Usefulness of RIPASA Score In Diagnosing Acute Appendicitis

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ABSTRACT

Objective — *To determine the diagnostic accuracy of RIPASA score in detecting acute appendicitis.*

Study design — *Cross sectional - Descriptive.*

Place & Duration of study — *Department of Surgery, Dow University of Health Sciences Karachi (DUHS), from August 2017 to June 2018.*

Methodology — *One hundred and thirty patients aged 10 years to 60 years with right lower quadrant pain were included. Baseline laboratory tests including blood CP and urine analysis were sent for all patients. Total score of RIPASA was calculated and highly suspected acute appendicitis patients underwent open appendectomy. Histopathology of specimen of appendix was performed. Sensitivity and specificity of RIPASA score was calculated along with positive predictive value, negative predictive value and accuracy.*

Results — *Mean age of the patients was 27.04±10.39 years. RIPASA score sensitivity in detecting acute appendicitis was 47.6%, specificity 85.7%, positive predictive value (PPV) 98.4%, negative predictive value (NPV) 8.3% and diagnostic accuracy 49.6%.*

Conclusion — *RIPASA score was not a reliable diagnostic method in diagnosing patients of acute appendicitis.*

Key words — *Diagnostic accuracy, RIPASA score, Acute appendicitis, Abdominal pain.*

INTRODUCTION:

Acute appendicitis is considered as a common surgical emergency having lifetime prevalence rate of approximately 1 among 7.[1,2] Incidence of acute appendicitis is 1.4 times higher in males than females.[3,4] Peak incidence of appendicitis is reported between 10-30 years of age.[5] Diagnosis of acute appendicitis is based upon classical history and clinical examination along with few laboratory investigations such as elevated white cell count.[6] Although acute appendicitis is considered as a common problem, but is difficult to diagnose in some cases, especially young female patients of reproductive age.[7] Ultrasonography and computed tomography (CT) both can be supportive in making diagnosis of acute appendicitis.[8] Diagnostic accuracy of CT scan is high; however, it is not possible to subject each and every patient to this investigation mainly because of limited resources. Delay in diagnosis can lead to increased morbidity and even mortality. To avoid frightful complications of acute appendicitis, doubtful cases preferably undergo surgery, thus a 10-15% or even more negative appendectomies are reported.[9] To minimize all these complications, various investigations have been carried out to help in diagnosis of acute appendicitis, but still surgeon's clinical skills play an important role in detection of acute appendicitis.[10]

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Different scoring systems have been devised to improve diagnostic efficacy.[11] Scoring systems are simple diagnostic aids.[12] The Alvarado score and modified Alvarado score are two commonly used systems. The Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score is another scoring system for detection of acute appendicitis with higher diagnostic accuracy particularly when it is applied to Asian population.[1] Different studies on role of RIPASA score in detection of acute appendicitis are available on Western population but data is lacking on Asian population particularly from Pakistan. The aim of this study was to determine usefulness of RIPASA score in patients with right iliac fossa pain.

METHODOLOGY:

A prospective cross-sectional study was performed from August 2017 to June 2018 at Dow University Hospital, Karachi. A total of 133 patients aged 10 years to 60 years visiting hospital with right lower quadrant pain were included. Right iliac fossa (RIF) tenderness and rebound tenderness were assessed at clinical examination. Baseline laboratory tests including blood CP and urine analysis were sent for all patients. Patients having a lump on examination, comorbid conditions like diabetes mellitus and hypertension, were excluded.

RIPASA score was calculated for all patients and those with score > 7.5 underwent open appendectomy after obtaining written and informed consent. With RIPASA Score 7.5 -11.0 there is high possibility of acute appendicitis and score greater than 12 is definitive diagnosis of acute appendicitis. All appendectomies were carried out under general anesthesia. All appendix specimens were sent for histopathology. Scientific and ethical clearance was provided by the REU of College of Physicians & Surgeons of Pakistan by formal approval of research protocol.

Data were analyzed by utilizing SPSS version 17. Mean and standard deviation were calculated for age, duration of symptoms and RIPASA score. Frequency and percentage were calculated for qualitative variables like gender, migration of pain and negative urine analysis. A 2x2 table was constructed to calculate sensitivity, specificity, positive predictive value, negative predictive value and accuracy of RIPASA score to predict acute appendicitis taking histopathology as gold standard. Effect modifiers were controlled through stratification of age, gender, duration of symptoms, and migration of pain, raised white cell count and negative urine analysis to see effect of these on outcome variables post stratification by calculating diagnostic accuracy.

RESULTS:

Out of 133 cases, 88 (66.17%) were males and 45 (33.83%) females. The mean age of the patients was 27.04±10.39 years. Details are given in table I. Migration of pain was present in 98.5% patients and negative urine analysis in 87.97%. RIPASA score sensitivity in detecting acute appendicitis was 47.6%, specificity 85.7%, PPV 98.4%, NPV 8.3% and diagnostic accuracy 49.6% (table II).

RIPASA score sensitivity in detecting acute appendicitis in patients below 40 years of age was 7.1%, specificity 100%, PPV 100%, NPV 23.5% and diagnostic accuracy 27.8%. The sensitivity for the age 40 years and above was 52.7%, specificity 66.7%, PPV 98.3%, NPV 3.6% and diagnostic accuracy 53%. The accuracy of RIPASA score for males was 63.7 % and that for females 22.2 %. Similarly, with respect to migration of pain and negative urine analysis low accuracy of 49.6% and 51.3 % respectively was observed.

DISCUSSION:

Acute appendicitis is a common surgical emergency with highest incidence in adolescent age.[13] However, its diagnosis is always challenging as number of conditions mimic acute appendicitis but precise clinical evaluation remains the cornerstone.[14] There are number of tools available to strengthen the clinical diagnosis and imaging studies are frequently employed but cost of these investigations limits their use.[15] Different scoring system are thus devised and RIPASA scoring system is one of them which has been studied in this research.

Table I: Demographic Details of Study Patients (n=133)

Statistics	Mean + SD	95 % Confidence Interval	
		Lower Bound	Upper Bound
Age (Years)	27.04 + 10.39	25.25	28.82
Duration of symptoms (Minutes)	43.25 + 8.95	41.27	44.77
RIPASA score	10.92 + 1.66	10.66	11.18

Table II: Diagnostic Accuracy of RIPASA Score

Statistics		Histopathology As Gold Standard		Total
		Positive	Negative	
>12		60 (TP)	1 (FP)	61 (45.9%)
<12		66 (FN)	6 (TN)	72 (54.1%)
Total		126 (94.7%)	7 (5.3%)	133
Sensitivity	47.6%			
Specificity	85.7%			
PPV	98.4%			
NPV	8.3%			
Accuracy	49.6%			

The RIPASA score is reported to give better results than Alvarado score. In this study, RIPASA score diagnostic accuracy was determined by using histopathology as gold standard. RIPASA score includes history and physical examination along with two simple laboratory investigations of total leucocytes count and urinary analysis for assigning patients in high or low probability group based on score and quick decision can be taken for surgery. In this study males were predominant (66.17%) and the mean age was 27.04±10.39 years which is comparable to other studies.[16-18]

Negative urine analysis was reported in 87.97% in this study population. In this study RIPSA score showed low sensitivity but high specificity. It also had high PPV but low NPV with accuracy of 49.6%. This shows that RIPSA score may not be reliable. Other studies reported diverse results. Butt et al reported the sensitivity of 96.7% and specificity of 93.0% with diagnostic accuracy of 95.1%.[7] This is quite different from our results. Chong et al also found RIPASA score as a reliable tool.[15] A study done by Singh et al also reported similar results and concluded that the RIPASA score is superior to Alvarado and other systems.[19]

Our results are in contradiction with other studies. One of the reasons for this could be our small sample size. Another reason could be the study was performed on Asian population. RIPASA has shown different accuracies on different populations. Finally, the fact that we took 7.5 as our cut-off could be another element leading to variability in results. Different studies have taken 7.75 as their threshold score for appendectomy with varying results. Prospective trials with larger sample size and multicenter involvement are required to be absolutely sure of effectiveness of this tool.

CONCLUSION:

RIPASA score is not a reliable diagnostic tool in detection of acute appendicitis.

REFERENCES:

1. Mohammed A, Shanbhag V, Ashfaque KS. A comparative Study of RIPASA Score and ALVARADO score in the diagnosis of acute appendicitis. J Clin Diagn Res. 2014; 8:NC03-NC05:9055.5170.
2. Chong CF, Adi MI, Thien A, Suyoi A, Mackie AJ, Tin AS, et al. Development of the RIPASA score: a new appendicitis scoring system for the diagnosis of acute appendicitis. Singapore Med J. 2010;51:220-5.
3. Chong CF, Thien A, Mackie AJ, Tin AS, Tripathi S, Ahmad MA, et al. Evaluation of the RIPASA Score: a new scoring system for the diagnosis of acute appendicitis. Brunei Int Med J. 2010;6:17-26.
4. Flum DR. Acute appendicitis: appendectomy or the “antibiotics first” strategy. N Engl J Med. 2015;372:1937-43.
5. Khadda S, Yadav AK, Ali A, Parmar A, Sakrani JK, Beniwal H. Clinical study to evaluate the RIPASA scoring system in the diagnosis of acute appendicitis. Am J Adv Med Surg. 2015;1:67-73.
6. Ergul E, Ucar AE, Ozgun YM, Korukluoglu B, Kusdemir A. Family history of acute appendicitis. J Pak Med Assoc. 2008;58:635-7.

7. Butt MQ, Chatha SS, Ghumman AQ, Farooq M. RIPASA score: a new diagnostic score for diagnosis of acute appendicitis. J Coll Physicians Surg Pak. 2014;24:894-7.

8. Alnjadat I, Abdallah B. Alvarado versus RIPASA score in diagnosing acute appendicitis. Rawalpindi Med J. 2013;38:147-51.

9. Haider AH, Qureshi MN, Bila R, Ahmad I. Acute appendicitis; ultrasonography as pre-operative screening tool. Pak Armed Forces Med J. 2016;66:S-178-83.

10. Verma M, Vashist MG, Goyal K, Yadav P. Comparison of ALVARADO and RIPASA scoring systems in diagnosis of acute appendicitis. Paripex Indian J Res. 2016;4:8.

11. Karan M, Mukesh MK. Significance of RIPASA scoring system in diagnosis of acute appendicitis. Int J Healhtcare Sci. 2015;3:4-10.

12. Erdem H, Çetinkünar S, Daþ K, Reyhan E, Deðer C, Aziret M, et al. Ohhmann and Raja Isteri Pengiran Anak Saleha appendicitis scores for diagnosis of acute appendicitis. World J Gastroenterol. 2013;19:9057.

13. Patil S, Harwal R, Harwal S, Kamthane S. Appendicitis inflammatory response score: a novel scoring system for acute appendicitis. Int Surg J. 2017;4:1065-70.

14. Cuschieri A. The small intestine and vermiform appendix. In: Cuschieri A, Grace P, Darzi A, editors. Clinical surgery. London: Blackwell Publishing Company; 2003. p. 386-406.

15. Flum DR, Koepsell T. The clinical and economic correlates of misdiagnosed appendicitis: nationwide analysis. Arch Surg. 2002;137:799-804.

16. Love RJ. The Appendix. London: Lewis; 1947.

17. Boyce FF. Acute appendicitis and its complications. New York: Oxford University Press; 1949.

18. Health and Social Care Information Centre. Hospital episode statistics; England. [Online]. 2015 Available from: URL:http://www.hesonline.nhs.uk

19. Singh K, Gupta S, Pargal P. Application of Alvarado scoring system in diagnosis of acute appendicitis. JK Sci. 2008;10:84-6.

Received for publication: 03-03-2021

Accepted after revision: 09-05-2021

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Nighat Bakhtiar: Supervision, critical revision and final approval
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Conflict of Interest:

The authors declare that they have no conflict of interest.

Source of Funding: None

How to cite this article:
Awan S, Bakhtiar N, Kerawala AA, Abidi SS. Usefulness of RIPASA score in diagnosing acute appendicitis.. J Surg Pakistan. 2021;26 (1):28-31. Doi:10.21699/jsp.26.1.7.