No	23(23%)
Elevated temperature	
Yes	12(12%)
No	88(88%)

\*P value of < 0.05 is significant

**Table (3):** Data comparison between the Responders and nonresponders

Variable	Responder Number (%)	Non-responder Number (%)	P Value
Age (Mean±SD)	24.35±11.11	24.48±7.65	0.948
Sex			
Male	24(40.7%)	13(31.7%)	0.361
Female	35(59.3%)	28(68.3%)	
Adress			
Sulaimani	57(96.6%)	39(95.2%)	0.531
Kirkuk	1(1.7%)	1(2.4%)	
Salahaddin	1(1.7%)	0(0%)	
Dyala	0(0%)	1(2.4%)	
Marital state			
Single	32(54.2%)	15(36.6%)	0.082
Married	27(45.8%)	26(63.4%)	
Duration (Mean±SD)	20.03±16.68	17.75±14.92	0.485
Alvarado score			
4	10(16.9%)	3(7.3%)	0.241
5	16(27.9%)	16(39%)	
6	31(52.5%)	22(53.7%)	
7	2(3.4%)	0(0%)	
Chief complain			
Right iliac fossa pain	59(100%)	40(97.6%)	0.228
Central	0(0%)	1(2.4%)	

G.U.E			
Normal	52(88.1%)	37(90.2%)	0.275
10 pus cells/HPF	4(6.8%)	0(0%)	
20 pus cells/HPF	1(1.7%)	2(4.9%)	
30 pus cells/HPF	1(1.7%)	0(0%)	
40 pus cells/HPF	1(1.7%)	2(5.1%)	
Ultrasound finding			
Normal	48(81.4%)	29(70.7%)	0.483
Inflamed	7(11.9%)	8(19.5%)	
Mild free fluid	4(6.8%)	4(9.8%)	
WBC			
Normal	40(67.8%)	24(58.5%)	0.343
High	19(32.2%)	17(41.5%)	

**Table (4):** Alvarado components among the responders and non-responders with comparison

Variable	Responder Number (%)	Non-responder Number (%)	P Value
Migratory pain			0.345
Yes	33(55.9%)	19(46.3%)	
No	26(44.1%)	22(53.7%)	
Anorexia			0.197
Yes	47(79.7%)	28(68.3%)	
No	12(20.3%)	13(31.7%)	
Nausea			0.615
Yes	33(55.9%)	25(61%)	
No	26(44.1%)	16(39%)	
Tenderness			0.087
Yes	59(100%)	39(95.1%)	
No	0(0%)	2(4.9%)	
Rebound tenderness			0.009
Yes	40(67.8%)	37(90.2%)	
No	19(32.2%)	4(9.8%)	
Elevated temperature			0.089
Yes	4(6.8%)	0(0%)	
No	55(93.2%)	41(100%)	
shift to the left			N/A*
Yes	0(0%)	0(0%)	
No	59(100%)	41(100%)	

\*not applicable

The operative finding like inflamed Alvarado score .  
Appendix was more in patients with higher

**Table (5):** Relationship between the operative findings and the Alvarado Score in 41% of patients

operative findings	Alvarado score				P value
	4 Number(%)	5 Number(%)	6 Number(%)	7 Number(%)	
Inflamed	3(100)	15(93.7)	21(95.5)	0(0)	0.894
Perforated	0(0)	1(6.3)	1(4.5)	0(0)	
Total	3	16	22	0	

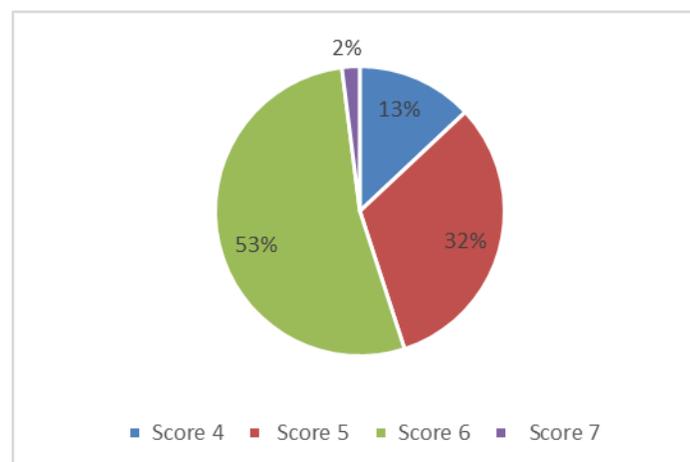
\*The WBCs were elevated in patients with higher score of AA

**Table (6):** Relationship between the operative findings and white blood cells

operative findings	White blood cell		P value
	Normal N(%)	High N(%)	
Inflamed	23(95.8)	16(94.1)	0.802
Perforated	1(4.2)	1(5.9)	
Total	24	17	

**Table (7):** Alvarado score among the responder and non responders group

Variable	Responder Number (%)	Non-responder Number (%)	P value
Alvarado score			0.241
4	10(16.9%)	3(7.3%)	
5	16(27.9%)	16(39%)	
6	31(52.5%)	22(53.7%)	
7	2(3.4%)	0(0%)	



**Figure (1):** Distribution of the patients according to the Alvarado score

## Discussion

In this study the incidence of appendicitis is higher in female than in male with 63% were females & 37% were males this shows that in our study female patients are predominant with the ratio of female to male 1.7:1 while in the study described by ktob MBM ,et al on 2016 [11] the incidence of appendicitis is 46% were males and 42% were females ,since the incidence of clinically diagnosed appendicitis is higher in female, these patient require more intense evaluation to exclude causes that may present as appendicitis like ectopic pregnancy. Ovarian cyst & pelvic inflammatory disease regarding presentation, in this study the incidence of anorexia was 75% and nausea and vomiting were 58 % while in the study described by ktob MBM , et al on 2016. [11]the incidence of anorexia and vomiting were 34.1% .in the study by Okobia et al. [15] revealed vomiting in 41% anorexia in 24.4% of cases .Kpolugbo et al. [14] in Benin City revealed a reasonable relation between acute appendicitis andneutrophilia.In the study by ktob MBM , et al on 2016[11] leukocytosis and neutrophilia was present in 40% while in this study leukocytosis andneutrophilia was present in 36% of patients and 64% were normal.

In a study which described by Park and Coworker 2011[12] 1215 patients were diagnosed to have acute appendicitis out of which 107 patients were having mild appendicitis based on Alvarado score were they had a score of (4-8) means intermediate Alvarado score were treated conservatively

and put on intravenous Cefmetazole& Metronidazole for 48 hours with success rate of 85.7% after a follow up period of 18 months. In another study by Lien et al between 2003 and 2009[13] 1498 patient diagnosed with acute appendicitis out of which 132 treated conservatively treatment started with Metronidazole and Cefmetazole intravenously then they were put on oral Metronidazole and Amoxicillin/Clauvulenic acid for three weeks duration and the success rate was 65% after one year of follow up period while in this study all the patients who were included in the study had intermediate Alvarado score of (4-7) treatment initiated by intravenous Cefotaxime and Metronidazole for 48 hours then put on oral antibiotic Metronidazole and Amoxicillin/Clauvulenic acid for one week duration with success rate of 59% after a period of follow up for one month and the failure rate was 41% this was because these patients didn't respond to initial treatment and their symptoms like pain and clinically their condition deteriorated demanding intervention

## Conclusions

The result of this study shows that conservative treatment of AA of Moderate Alvarado score(4-7) is safe and reduces the rate of negative appendectomy rate and complications associated with operation in these patients.

## Recommendation

Although appendectomy was previously the ideal treatment for acute appendicitis but

nowadays the trend is towards conservative treatment and this can be tried in selected cases and they can tolerate it well.

### Informed consent

All the patients who were included in the study had been informed about the procedure and its pros and cons. All patients had been informed about the duration of treatment which was one week duration and the need for hospital stay until alleviation of their symptoms .the possibility of deterioration of their disease and the possibility of operation any time within one year period .all patients who were included in the study were agreed to participate and informed consent taking from all of them

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