Publisher
MEDRESEARCH
www.medresearch.in

Surgical Review: International Journal of Surgery, Trauma and Orthopedics

2020 Volume 6 Number 2 March-April

E-ISSN:2455-5436
P-ISSN:2456-9518
RNI:MPENG/2017/70870

Research Article
Appendicitis

Evaluation of the significance of Alvarado score in the diagnosis of acute appendicitis in tribal area

K. Kulkarni R.[1*]

DOI: https://doi.org/10.17511/ijoso.2020.i02.10

[1*] Ravindra K. Kulkarni, Associate Professor, Department of Surgery, Zydus Medical College and Hospital, Dahod, Gujarat, India.

Background: Acute Appendicitis is a common surgical emergency which even with modern diagnostic facilities remains a challenging task for the surgeon. The variation in the presentation can confuse even experienced surgeons. On looking at the literature, it was found that a negative Appendicectomy rate has been consistently mentioned **Aim:** The following study was therefore conducted for Evaluation Of Significance Of Alvarado Score In Diagnosis Of Acute Appendicitis In Tribal Area. This is an old standard scoring system, very economical, noninvasive, and revalidation was done in the tribal area to reach the diagnosis. **Material and Methods:** A Study of 180 patients of acute appendicitis was conducted in tribal areas and Alvarado score carries high significant value in diagnosis and management of acute appendicitis. The period to study was from August 2018 to January 2020. **Result:** 180 patients were subjected to Appendicectomy. Out of the 33 were operated by laparoscopy (18.33%). All the Appendicectomy specimens were studies macroscopically and microscopically. All the specimens were cut open and inspected for pathology. Conclusion: The present study concludes that the Alvarado score, an economical, noninvasive clinical scoring system, carries high significant value in the diagnosis and management of acute appendicitis in the tribal area.

Keywords: Alvarado Score, Acute Appendicitis, Appendicectomy, Tenderness, Rebound tenderness

Corresponding Author

Ravindra K. Kulkarni, Associate Professor, Department of Surgery, Zydus Medical College and Hospital, Dahod, Gujarat, India.
Email: lionravindrakulkarni@yahoo.com

How to Cite this Article

Ravindra KK. Evaluation of the significance of Alvarado score in the diagnosis of acute appendicitis in tribal area. Surgical Review Int J Surg Trauma Orthoped. 2020;6(2):127-133.
Available From
https://surgical.medresearch.in/index.php/ijoso/article/view/175

To Browse

Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
22-01-2020	03-02-2020	08-02-2020		12-02-2020

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
No	Nil	Yes	15%	

Introduction

Acute Appendicitis is the most commonly done emergency surgery. Appendicitis was described in 1886, by Regainlad Fitz, but even today it is still considered as a diagnostic challenge. Modern investigations like C-T –scan studies may pinpoint the diagnosis but it may cause an economic burden to families and especially poor tribal people cannot afford it.

So even, nowadays good clinical scoring system is the only viable option for diagnosis in the tribal area. Like Alvarado scoring system many scoring systems like available [1,2,3], IRA Teicher, RIPASA, Lindberg, AIRS, Modified Alvarado Score (MAS) [4,5], etc many scoring systems evolved but Alvarado score system remains as the gold standard.

The Alvarado Score is a clinical scoring system used in the diagnosis of appendicitis [1,6]. The score has 6 clinical and 2 laboratory measurements with a total of 10 points. It was introduced in 1986 and although meant for pregnant females, it has been extensively validated in the non-pregnant population.

The Alvarado score has largely been superseded as a clinical prediction tool by the Appendicitis Inflammatory Response Score [7,8,9].

A score of 5 or 6 is compatible with the diagnosis of acute appendicitis. A score of 7 or 8 indicates probable appendicitis, and a score of 9 or 10 indicates a very probable acute appendicitis.

Values: The original Alvarado score describes a possible total of 10 points [6]. But these medical facilities that are unable to perform a diffraction white blood cell count, are using a modified to Alvarado Score with a total of 9 points [10,11] which could be not as accurate as of the original score[10].

The high diagnostic value of the Score has been confirmed in a number of studies across the world. The consensus is that Alvarado Score is a noninvasive, safe, and diagnostic in the management of the acute appendicitis cases [6,12].

Table-1: Various parameters for the Alvarado score.

Symptoms	Points
Abdominal pain that migrates to the right iliac fossa	1
Anorexia (loss of appetite)	1
Nausea or vomiting	1
Signs	
Tenderness in the right iliac fossa	2
Rebound tenderness in Rt. Iliac Foosa. (Blumberg)	1
Fever of 37.3* C or more	1
Laboratory	
Leukcytosis> 10,000/cmm	2
Neutrophilia> 70%	1
Total	10

Dahod is a District city situated on the bank of Dudhimati River and the name Dahod also signifies two boundaries as the borders of Rajasthan and Madhya Pradesh which are nearby.

It is a tribal district of Gujarat. The tribal area of Rajasthan and Madhya Pradesh are on boundaries. Zydus Medical College and Hospital Dahod is only tertiary care hospital available in the tribal area.

Purpose: To evaluate the significance of the Alvarado score in the diagnosis of acute appendicitis in the tribal area.

Materials and Methods

This study was conducted in the Surgical Department of Zydus Medical College and Hospital Dahod, Gujarat. The period to study was August 2018 to January 2020.

270 patients from O.P.D complaining of Acute pain in lover abdomen mainly in right ileac fossa [3], Nausea and vomiting, Anorexia, Fever were selected

All these patients were admitted to the hospital. Detail history is taken and a detailed examination is done.

75 of these 270 patients were excluded as they had a history of burning micturition, occasional hematuria, Suggestive of right ureteric calculus, mid menstrual pain, ovarian pain, abdominal colic, worm infestation.

Tabel-2: Exclusion of patients.

Rt ureteric colic	35
Menstrual pain	20
Worm infestation	10
Blunt trauma to the abdomen	03
Non-specific course	07
Total:	75

(All these diagnoses were confirmed by an investigation like x-ray and, sonography studies later on.)

From the remaining 195 patients, 10 Patient Excluded because the Alvarado score was less than 5 [13]. Total 185 patients had a significant Alvarado score. i.e. score more than 5.

Table-3: Alvarado score of the patient.

Alvarado score	Total no.
Alvarado Score of less than 5	10
Alvarado Score between 6 to 8	130
Alvarado Score between 9 to 10	55
Total	195

All these Patients were investigated by x-ray abdomen in standing position, blood Investigation like Hb, WBC total and differential count, neutrophil count, BSL, BUN, Serum Creatinin, Blood–grouping, Tridot test, Australia Antigen and USG abdomen.

Appendicular mass was detected In 5 patients and they were given Ochsner Sherren Regimen and managed medically and they have advised Appendicectomy after 3 months.

Thus a total of 180 patients was operated and the efficacy of the Alvarado score was studied.

Exclusion:- 1) Acute Appendicitis in pregnant ladies excluded

2) Acute Appendicitis due to malignancy, regional ilities, Crohn's disease excluded.

Ethical clearance was obtained from the ethical committee of Zydus Hospital and Medical College Dahod, Gujarat, India

Results

180 patients were subjected to appendicectomy. Out of the 33 were operated by laparoscopy (18.33%). All the Appendicectomy specimens were studies macroscopically and microscopically.

All the specimens were cut open and inspected for pathology. Histopathology was also done on a few specimens. The following are operative findings.

Finding:

Table-4: Operative pathology.

Gangrenous	08	4.4%
Perforated	30	17.7%
Purulent	42	23.3%
Obstructive	72	40.00%
Catarrhal	28	15.00% Total = 180

Of these 180 specimens, in 72 specimens (40%), were having obstructive pathology like fecolith, Seeds of the fruit, roundworms. One patient had Torsion of the long mesentery.

Table-5: Obstructive pathology.

Obstructive Finding	No of patients
Fecolith	48
Seeds of fruit	21
Round Worms	02
Torsion because of large mesentery	01
[Total 72 (40.00%) patients]	

All operated patient was kept N.B.M and on IV fluids and antibiotics for one to two days. Then oral fluids, liquid soft diet started. All patients were discharged on 7 to 9 days after the removal of sutures.

Discussions

Even though modern facilities like C-T scan available, the diagnosis of acute appendicitis is still challenged. In a developing country like India and the mainly tribal area where the cost of investigation matters, economical clinical Alvarado scoring system acquires good merits.

In this series 180 patients in whom Alvarado score is significant (more than 5) were selected, investigated, and subjected for operations and follow up and efficacy in Evaluation Of Significance Of Alvarado Score In Diagnosis Of Acute Appendicitis In Tribal Area is done.

Age-wise comparison: On comparison of results of the present study, the disease is more prevalent in the age group of 31 to 45 years (64%) and in the age group 16 to 30 years (50%). The age group is a little bit more as compared to other series in which disease is more prevalent in 21-30 years [7,8,11,14,15]. This is because of illiteracy and fear operation in the tribal area.

Sex wise comparison:-Youngest male operated of Appendicectomy was 7 years old, youngest female patient operated of Appendicectomy was 8 years old. Oldest male patient operated on Appendicectomy was 72 years old and the female patient was 63 years old. Male to female ration before puberty was 1:1. (Male 18 and Female16). Total patient before puberty are 34 out of 180 (18 .88%) [14,16,17].

Out of 180 patients, Total male patients are 115 (63.88%) and total female patients 65 (36.11%). Male to female ratio is1.85:1.64 patients (35.55%) occurred in the age group between 31 to 45 years. This mostly concedes with different studies [12,13].

But in this series female patients are a little bit more because females in Tribal area work hard and more unhygienic food consumption by females may be the cause.

Table-6: Age-wise male to female ratio.

Age	Male	Female	Total
5 to 15 years	18	16	34(18.88%)
16 to 30 years	32	18	50(27.77%)
31 to 45 years	44	20	64(35.55%)
46 to 60 years	17	10	27(15%)
60 to 75 years	04	01	05(2.7%)
	115	**65**	**180**

Male 115 pts (63.88%) and Female 65 pts (36.11%).

Significance of Alvarado score in male to female ratio in acute appendicitis symptoms (Figure-1):

Abdominal pain that migrates to right iliac fossa was present in 115 males and 65 female patients (100%). This was given 1 point. this coincides with other series[7,8,9,11,12,16,17]. Anorexia: - was present in 60 male (52%) and 39 females (60%) patients. In the pediatric age group, this symptom

Could not be correlated correctly. This is also evident in the study of Bundy [16], Dado G [11]. Nausea and vomiting: - This was present in 98 male patients (85.21%) and 61 females (93.84%).This was given 1 point. This is a little bit high in this series as the comparison with studies of De Castro [8], Kalan [4]. This isn't probably because tribal people both male and female consume more tobacco and local alcohol.

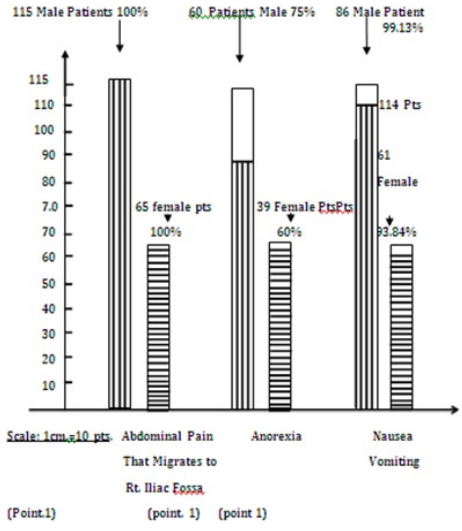

Fig-1: Comparison of symptoms and male-female ratio in Alvarado score.

Significance of Alvarado score in male to female ratio in acute appendicitis signs (Figure 2):

Tenderness in Right iliac fossa in 115 male (100%) patients and 65 female (100%) patient tenderness was present in right ilea fosse. This was given 2 Points.

This incidence coincides with many series in the literature. Rebound Tenderness in Right iliac fosse: In 86 male patients (75%) this was present and in39 female patient (60%) rebound tenderness was present.

This is a little bit higher in comparison with Dado average 45-55 % [11], Kollar 48-55%[9]. This is probably because the patient came a little bit late in the hospital.

Elevated Temperature: In 114 male patients temperature was more than 37.3*C, 99. 13% and in 63 female patients (96.92%) it was elevated.

This was given 1 point. This coincides with many series.

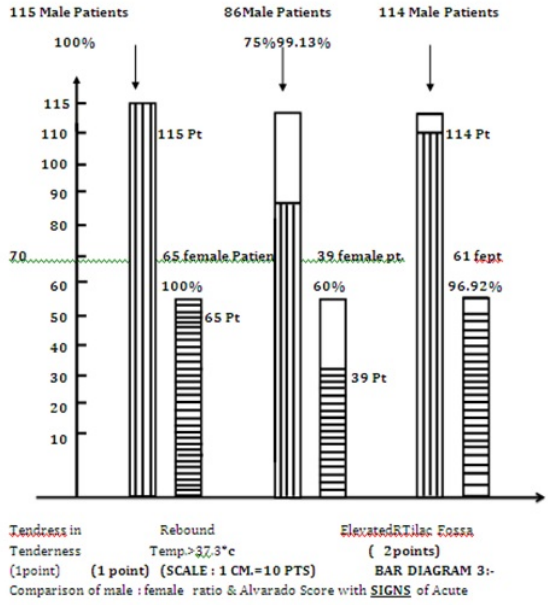

Fig-2: Comparison of male: female ratio and Alvarado score with symptoms of acute appendicitis.

Laboratory investigations (Figure 3):

Leucocytosis: - W. B. C. count more than 10,000/Cmm. This was given 2 points. In 115 male patients (100%) it was more than 10000/c.mm and in 65 female patients, it was more than 10000/

C.mm (100%). Neutrophilia more than 70%. This was given one point. In 82 male patients.(71.3%) and in 41 female patients (63.07%) Neutrophil cells count was more than 70% cell/ c. mm. These findings coincide with all studies [12,15].

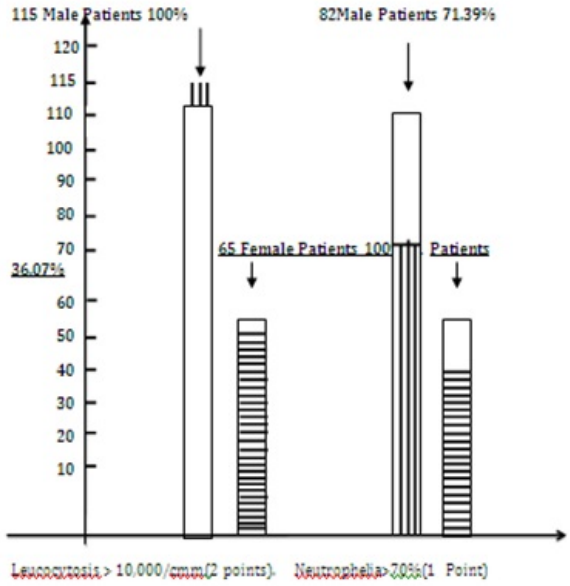

Fig-3: Comparison Of male: female ratio, Alvarado score with white blood cell counts, and neutrophil count.

Conclusion

A study of 180 patients of acute appendicitis was conducted in tribal areas. All patients have an Alvarado score of more than 5. After investigations, all were undergone appendicectomy operation. Appendicectomy specimen was examined for pathology.

What does the study add to the existing knowledge?

The current study observed that the Alvarado score is an economical, noninvasive clinical scoring system, which carries high significant value in the diagnosis and management of acute appendicitis in the tribal area.

Reference

01. Macklin CP, Radcliffe GS, Merei JM, Stringer MD. A prospective evaluation of the modified Alvarado score for acute appendicitis in children. Ann R Coll Surg Engl. 1997;79(3)203-205.
[Crossref]

02. Fenyö G, Lindberg G, Blind P, Enochsson L, Oberg A. Diagnostic decision support in suspected acute appendicitis- validation of a simplified scoring system. Eur J Surg. 1997;163(11)831-838.
[Crossref]

03. De Castro SM, Ünlü C, Steller EP, Van Wagensveld BA, Vrouenraets BC. Evaluation of the appendicitis inflammatory response score for patients with acute appendicitis. World J Surg. 2012;36(7)1540-1545.
doi: [Article:https://doi.org/10.1007/s00268-012-1521-4][Crossref]

04. Andersson M, Andersson RE. The appendicitis inflammatory response score- a tool for the diagnosis of acute appendicitis that outperforms the Alvarado score. World J Surg. 2008;32(8)1843-1849.
doi: [Article:https://doi.org/10.1007/s00268-008-9649-y][Crossref] PubMed]

05. Kalan M, Talbot D, Cunliffe WJ, Rich AJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis a prospective study. Ann R Coll Surg Engl. 1994;76(6)418-419.
[Crossref]

06. Macklin CP, Radcliffe GS, Merei JM, Dtringer MD. A Prospective evaluation of the modified Alvarado scores for acute appendicitis in children. Ann R Coll Surg Engl. 1997;79(3)203-205.
[Crossref]

07. Alvarado A. A Practical Score for the early diagnosis of acute appendicitis. Ann Emerg Med. 1986;15(5)557-564.
doi: [Article:https://doi.org/10.1016/S0196-0644(86)80993-3][Crossref]

08. Ohmann C, Yang Q, Franke C. Diagnostic scores for acute appendicitis Abdominal Pain Study Group. Eur J Surg.1995;161(4)273-281.
[Crossref]

09. Kollár D, McCartan DP, Bourke M, Cross KS, Dowdall J. Predicting acute appendicitis? A comparison of the Alvarado score, the Appendicitis Inflammatory Response Score and clinical assessment. World J Surg. 2015;39(1)104-109.
doi: [Article:https://doi.org/10.1007/s00268-014-2794-6][Crossref]

10. Fenyo G. Routine use of a scoring system for decision-making in suspected acute appendicitis in adults. Acta Chir Scand. 1987;153(9)545-551.
[Crossref]

11. Dado G, Anania G, Baccarani U, Marcotti E, Donini A, Risaliti A. Application of a clinical score for the diagnosis of acute appendicitis in childhood- a retrospective analysis of 197 patients. J Pediatr Surg. 2000;35(9)1320-1322.
doi: [Article:https://doi.org/10.1053/jpsu.2000.9316]
[Crossref]

12. Chan MY, Teo BS, Ng BL. The Alvarado score and acute appendicitis. Ann Acad Med Singapore. 2001;30(5)510-512.
[Crossref]

13. Chandrabose K, Nair V. Comparison of predictive validity of Alvarado score and Lintula score in acute appendicitis in adults. Int J Surg Ortho. 2017;3(3)60-65.
Available from: [Article:https://surgical.medresearch.in/index.php/ijoso/article/view/29][Crossref]

14. Crnogorac S, Lovrenski J, Cvijanović R, Vuković M. Evaluation of the Alvarado score in the diagnosis of acute appendicitis. Med Pregl. 2001;54(11-12)557-561.
[Crossref]

15. Konan A, Hayran M, Kılıç YA, Karakoç D, Kaynaroğlu V. Scoring systems in the diagnosis of acute appendicitis in the elderly. Ulus Travma Acil Cerrahi Derg. 2011;17(5)396-400.
doi: [Article:https://doi.org/10.5505/tjtes.2011.03780]
[Crossref]

16. Douglas CD, Macpherson NE, Davidson PM, Gani JS. Randomised controlled trial of ultrasonography in diagnosis of acute appendicitis, incorporating the Alvarado score. BMJ. 2000;321(7266)919-922.
doi: [Article:https://doi.org/10.1136/bmj.321.7266.919]
[Crossref]

17. Bundy DG, Byerley JS, Liles EA, Perrin EM, Katznelson J, Rice HE. Does this child have appendicitis?. JAMA. 2007;298(4)438-451.
doi: [Article:https://doi.org/10.1001/jama.298.4.438]
[Crossref]