

ALTERED ALVARADO SCORE; ROLE OF CAECAL GURGLING AS A NEW SIGN IN DIAGNOSIS OF ACUTE APPENDICITIS

Muhammad Hassan Abbas¹, Kashif Nadeem¹, Naveed Akhtar¹, Noor Ahmad Niazi¹, Muhammad Anwar¹

ABSTRACT

Background: Diagnosis of acute appendicitis is mainly clinical and many scoring systems are being used. **Objectives:** To assess the reliability of caecal gurgling as clinical sign in the diagnosis of acute appendicitis in equivocal cases with Alvarado score of 5-6. **Patients and Methods:** This descriptive study was conducted in the department of General Surgery, Sheikh Zayed Medical College & Hospital, Rahim Yar Khan, from 1st September 2009 to 31st September 2012. All the patients were presented in OPD & emergency department with history of pain in right lower abdomen of short duration and have no co morbid condition. We divided the patients into three groups on the basis of Alvarado score. Group I with score 1-4, Group II with score 5-6, Group III with score 7 or above. Group II was further subdivided into IIa having no caecal gurgling & IIb having caecal gurgling on clinical examination. We calculated the rate of negative appendectomies on histopathology in different groups. Data was entered and analyzed in SPSS version 15. **Results:** A total of the 840 patients were included in the study with age ranges from 12-60 years, out of which 67% were male. 185 patients fall in group I, 180 of which were managed conservatively successfully on oral medicine without admission. In group I only 5 patients needed to be operated and found appendicitis on histopathology. Group II included 286 patients, which was further subdivided into Group IIa (172 patients) having no caecal gurgling on examination and Group IIb (114 patients) having caecal gurgling on clinical examination. Out of 172 patients of group IIa, 135 were operated & 24 negative appendectomies were found on histopathology. While all 114 patients of group IIb were operated and only 3 appendices were found normal on histopathology. In group III, 369 patients were recruited, all were operated and only 12 appendices were proved normal on histopathology report. So with the addition of caecal gurgling, in group II with equivocal cases having alvarado score 5-6, there is decrease in rate of negative appendectomies from nearly 17% reported in literature to 10.8% reported in this study. **Conclusion:** Appendicitis is the common surgical emergency & diagnosis is mainly clinical. Delay in diagnosis and proper treatment increases morbidity. Altered Alvarado scoring, with addition of caecal gurgling as a clinical sign, is slightly more reliable as compared to the conventional Alvarado scoring system especially in equivocal cases with score of 5-6.

Key words: Acute appendicitis, Appendectomy, Alvarado score, Caecal gurgling.

INTRODUCTION

Acute appendicitis is one of the most common emergencies with life time prevalence of approximately 1 in 7.^{1,2} Its incidence is 1.5-1.9/1000 in male and female population.³ Even after a lapse of more than 120 years since its first description, this common surgical disease continues to remain a diagnostic problem and can baffle best of the clinicians. Delay in diagnosis definitely increases the morbidity, mortality and cost of treatment in equivocal cases. However aggressive surgical approach, when in doubt taken out has resulted in increased negative laparotomies.⁴ A negative appendectomy rate of 20-60% has been reported in the literature and many would accept rate of 30% as inevitable.⁵

There are several scoring systems for the diagnosis of acute appendicitis in which Alvarado

score is easy, simple and complimentary aid for diagnosis.⁶ It has been shown that with the use of higher score of more than 7, the sensitivity was 98.3% and specificity was 96.6% and negative appendectomy rate was much lower with less than 15% , but the rate of negative appendectomy is reported much higher of up to 40%, if score is 5-6.⁷ For this reason in our study we have added the caecal gurgle in modified alvarado scoring system when patients have equivocal signs (alvarado score 5-6). We named that system as altered alvarado scoring system. This study was conducted to assess the reliability of caecal gurgling as clinical sign in the diagnosis of acute appendicitis in equivocal cases with Alvarado score of 5-6.

PATIENTS AND METHODS

This descriptive study was conducted at department of surgical unit I, Sheikh Zayed Medical College/ Hospital Rahim Yar Khan, over a period of 3 years from 1st September 2009 to 31st September 2012, and a total of 840 patients were included in the study with age 12-16 years irrespective of gender. All these patients were presented in outpatient department & ER with short history of pain in right iliac fossa. All these patients were admitted & altered alvarado score

1. Department of General Surgery, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan

Correspondence: Dr. Muhammad Hassan Abbas, Assistant Professor General Surgery Department, Sheikh Zayed Medical College / Hospital, Rahim Yar Khan.

Phone: 0333-6722211
Email: drhassanabbas@yahoo.com

was calculated in all these patients as described in above table. Patients were categorized in three groups according to alvarado score.

Group I: Score 4 or less.

Group II: Score 5-6

a) Without caecal gurgle.

b) With caecal gurgle.

Group III: Score 7 or above.

Decision to recruit these patients in study and subsequent decision to operate or not on the basis of altered alvarado scoring system was made by consultant on call. All the patients having co morbid condition were excluded from study. Complete blood count (CBC), Blood chemistry, ECG, X-ray chest of all patients according to the anesthetic guidelines was done. Ultrasound (USG) abdomen & Pelvis of all patients was done. Patients in group I were discharged & followed up in OPD on every third day for 2 weeks. While patients in Group IIa were admitted in ward & managed conservatively. These patients were followed for signs of toxemia & serial USG for 72 hours. However, patients included in group IIb & III were operated and appendectomy was done. All specimens were sent for histopathology which was considered as gold standard for diagnosis. Histopathology reports were collected from pathology department. All the findings were noted on specially designed proforma made for this purpose. Descriptive analysis was applied to the altered Alvarado scoring system based group findings and outcome. Its reliability was assessed by calculating the negative appendectomy rate and positive predictive value. Simple chi-square test was applied to find out the relationship among negative appendectomy rate in patients with different alvarado score. Data was entered and analyzed in SPSS version 15.

RESULTS

In this study, out of total 840 patients, male were 562 (66.9%) and females were 278 (33.1%). Age of patients was ranging from 12-60 years and mostly 596 (70.9%) patients were of 12 to 30 years with male to female ratio of approximately 2:1.

Group I:

This group includes patients with alvarado score 4 or less. Among 840 patients 185 patients (22%) were in this group, which were admitted and followed with serial examination, for alvarado

score, and USG abdomen & pelvis, for 2 weeks on OPD basis. 160 patients (19%) out of 185 were resolved completely on conservative treatment, 20 patients (2.4%) develops signs of toxicity and only 5 patients (0.6%) undergone for appendectomy due to failed conservative treatment and found to have inflamed appendix and confirmed on histopathology report. (Table I and II)

Group II:

Group II includes 286 patients (34%) that have further been subdivided into patients without and with caecal gurgle. 172 patients (20.5%) were in group IIa in which caecal gurgle was not present and for them same protocol for management as for group I was adopted. 135 patients (16.1%) later on developed >7 alvarado score and needed to be operated and appendectomy was done. Out of these 135 operated patients, 24 (17.8%) appendices were found normal on histopathology. Only 37 patients (4.4%) of group IIa improved clinically and were managed conservatively and discharged. 114 patients (13.5%) were in group IIb, in which caecal gurgle was present and these patients were operated & appendectomy was done. On histopathology report only 3 female patients (2.6%) were having normal appendix.

Group III:

This group included 369 (44%) patients in which alvarado score was 7 or above. 12 patients were (3.25%) found to have normal appendix on histopathology report. All of them were operated and appendectomy was done. (Table I).

Table I: Normal Appendix on histopathology in different groups.

Group	Total patients	Operated patients	Normal appendix on Histopathology (negative appendectomy)
I	185 (22%)	5	0 (0%)
IIa + IIb	172+114 =286 (34%)	135+114 =249	24+3 =27 (10.8%)
III	369 (43.9%)	369	12 (3.25%)
Total	840 (100%)	623	39 (6.26%)

Table II: Sex wise distribution of negative appendectomies and positive predictive Value (PPV) n = 623

Sex	Total Patients	Operated Patients	Normal Appendix on histopathology	PPV (%)
Male	504	387(76.7%)	13 (3.3%)	96.6%
Female	336	236 (70.2%)	26 (11%)	88.9%
Total	840	623 (74.1%)	39 (6.2%)	93.7%

It was noted that 76% of the total male patients were operated as compared to 70% of the female patients. Among the males negative appendectomy was noted in 3.3% as compared to females in which it was 11%. Positive predictive value among males was 96% as compared to females where it was 89%. Overall positive predictive value was 93.7%.

DISCUSSION

Acute appendicitis is mainly a clinical diagnosis. Radiological modalities such as computed tomography (CT) imaging with its sensitivity (94%) and specificity (95%) further aid in making a definite diagnosis.⁸ However, routine to request for CT imaging will inflate the cost of healthcare substantially. Misdiagnosis of acute appendicitis is a common and crucial problem in general surgery. To improve clinical diagnostic accuracy and to reduce the rate of negative appendectomy many clinical scoring system has been devised like Alvarado score.⁹ The Alvarado score, which was developed in 1986, was a simple additive scoring system to help with the diagnosis of acute appendicitis.¹⁰ It was later on modified by deducting shift to left. But in our study we have introduced caecal gurgle as another variable. By adding caecal gurgle in modified Alvarado scoring system we found that negative appendectomy rate can be further reduced as shown in above results. Review of literature showed that all the data of this study is comparable to other studies published in this region except in group II with Alvarado score of 5-6, where negative appendectomy rate has been reduced in our study. (Table III).

Table III: Comparison & review of literature.

Sr. No	Component	Abbas MH et al 2012 (present study)	Dholia KR et al ¹¹ 2009	Kamran H et al ¹² 2010
1	Group II negative appendicectomies	G-IIa 24/135 (17.7%)	Total 27/249 (10.8%)	Total 6/34 (17.6%)
		G-IIb 3/114 (2.6%)		
2	Group III negative appendicectomies	12/369 (3.25%)	3/44 (2.9%)	4/46 (8.6%)
3	Total negative appendicectomies	39/623 (6.26%)	9/105 (8.5%)	6/58 (10.3%)
4	Positive predictive value (PPV)	93.7%	91.5%	89.7%

CONCLUSION

Diagnosis of acute appendicitis is mainly clinical. Keeping in view the results of present study, we conclude that altered Alvarado scoring system in which an additional point of caecal gurgling has been added, is slightly better in diagnosis of acute appendicitis especially in equivocal patients (score of 5-6). This clinical sign of caecal gurgling don't need much expertise to elicit. Even a resident can feel caecal gurgling on palpation and it can make our decisions further easier to operate or not in equivocal cases.

REFERENCE

- Stephens PL, Mazzucco JJ. Comparison of Ultrasound and Alvarado score for diagnosis of Acute Appendicitis. *Conn Med* 1999; 63: 137-40.
- Iqbal M. Appendicitis: a diagnostic dilemma. *Rawal Med Jour* 2005; 30(2): 51-2.
- Pal KM, Khan A. Appendicitis, a continuing challenge. *J Pak Med Assoc* 1998; 48: 189-92.
- Techer I, Landa B, Cohen M, Kabnick LS, Wise L. Scoring system to aid in diagnosis of appendicitis. *Ann surg.* Dec 1983;1998 (6) 753-759.
- Al Qabtain HH, Muhammad AA. Alvarado Score as admission criteria for the suspected appendicitis in adults. *Saudi Journ Gastroenterol* 2004; 10: 86-91.
- Khan I, Rehman A. Application of Alvarado Scoring system in diagnosis of Acute Appendicitis. *Journ Ayub Med C o l l* 2005; 17(3): 41-4.
- Khan AH, Azhar MZ, Rasheed A, Farooq MU. Role of Alvarado Score to minimize rate of negative appendicectomy without risk of perforation. *J Surg Pakistan* 2007; 12: 93-7.
- Terasawa T, Blackmore CC, Bent S, Kohlwes RJ. Systematic review: computed tomography and ultrasonography to detect acute appendicitis in adults a n d adolescents. *Ann Intern Med* 2004; 141:537-46.
- Soomro AG, Siddiqui FG, Abro AH, Abro S, Shaikh NA, Memon AS. Diagnostic accuracy of Alvarado scoring system in acute appendicitis. *J Liaquat Uni Med Health Sci.* 2008;7:93-6.
- Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 1986; 15:557-64.
- Dholia KR, Shaikh MS, Abro AA, Shaikh SA, Soomro SH, Abbasi MA. Evaluation of Alvarado score in diagnosis of acute appendicitis. *Pak J Surg* 2009; 25: 159-163.
- Kamran H, Naveed D, Asad S, Hameed M, Khan U. Evaluation of modified alvarado score for frequency of negative appendicectomies. *J Ayub Med Coll Abbottabad* 2010; 22(4): 46-49.