

Original Research Article

Superiority of RIPASA over modified ALVARADO scoring systems for the diagnosis of acute appendicitis

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ABSTRACT

Background: Acute appendicitis is the most common abdominal emergency. The diagnosis is primarily clinical. Various scores have been established based on clinical, laboratory and radiological investigations for the accurate diagnosis and to reduce the negative appendectomy rates.

Methods: A prospective observational study in the Department of General Surgery was conducted from February 2018 to September 2019. A total of 50 cases were studied. Alvarado and Ripasa scores were calculated and accordingly decision was taken to operate or conserved. Diagnosis was confirmed on histopathological evaluation and the scores were compared on the basis of their sensitivity, specificity, positive predictive value, negative predictive value.

Results: RIPASA score is a more valuable tool for diagnosing acute appendicitis with 78.72% sensitivity and specificity 33.33%, in spite of sophisticated investigations like CT, thus reducing the cost of treatment especially in developing countries. In our study. Negative appendectomy rate was 6% (3 cases out of 50) which is appreciably less than traditional literature.

Conclusions: Our study concludes that in the diagnosis of acute appendicitis Ripasa score is more specific than Modified Alvarado score. It helps in categorization for the proper management. It not only reduces the number of "missed appendicitis" but also reduces the cost of treatment by avoiding imaging modalities.

Keywords: Appendicitis, Ripasa score, Alvarado score

INTRODUCTION

Acute appendicitis has a lifetime prevalence rate of approximately 14% and is one of the most common surgical emergencies.¹ Though it is a common problem, acute appendicitis remains a difficult diagnosis to establish. It is particularly difficult to diagnose in young, elderly and in the females of reproductive age group as genitourinary and gynecological conditions can present with similar signs and symptoms. The most effective and gold standard modalities for diagnosis are the history and clinical examination.² Mostly in 50% of the cases, the clinical presentation is typical, but the decision to operate

can sometimes be challenging for the surgeon, particularly in young, elderly, and females of reproductive age group.³ History, clinical examination, few laboratory and radiological investigations helps in the diagnosis of acute appendicitis. A negative appendectomy rate of 20-40% has been documented, a rate of 30% has been accepted by many surgeons.⁴

The gold standard method for confirmation of diagnosis is by histopathology. Ultrasound is an operator dependent investigation. Usually, it is over-diagnosed or under diagnosed.⁵ The next superior investigation is contrast computed tomography scan. The contrast CT scan has a

high sensitivity and specificity but it is very costly and cannot be routinely performed.⁶ Therefore a clinical scoring system is cheaper, faster, and non-invasive diagnostic tool in diagnosing acute appendicitis.⁷

The most commonly used scoring system worldwide is the Alvarado and the Modified Alvarado scoring systems (MASS) (Evaluation of modified Alvarado score in the diagnosis of suspected acute appendicitis, 2015). Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score is a relatively new scoring system developed in 2008. The study was done in RIPAS Hospital, Brunnei Darssalem (Chong et al and Chong et al). Since Alvarado and Modified Alvarado were found to have poor sensitivity and specificity in Middle Eastern and Asian population, there was a need for more accurate scoring system.

In the present study, RIPASA and Modified Alvarado scoring systems (MASS) are compared among the local population in one of the metropolitan city of India, to find out which scoring system is more reliable in order to aid early diagnosis of acute appendicitis.³

Aim of the study were to validate the RIPASA scoring system in the diagnosis of acute appendicitis and to assess the RIPASA scoring system and the Modified Alvarado Scoring System (MASS) for the diagnosis of acute appendicitis, and compare them with respect to sensitivity, specificity, positive predictive value, negative predictive value.

METHODS

A prospective clinical study comparing ALVARADO and RIPASA scoring system in the diagnosis of acute appendicitis has been conducted at Dr. D. Y. Patil University, School of Medicine, Nerul, Navi Mumbai, in the department of General Surgery during the period of February 2018 To September 2019.

Inclusion criteria

All patients presenting with RIF pain and clinically diagnosed as acute appendicitis, patients willing for surgery, patients willing to participate in the study were included in the study.

Exclusion criteria

Patients presenting with non-RIF pain, Patients with generalized peritonitis, Patients not willing for surgery, Patients not willing to participate in the study, patients admitted for interval appendicectomy, pregnant females, paediatric age group (<12 years) were excluded from the study.

A total of 50 patients have been included in the study. After the clinical assessment, based on history, symptoms, signs and laboratory investigations

ALVARADO and RIPASA scores were calculated. Investigations included a complete hemogram with total white blood cell count and urinalysis for routine microscopy. Each patient was designated to definite/clinically confirmed or high probability/ clinically equivocal according to the scores. Based on which the decision to operate or not was taken with prior consent. Intra-operative findings were noted and specimen (appendix) was sent for histopathological examination. The diagnosis of acute appendicitis was taken confirmatory on histopathological reports. Those patients who were conserved/ not operated were excluded from the study due to unavailability of histopathological confirmation of appendicular inflammation.

Classification was done as follows: a) Definite/clinically confirmed; Alvarado score of more than or equal to 7 and Ripasa score of more than or equal to 12. b) High probability/ clinically equivocal; Alvarado score less than 7 and Ripasa score between 7.5-11.

MASS

Criteria

Migratory RIF pain-1, Anorexia-1, Nausea and vomiting-, Tenderness in RIF -2, Rebound tenderness – 1, Elevated temperature >37.5°C -1, Leucocytosis -2, Shift to left (neutrophilia) -1; Total Score- 10.

RIPASA scoring system

Criteria

Male: 1.0, Female : 0.5, Age <39.9 : 1.0, Age >40.0 : 0.5, RIF Pain: 0.5, Migration of RLQ Pain: 0.5, Anorexia : 1.0, Nausea and vomiting: 1.0, Duration of symptoms <48 hours : 1.0, Duration of symptoms >48 hoysrs : 0.5, RIF tenderness : 1.0, RIF guarding : 2.0, Rebound tenderness: 1.0, Rovsing's Sign : 2.0, Fever: 1.0, Raised WBC: 1.0, Negative urinalysis : 1.0, Foreign NRIC : 1.0 ; Total score: 17.

History of pain originating at the umbilical region and migrating to the right iliac fossa with a change from dull aching to well localized pain was considered as positive and given a score of 1. Pain elicited on palpation at right iliac fossa was given a score of 2. Pain elicited on withdrawal of palpation at right iliac fossa was scored 1. Temperature more than 37.5 degree Celsius was given a score of 1. Leucocytes more than 11,000/ mm³ was considered significant and scored 2. Shift to the left was evaluated on peripheral smear when more immature/ band forms of WBC's were present in the smear. Pain elicited at RIF on palpation at the left iliac fossa was considered positive for Rovsing sign and was scored 2. The decision to operate in case of diagnostic dilemma when one or both the tests were not suggestive of acute appendicitis was taken by senior faculty in the emergency surgery team.

RESULTS

In this study the peak incidence is seen in the age group of 20-29 years (42%). The number of cases were very less in old age group i.e >50 years of age. There were only 3 cases in this age group: The age group of 12 to 29 years had a total of 32 (64%) cases contributing more than 50% of the total. The median age was 25 years. The youngest patient was of 13 years of age and the eldest was of age 60 years.

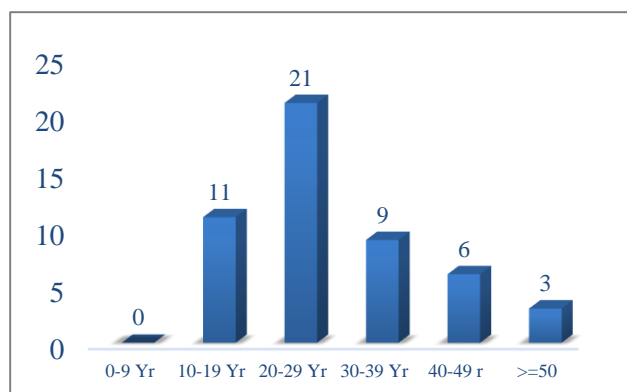


Figure 1: Age distribution.

There were 28 (56%) of male cases and 22 (44%) of female cases in the study. The most common symptom is pain in the right iliac fossa which is seen in all the patients in the study. It is the most common symptom that draws the patient to seek medical advice, whereas right lower quadrant tenderness is the most common sign elicited by the surgeon. RIF pain was seen in 100% cases where as tenderness was elicited in 98% cases. Migration of pain from umbilical region to right iliac fossa (dull aching, well localized) was present in 18 cases (36% of cases). Rest of the cases complained either a predominantly somatic or visceral poorly localized pain. Nausea/ vomiting was a more prominent feature being present in 30 (60% of cases) compared to anorexia which was present in 17 (34% of cases). Nausea/ vomiting being the second most common symptom. Rebound tenderness was present in 22 (44% of cases) whereas guarding was seen in 12 (24% of cases). Rovsing sign was elicited in 12 (24% of cases). 25 (50% of cases) had fever on examination whereas 35 (70% of cases) had increased leucocytes in peripheral smear. All cases in the study were Indian national and did not possess a foreign national registration identity card. Only 1(2% of cases) female in the study showed positive urine analysis for Urinary tract infection.

Laboratory investigations

In all cases, total leucocyte count and shift to left (more immature forms of neutrophils) were evaluated. Leucocyte count more than 11000/mm³ was considered significant and was given a score of 2 and 1 in Alvarado score and Ripasa score respectively. Leucocytosis was

observed in 70% of cases. Shift to left was observed in only 10 (20% of cases).

Alvarado score

Alvarado score was calculated in all 50 cases. Cases were categorized as clinically confirmed or clinically suspicious depending on the score. Clinically confirmed were those with score of more than equal to 7. Rest of the cases with score less than 7 were considered clinically suspicious. From the Table 1, it can be interpreted that there were 26% clinically confirmed cases and 74% cases belonged to clinically suspicious group. The statistical analysis was obtained after histopathological confirmation of the diagnosis.

Table 1: Number of cases according to Alvarado Score.

ALAVARADO Score	Male	Female	Total
Clinically confirmed ≥ 7	4	9	13 (26%)
Clinically suspicious < 7	18	19	37 (74%)
Total	22	28	50

RIPASA score

Ripasa score was calculated in all 50 cases. Cases were categorized as clinically confirmed or clinically suspicious depending on the score. Clinically confirmed were those with score of more than equal to 8. Rest of the cases with score less than 8 were considered clinically suspicious. From the Table 2, it can be interpreted that there were 78% clinically confirmed cases and 22% cases belonged to clinically suspicious group, whereas Alvorada score showed 26% and 74% respectively. The statistical analysis was obtained after histopathological confirmation of the diagnosis.

Table 2: Number of cases according to RIPASA score.

RIPASA score	Male	Female	Total
Clinically confirmed ≥ 8	18	21	39 (78%)
Clinically suspicious < 8	4	7	11 (22%)
Total	22	28	50



Figure 2: Gangrenous appendix.

Histopathology

Specimen of appendix post-surgery were all sent for histopathological evaluation in each case and histopathological confirmation was the criterion to label the case as “acute appendicitis”. Out of the 50 cases that were operated, 3 among them had histopathology report as Normal appendix. Rest 47 cases were confirmed histologically as acute appendicitis. Therefore the negative appendectomy rate in the study was 6%. For Alvarado out of the normal appendices removed, two were from the clinically suspicious group and 1 from the clinically confirmed group. For Ripasa out of the normal appendices removed, two were from the clinically confirmed group and 1 from the clinically suspicious group. Intra operatively, appendix from the clinically confirmed group was mildly congested on the serosal surface. In 2 out of the 3 normal appendices there was mesenteric lymphadenopathy.

Statistical parameters for ALVARADO scoring system

Sensitivity: 25.53%, Specificity: 66.66%, Positive predictive value: 92.3%, Negative predictive value: 5.4%. Alvarado Score for male cases can be interpreted: Sensitivity: 19.04%, Specificity: 100%, Positive predictive value: 100%, Negative predictive value: 5.55%.

Alvarado score for female cases can be interpreted: Sensitivity: 30.7%, Specificity: 50%, Positive predictive value: 88.88%, Negative predictive value: 5.2%.

Table 3: Statistical parameters calculated and compared for overall, male, female cases for ALVARADO score.

Statistical parameters	Overall	Male	Female
Sensitivity (%)	25.33	19.04	30.7
Specificity (%)	66.66	100	50
PPV (%)	92.3	100	88.88
NPV (%)	5.4	5.55	5.2

Statistical parameters for RIPASA scoring system

Sensitivity: 78.72%, Specificity: 33.33%, Positive predictive value: 94.87%, Negative predictive value: 9.09%. Ripasa Score for male cases can be interpreted: Sensitivity: 90.47%, Specificity: 100%, Positive predictive value: 100%, Negative predictive value: 33.33%.

Ripasa Score for female cases can be interpreted: Sensitivity: 73.07%, Specificity: 0%, Positive predictive value: 90.47%, Negative predictive value: 0%.

Negative appendectomy rate

(NAR) Out of 50 operated cases, 3 among them had normal histopathology report. Thus, the negative

appendectomy rate was 6%. Out of those 3, there were 2 females and 1 male patient. Therefore, NAR was 7.1% in female population and 4.54% in males.

Table 4: Statistical parameters calculated and compared for overall, male, female cases for RIPASA score.

RIPASA	Overall	Male	Female
Sensitivity (%)	78.72	90.47	73.07
Specificity (%)	33.33	100	0
PPV (%)	94.87	100	90.47
NPV (%)	9.09	33.33	0

Table 5: Statistical comparison between RIPASA and ALVARADO score.

	Sensitivity	Specificity	PPV	NPV
Alvarado	25.33	66.66	92.3	5.4
Ripasa	78.72	33.33	94.87	9.09



Figure 3: Intra-operative inflamed appendix- Long, tubular structure with increased diameter.

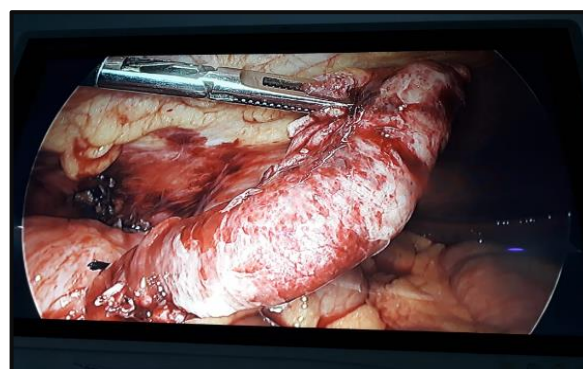


Figure 4: Ligation of mesoappendix on laparoscopic appendectomy.

DISCUSSION

Acute appendicitis is one of the commonest surgical emergencies. It has different modes of presentation.

Clinical diagnosis sometimes may lead to unnecessary negative laparotomy. Various scoring systems have been devised for its accurate diagnosis and treatment supplemented by laboratory and radiological investigations. Alvarado and Ripasa scoring system are simple, easy to use, cheap and repeatable tool. It is useful in situations where radiological investigations are unavailable. It helps to categorize patients for surgery, observation or for discharge.

The present study was conducted in the Department of General Surgery at Dr. D.Y. Patil hospital, Navi Mumbai from February 2018 to September 2019. A total of 50 cases were studied based on history, clinical features and Laboratory investigations. Based on which Alvarado and Ripasa scores were calculated and compared. In our study it was observed that maximum incidence of acute appendicitis was seen in the second and the third decade of life (22% and 42% respectively of total cases). The median age was 25 years. Pieper and Kager observed that 75% of patients were younger than 33 years with 25 % below 14 years, 8 while Lewis et al showed highest incidence in age group 21-30 years.⁹ Adiss et al mentioned the highest incidence of acute appendicitis is in second through fourth decade of life with a life time risk of 7%.¹⁰ Our study shows the same results. The higher incidence of acute appendicitis in second and third decade can be attributed to the lymphoid hyperplasia which is particularly common in this age group. The average peak age group for this is 12-20 years.^{11,12}

At the extremes of age, the incidence is less compared to adult age groups due to decreased number of lymphoid follicles with advancing age. In our study only 6% of patients belonged to age group more than 50 years. Regar et al in a study of 100 cases observed that the mean age as 24.86 years which is comparable to our study.¹³ The male to female ratio reported by Oguntola et al was 1.08:1 (52% males and 48% females).¹⁴ In a cross-sectional study done on 25 patients who were having acute appendicitis by Zulfiqar et al the mean age was 35.17, and 74% were males and 26% were females (1.92:1.9).¹⁵ However, such correlation was not seen in our study which may be due to a smaller number of total subjects. The present study had 50 cases, out of which 22 were males and 28 were females (44% and 56% respectively). The overall male to female ratio was 1:1.27. In the study by Guercio et al, 142 patients were included with 68 males and 74 females (ratio being 1:1.08) with a mean age of 32 years.¹⁶

Pain is the most common symptom in a case of acute appendicitis. This series showed that there were 18 cases where pain started around the umbilical region and got localized to right iliac fossa, however all 50 cases (100%) complained of pain in right iliac fossa. Abdominal pain was present in 88.6% of cases as described by Aviral et al.¹⁷ Similar reports were given by Gulzar et al where pain was present in 92 to 100% of patients.¹⁸ Thus our study compares favorably with other studies with respect

to pain being the most common symptom in acute appendicitis. In a patient with acute appendicitis, pain initially starts in the umbilical region and then migrates to the right iliac fossa. Normal luminal capacity of appendix is only 0.1 ml and increased secretions as little as 0.5 ml will increase intraluminal pressure up to 60 cm of water. This distension and luminal obstruction are also responsible for nausea and vomiting. Then inflammatory process involves serosal surface and parietal peritoneum causing shift of pain from umbilical region to right iliac fossa, thus resulting in migration of pain. Classically, the pain is initially diffuse, centered in the lower epigastrium or umbilical area; it is moderately severe and steady, sometimes with intermittent cramping superimposed. Within a period of 4 to 6 hours, pain migrates to right lower quadrant.

Migration of pain in different studies are as follows Lee et al 19-91%, Jerry et al 50%, Gulzar et al 34%, Present study 36%.^{18,19} In our study 36% had migratory RLQ pain which was relatively similar to the study by Gulzar. Jerry et al reported that 24% to 99% cases with anorexia as one of the clinical symptoms.²⁰ Anorexia was present in 17 out of 50 cases (34%) in our study. Nausea or vomiting were the second most common symptom in our study. It was present in 30 cases i.e. 60% of total cases. Avirel et al conducted a study that showed nausea in 56% and vomiting in 50.67% cases whereas in a study by Gulzar et al corresponding figures were 94% and 72%.¹² The figures obtained in our study are intermediate between these. It should be noted that it is the symptom complex and not the individual symptom which makes the clinical suspicion of acute appendicitis most likely. If none of the above symptoms are present, the diagnosis should be seriously questioned.¹² One of the common presenting symptom in acute appendicitis is low grade fever. There is increase in the body temperature due to release of pyrogens. Fever is sometimes of high grade and persistent, particularly in cases of appendiceal perforation and gangrenous appendicitis.⁸

In the present study fever was of low-grade type present in 50% (25 cases out of 50). Gulzar et al reported that 67% of the cases had fever and Lee et al reported 44.9% incidence of fever in his study.¹⁹ Common Symptoms of Appendicitis are abdominal pain, anorexia, nausea, vomiting, pain migration.^{21,22} The most common sign present in our study was RIF tenderness seen in 98% i.e. 49 out of 50 cases. The degree of tenderness was different in each individual patient and in obese patients, tenderness was present only on deep palpation. Similarly, for patients with appendix in pelvic position, tenderness was present on deep palpation. Similar studies conducted in past show that tenderness was present in 96 to 100% of patients.

In a study conducted by Adesunkonmi et al, muscle guarding and rebound tenderness was present in 81% of cases.²³ Similarly Alshebri et al reported rebound tenderness in 94.7% cases in their study and emphasized

the use of this particular clinical feature.²⁴ In our present study, rebound tenderness was present in 44% cases and indeed it was used a deciding factor for the surgery when one or both diagnostic criteria were negative (or suspicious). RIF guarding and Rovsing sign was present in 24% of individuals. The white blood cell (WBC) count is elevated ($>10,000$ per mm^3) in 80 percent of all cases of acute appendicitis.²³ Unfortunately, the WBC is elevated in up to 70 percent of patients with other causes of right lower quadrant pain.²⁴ Thus, an elevated WBC has a low predictive value. Serial WBC measurements (over 4 to 8 hours) in suspected cases may increase the specificity, as the WBC count often increases in acute appendicitis (except in cases of perforation, in which it may initially fall).²¹

In the present study, total leucocyte count was raised in 35 out of 50 cases (70%). A raised total leukocyte count is regarded as a sensitive test for acute appendicitis, but is not diagnostic because of its relatively low specificity and does not add much to the management in patients with doubtful clinical findings. The total leukocyte count is also raised in other pathologies like pelvic inflammatory disease, enteric fever, etc. Therefore, it is non-specific investigation. Even a perforated appendix may be associated with a normal white cell count and therefore the clinical judgment should be considered more reliable.²⁵

In our study shift to left was present in 10 cases of the total number of patients (i.e. 20% of total cases). Wang et al conducted a study to evaluate the role of shift to left and leukocytosis in acute appendicitis.²⁶ Among adolescents, 53.5% of patients with a left shift had appendicitis, whereas 6.1% of adolescents without a left shift had appendicitis.

Table 6: Different studies for ALVARADO score.

	Nautiyal et al ²⁸	Ahmed et al ²⁹	Denzbasi et al ³⁰	Inci et al ³¹
Sensitivity	40	58.2	95.4	84.2
Specificity	93.33	88.9	45.7	66.67
PPV	93.33	98.1	-	94.12
NPV	40	17.4	-	40.0

In patients with appendicitis, a urinalysis may demonstrate changes such as mild pyuria, proteinuria and hematuria, 1 but the test serves more to exclude urinary tract causes of abdominal pain than to diagnose appendicitis.²⁷ It was observed that 49 out of 50 cases (98%) showed negative urinalysis and only 1 female showed urinalysis positive for urinary tract infection. It can be observed that in the study the sensitivity of Alvarado score is 25.33% and specificity is 66.66% for a score of more than 7. This means that Alvarado score identified 25.33 patients with the disease that test positive. 66.66% of specificity indicates the false positive rate. The positive predictive value is high as 92.3% which indicates the power of the test and is good for Alvarado

score. However, the negative predictive value is low as 5.4% and hence when Alvarado score suggests against acute appendicitis, surgeon must exercise his clinical experience.

In case of Alvarado score, there have been wide variations in sensitivity and specificity in different studies. Positive predictive value has been, in general, high. So Alvarado score can be used early in the protocol to decide the likelihood of acute appendicitis. A high score can predict the diagnosis relatively accurately. The negative predictive value is low in general and hence those with negative diagnosis can be subjected to further investigations and senior opinion. Our study had similar PPV and NPV. For Ripasa Score it can be observed that in the study the sensitivity of Ripasa score is 78.72% and specificity is 33.33% for a score of more than 8. This means that Ripasa score identified 78.72 patients with the disease that test positive with a positive predictive value of 94.87.

In the present study Ripasa and Alvarado score were compared, and final diagnosis was analysed in relation to post-operative HPE reports. It was found that both sensitivity and specificity was higher in Ripasa (78.72%) as compared to Alvarado (25.33%). Also the positive predictive value of Ripasa (94.87%) was higher than Alvarado (92.3%). The negative predictive value of Ripasa and Alvarado were comparable (9.09% and 5.4% respectively). Analysing both Ripasa and Alvarado, it was found that both Ripasa and Alvarado were easy to perform as they mainly relied upon clinical symptoms and signs, along with basic laboratory investigations, and they did not need elaborate investigations. As Ripasa had more number of parameters compared with Alvarado, subjectively it felt like it summarized the patient's clinical condition better. The time taken to apply the scores (both Ripasa and Alvarado) were minimal, and did not cause any undue delay in management. Even though Alvarado is a routinely used scoring system for the diagnosis of acute appendicitis worldwide, it has found to be lacking in its sensitivity and specificity.

Butt et al conducted a cross sectional study on 267 patients and found Ripasa score to have a sensitivity and specificity of 96.7% and 93% respectively.³² Its positive predictive value was 98% and negative predictive value was 95%. In a study by Chong et al, sensitivity for RIPASA and MASS were 98% and 68% respectively whereas the study conducted by Mohammed et al had a sensitivity of 96% and 58% with a specificity of 90% and 85% respectively.^{33,34} Keeping all these factors in mind, the present study was analysed. When we retrospectively analysed the proven appendicitis cases with the scores, we found that among the clinically suspicious categories, Ripasa picked up 95% cases as high probability of appendicitis, whereas Alvarado picked up only 92% as high probability cases. Hence, we understood that by using the Ripasa score, cases that fall under clinically

suspicious category can be more confidently taken up for surgery, without the need for any imaging modality.

Under the LP (low probability) category in Ripasa, further investigations were done, and 83% of them turned out to be acute appendicitis, as compared to 94% in Alvarado. This further strengthens the point that Ripasa filters out low probability cases better than Alvarado. Under the U (Undetermined) category (<5), or “Unlikely to be appendicitis” category, Ripasa had 0 appendicitis cases. That means, it proved that 100% of the cases were unlikely. Meanwhile, Alvarado (<5) had 12% cases under unlikely category which were finally diagnosed as appendicitis. Hence, the number of missed cases would have been higher in Alvarado. Hence in the present study, comparatively Ripasa seems to be better than Alvarado clinically as well as statistically. After final analysis, it was found that Ripasa was statistically superior to Alvarado in terms of sensitivity (78% vs 25%), specificity (33% v/s 6%) and positive predictive value (94% v/s 92%), whereas the negative predictive value (9% v/s 5%) were comparable.

Negative appendicectomy rate

In our study the final proof of acute appendicitis was confirmed by histopathological report. Our study revealed 3 patients out of 50 to have a normal appendix on histopathology confirmation. Thus, the negative appendicectomy rate was 6%. For males it was 7.1% and females was 4.54%. Govaert et al in their study observed normal appendix in 3.4% males and 24.1% females.³⁵ NAR observed in few more studies are Nautiyal et al 6.06%, Mardaan et al 7.4%.³⁶ Thus, the NAR in our study is acceptable and comparable with other studies as well.

CONCLUSION

Acute appendicitis is the most common cause of an acute abdomen requiring surgery. The present study concludes that, in the diagnosis of acute appendicitis, RIPASA score is more specific than Modified Alvarado Score. For the clinician, it gives a clearer categorization of management of patients with RIF pain- suggesting that in most cases, patients in HP/D category can straight away be taken up for surgery without any extra imaging modality, patients in LP category would benefit the maximum from further investigations and that patients in the U category can be worked up for non-appendiceal diagnoses. RIPASA score is a more valuable tool for diagnosing acute appendicitis with 78.72% sensitivity and specificity 33.33%, in spite of sophisticated investigations like CT, thus reducing the cost of treatment especially in developing countries. It also reduces the number of “missed appendicitis” cases. Hence, RIPASA is clinically and statistically a better scoring system for the diagnosis of acute appendicitis, as compared to Alvarado score. Thus, Ripasa score is a simple scoring system with high sensitivity and specificity for the diagnosis of acute appendicitis. The 14 clinical parameters are all present in a good clinical

history and examination and can be easily and quickly applied. Therefore, a decision on the management can be made early. The mortality and morbidity due to appendicitis can thus be reduced.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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