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Original Research Paper

Surgery

VALIDATION OF ULTRASOUND COMBINED MODIFIED ALVARADO SCORING SYSTEM IN ACUTE APPENDICITIS PATIENTS

Supreeth kumar reddy Kunnuru	Senior resident General surgery department, Sri Ramachandra medical university,
Selvapriya Bharathi	Assistant professor General surgery department, Sri Ramachandra medical university,
Manuneethimaran Thiyagarajan*	Associate professor of surgery General surgery department, Sri Ramachandra medical university, *Corresponding Author
Balaji Singh K	Professor of surgery and HOD General surgery department, Sri Ramachandra medical university,
Arulappan.T	Professor of surgery General surgery department, Sri Ramachandra medical university,

ABSTRACT

Objectives: Acute appendicitis, though one of the common emergencies in surgical practice, at times can confuse the best clinicians. There are lot of scoring system used to diagnose the appendicitis. We used Combination of USG abdomen with Modified Alvarado scoring system to make UcMASS and was compared with Histopathology reports to identify the sensitivity and specificity. **Material and methods:** Totally 120 patients with clinically suspected appendicitis patients were included in our study. Although decision making was not done based on Uc MASS , study was conducted and data were collected simultaneously .Comparison was done with confirmatory histopathology reports and cross table was made with two groups of UcMASS(group 1 score seven and above, group 2 score <7). Sensitivity specificity, PPV and NPV were collected. **Results:** Maximum number of patient included in our study belongs to 21- 30 yrs of age group (53.3%). Out of 120 patients in the study 90(75%) patients were male and 30(25%) were female (with M: F ratio of 4:1). Out of 120 patients 96 (80%)patients score was above 7 in which histopathological report was positive for 83(69%) patients and rest of 13 (10.8%) only histopathology negative patients. Out of 120 patients 24(20%) patients score was below 7 in which histopathological report was negative for 23(19.1%) patients. This is Statistically significant with p value < .001 = 99.9% significant. Sensitivity of the Uc MASS in appendicitis is 98.8% And Specificity is 63.8 %. . Its Positive Predictive Value is 86.4% Negative Predictive Value is 95.8% **Conclusion:** In this study,the diagnostic score may be used as a guide to evaluate the patients need for surgery or observation. so we conclude that UcMASS can be used routinely to diagnose the acute appendicitis and decision making can be done on score basis.

KEYWORDS : Modified Alvarado scoring system, appendicitis, appendicectomy, scoring system, ultrasound combined Alvarado

INTRODUCTION:

Appendicitis – acute inflammation of vermiform appendix is the most common cause of intra-abdominal infection both in developed and developing countries and appendicectomy in the most common emergency surgical operation. Lifetime risk for appendicitis for full population is 6%, so early diagnosis and treatment is important [1,2] The clinical picture may not be classical and the policy of early operation in such cases may lead to large number of normal appendix being removed. [3]

Early stage of appendicitis symptoms overlaps with other emergency conditions which makes the diagnosis challenge [4]. Failure of an early diagnosis could lead to the risk of perforation and peritonitis with its consequent increase in the morbidity and mortality [5] In 1986, MANTRELS scoring was constructed by Alvarado for clinical diagnosis of appendicitis with score of 10 [6]. Latter it was modified as modified Alvarado with 9 score excluding the shift to left of neutrophil. Some studies combined USG with Alvarado scoring to make more accurate diagnosis [7]. In our study we included USG finding also in the MASS to make Ultra sound combined modified Alvarado scoring System with a score of 10 for making the diagnosis more accurate.

AIM AND OBJECTIVES:

To analyze the efficacy of Ultra sound combined modified Alvarado scoring system [UcMASS] in diagnosis of acute appendicitis by comparing the histopathological examination of appendicectomy specimens.

MATERIALS AND METHODS:

This study was conducted on 120 patients who came to Sri Ramachandra Hospital and Research Institute with complaints of pain in right lower abdomen with clinical suspicious of appendicitis . study done for three years period. Appendicitis with generalized peritonitis, Appendectomy combined with any other abdominal procedures, Appendicitis in pregnancy, Appendicular mass and Patients below the age of 15 years were excluded from study.

All patients included in our study were admitted in our hospital with clinical diagnosis of Appendicitis. The decision for surgery was primarily done by concern surgical team based on clinical finding and investigation not based on UcMASS. We have done USG abdomen for all patients included in our study.Scoring was done by principle investigator for each patient simultaneously. The data were collected and coded in software analysis using SPSS statistical software version 11.5. The both groups were cross tabled against gold standard confirmatory histopathology reports. The sensitivity, specificity, positive predictive value and negative predictive value were calculated.

OBSERVATION AND RESULTS:

Table 1: age distribution, sex distribution and score in UcMASS

Age n=120		Number	percentage
	<20 yrs.	18	15%
	21-30 yrs.	64	53.3%
	31-40 yrs.	22	18.3%
	41-50 yrs.	10	8.3%
	>50 yrs.	6	5%
Sex n=120			
	Male	90	75%
	Female	30	25%
Type of surgery n=120			
	laparoscopy	100	83.3%
	Open	20	16.7%
UC MAS			
	Score 7&above	96	80%
	Score<7	24	20%

A total 120 patient enrolled in our study. In Table 1, Maximum number of patient included in our study belongs to 21- 30 yrs of age group (53.3%). Out of 120 patients in the study 90(75%) patients were male and 30(25%) were female (with M: F ratio of 4:1)

'UcMASS more than seven was 96 patients (80%) and less than seven was 24 patients (20%). Laparoscopy surgery was done in 100(83.3%)patients and open surgery was done in 20(16.7%) patients

TABLE 2: Intra operative findings with position of appendix

Intra operative findings		number	Percentage
	Inflamed	98	81.7%
	Perforated	10	8.3%
	Gangrenous	4	3.3%
	Fecolith	5	4.1%
	Fibrosis	3	2.5%
position of appendix			
	Retrocaecal	98	81.7%
	Pelvic	14	11.6%
	Preileal	4	3.3%
	paracolic	2	1.7%

Table 2 shows the intraoperative finding of appendicectomy patients. Commonest intraoperative finding is inflamed appendix (81.7%) and perforated appendix was 8.3%. According to the position of appendix ,98(81.7%) patients had retrocaecal appendix, 14(11.6%) patients had pelvic appendix, 4(3.3%) patients had Preileal appendix, 2(1.7%) patients had paracolic appendix

TABLE 3: UcMASS VS Histopathology report cross table:

			HPE		Total
			POSITIVE	NEGATIVE	
UcMASS	> 7	Count	83	13	96
		% of Total	69%	10.8%	80.0%
	< 7	Count	1	23	24
		% of Total	0.8%	19.1%	20.0%
Total		Count	84	36	120
		% of Total	70.0%	30%	100.0%

In table 3, out of 120 patients, histopathology positive rate is 84 patients (70%) and remaining 36 patients (30%) have normal appendix. so negative appendicectomy rate is 30%. Out of 120 patients 96 (80%)patients score was above 7 in which histopathological report was positive for 83(69%) patients and rest of 13 (10.8%) only histopathology negative patients. Out of 120 patients 24(20%) patients score was below 7 in which histopathological report was negative for 23(19.1%) patients. This is Statistically significant with p value < .001 = 99.9% significant.

From this cross table, Sensitivity of the UcMASS in appendicitis is 98.8% And Specificity is 63.8 %. . Its Positive Predictive Value is 86.4% Negative Predictive Value is 95.8%.

The histopathological examination findings observed in this study includes :Acute appendicitis (35%), Acute appendicitis with periappendicitis (25%), Eosinophilic appendicitis(10%), Reactive lymphoid hyperplasia (12%), Chronic lymphoid hyperplasia (11%) and Sclerosed appendix(7%). Among these Acute appendicitis, Acute appendicitis with periappendicitis, and Eosinophilic appendicitis were taken as positive and remaining as negative.

DISCUSSION:

The present study is done to evaluate the validation of Ultra sound combined modified Alvarado scoring system in acute appendicitis versus histopathological examination reports in our institute. UcMASS is inclusion of ultrasound finding and exclusion of shift to left in modified Alvarado scoring system. If USG shows features of appendicitis one score included.

Results of our study shows that acute appendicitis is most common in the age group 21 to 30 years (53.3%). Next common group is 31 to 40 years (18.3%). Epidemiological studies have shown that appendicitis is more common in the 10 to 29 years of age group [8]

Our study reveals that acute appendicitis is more common in males 74 (61.7%). Lone et al [9] has shown in their study that appendicitis was common in male gender. Retrocaecal position of appendix is most common presentation in our study 49(81.7%). Different literatures also support this observation [10]

Comparison shows the sensitivity of our study is high as 98.8%. Other studies only used modified Alvarado scoring system , Al-hashemyetal 53.9% [11], Kalen et al 81.63%[12], Shrivastava uk et al 92.4%[13], Fengo et al 90.2%[14] sensitivity only. Since we included USG in scoring system the sensitivity is higher than other studies .Specificity of our study is 63.8 % and it has been compared with other studies like Mohd. Saleem and Ahmed M 80%[15], Khuram Siddique 78%[16].The overall negative appendicectomy rate is high in our study (30%)although it is comparable with Emmanuel S Kanumba et all -33.1% [17].

In our study UcMASS is having high sensitivity with high positive predictive value. So ultrasound combined modified

Alvarado score can be used as a routine scoring system for diagnosing acute appendicitis and decision making for surgery can be done based on this scoring system.

CONCLUSION:

Although modified Alvarado scoring system used widely to diagnose the acute appendicectomy, by including USG abdomen in the scoring system the diagnostic accuracy can be improved. In our study by comparing gold standard HPE with UcMASS, the sensitivity and positive predictive value were found high. Score 7 and above indicate confirmatory appendicitis diagnosis and can proceed with surgery .so we conclude that UcMASS can be used routinely to diagnose the acute appendicitis and decision making can be done on score basis .

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