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Research Article

**DIAGNOSTIC ACCURACY OF ALVARADO SCORE IN THE  
DIAGNOSIS OF ACUTE APPENDICITIS**<sup>1</sup>Dr. Arooj Anwar, <sup>2</sup>Dr. Mamoon Mirza, <sup>3</sup>Dr. Taha Hussain<sup>1</sup>Sahiwal Medical College Sahiwal<sup>2</sup>Aziz Bhatti Shaheed Teaching Hospital Gujrat<sup>3</sup>Services Institute of Medical Sciences Lahore**Abstract:**

**Objective:** The aim of this research work is to know about the detection precision of Alvarado score in the discovery of AA (acute appendicitis).

**Methodology:** This research work carried out in Mayo Hospital Lahore. This research work started in January 2016 and ended in December 2017. This study covered duration of more than six months. One hundred patients of painful and swollen appendix engaged with the surgical team of this research for the evaluation of this disease with the positive use of Alvarado score. The participants provided particular scores in accordance with variable. They separated in two different groups; group one participant found with more than seven score and group two participants found with have less than seven score. All the patients from both groups operated if painful and swollen appendix detected with the help of medical diagnosis. Histopathology report was in use to confirm the detection after operation. + Predictive level, specificity & sensitivity assessed with the help of authentic system of scores.

**Results:** One hundred patients were the part of this research work. There were sixty-five male patients and thirty-five were the female patients. At score > 7, painful and swollen appendix discovered in 53/54 patients. At scores < 7, the painful and swollen appendix discovered in 38/46 patients. + Predictive value was more than ninety-eight percent. The sensitivity was more than fifty-eight percent. Specificity was about ninety percent.

**Conclusion:** Medical experience is very significance in the discovery of painful and swollen appendix. Alvarado score is very simple system of scoring with exact result and easy process.

**Key Words:** Appendix, Alvarado, score, precision, scale, predictive, sensitivity, specificity.

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**INTRODUCTION:**

Burney concluded in his research work on 8 patients of painful and swollen appendix one hundred year ago that surgical removal of the appendix at early stage is good treatment [1]. It is very common medical state with seven to eight percent occurrence in the whole life [2]. About ten lacs patients come in emergency of hospitals every year in the whole world. Abdominal surgeons are identifying this disease from last hundred years. An early treatment of swollen and painful appendix is necessary to reduce its complications [3]. Patients with the painful and swollen appendix come with specific physical conditions and immediate surgery is beneficial to tackle this problem. Sometimes, sex and age of the patients bewilder the medical image, the considerations of diagnosis are wide in the case of premenopausal females even the discovery of this disease at old age is very difficult due to delay in getting the medical treatment or absence of the medical history or there is a requirement of precise physical examination [3].

Late discovery of the disease and treatment of swollen and painful appendix have connection with the high rate of occurrence of mortality & morbidity. So, to get rid from this complication, specialists have a customary approach for premature involvement even in the non-availability of the proper discovery of the disease [4]. Negative rate of surgical removal of appendix fifteen to forty percent in the case of swollen and painful disease and many surgeons viewed that we are not able to decrease this high rate [5, 6]. Discrepancy in the detection of this

complication and administration of patients available with pain in the right iliac fossa is a regular complication for surgeons. Modalities of imaging have the ability to increase the discovery precision but their application has not been displayed to improve this matter when compared to other medical treatment [7]. Various score methods are in use to increase the specificity & sensitivity in the detection of painful and swollen appendix. This is also beneficial to decrease the rate of wrong surgical removal of appendix [8-10]. A very simple, cheap and having easy application method regarding this matter is Alvarado score method. It depends on the medical checkups, background history and other investigations in the laboratory; which decrease the negative rate of surgical removal of appendix and increase the quality of care for the patient [11].

**METHODOLOGY:**

This research work was carried out in Mayo Hospital Lahore. This research work started in January 2016 and ended in December 2017. One hundred patients of this disease were entered in this research work after getting their willing for this research. The patients detected with painful and swollen appendix admitted in the hospital and the calculation of their Alvarado score carried out as described in table Table-1. Alvarado score greater than seven was showing the presence of painful and swollen appendix and score less than seven was describing the normal condition of appendix but the application of the surgery was depending on the pure medical diagnosis.

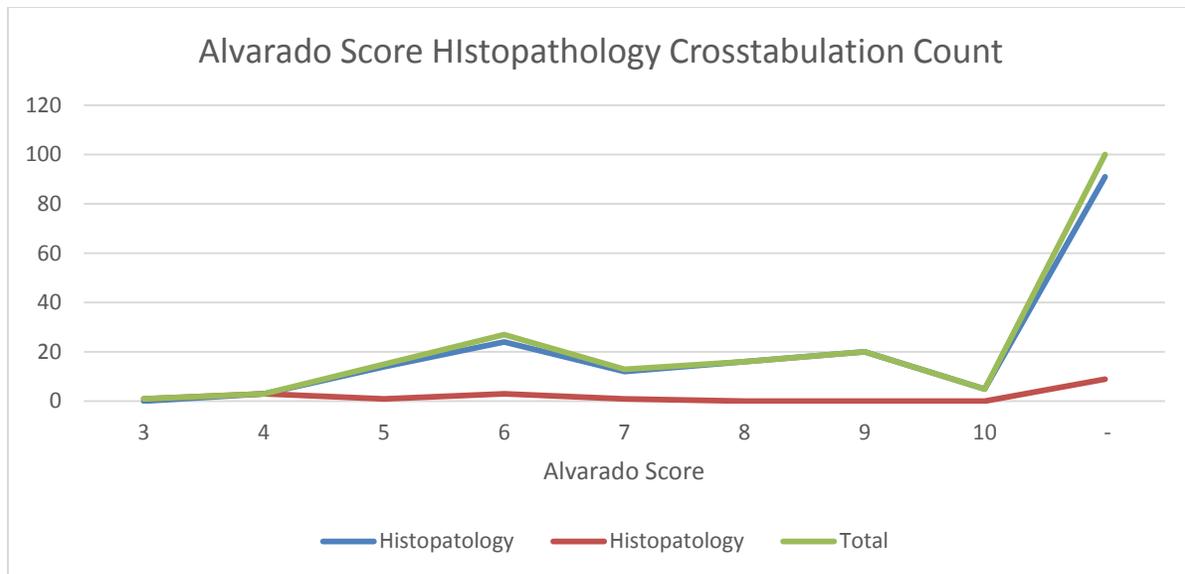
<b>Table-I: Alvarado Score</b>		
Variables	Clinical features	Score
Symptoms	Migratory RIF pain	1
	Anorexia	1
	Nausea and vomiting	1
Signs	Tenderness (RIF)	2
	Rebound tenderness	1
	Elevated temperature	1
Laboratory	Leucocytosis	2
	Shift to Left	1
Total Score		10



All the patients underwent operation with traditional procedure of surgical removal of the appendix. Histopathology outcomes were helpful in the detection of this problem in very initial stage. This Scoring system was linked with the histopathological outcomes of the disconnected appendix as described in Table-2. SPSS software version ten was in use for the analysis of the information.

**Table-II: Alvarado Score \*Histopathology Crosstabulation Count (n=100)**

Alvarado Score	Histopatology		Total
	Inflammed	Non Inflammed	
3	-	1	1
4	3	3	3
5	14	1	15
6	24	3	27
7	12	1	13
8	16	-	16
9	20	-	20
10	5	-	5
-	91	9	100



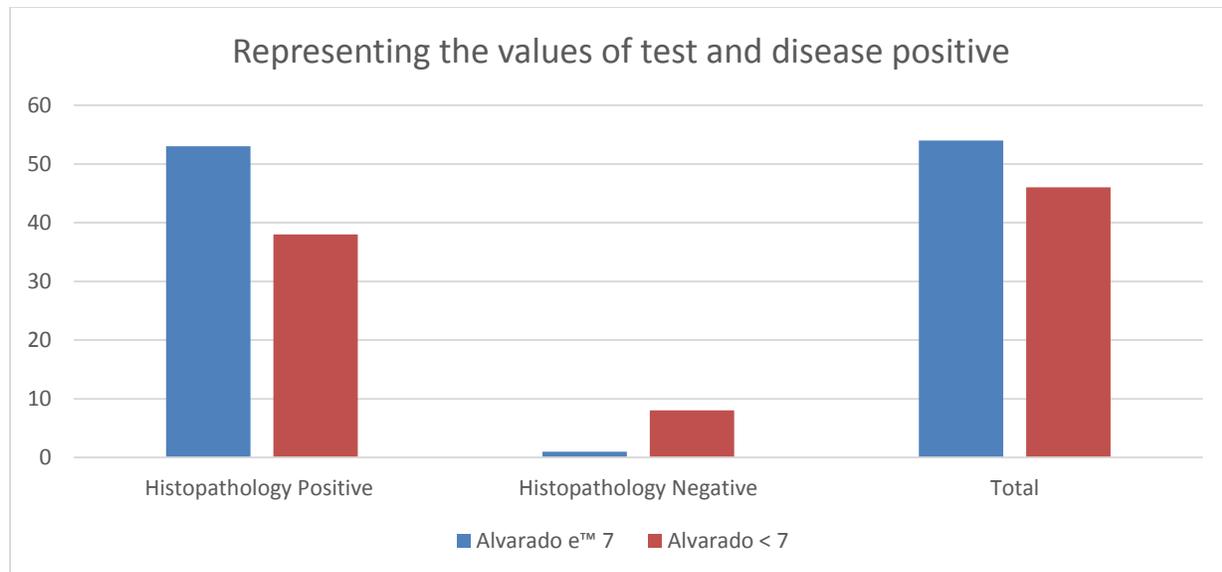
### RESULTS:

One hundred patients were the participants of this research work. Sixty five participants were the male and thirty five participants were females. The average age of the patients was  $24.80 \pm 9$  years. The range of the age of patients was thirteen year to fifty five years. A large number of patients were in the age group of ten to twenty year of age i.e. forty three percent. Fifty four patients were with Alvarado score greater than seven and forty six patients with this score less than seven. Examination before operation

showed that ninety seven percent patients had woollen and painful appendix. Histopathological diagnosis revealed that more than ninety eight percent patients had swollen appendix. The sensitivity was more than fifty eight percent, specificity was about eighty nine percent, PPV (positive predictive value) was about ninety eight percent, NPV (negative predictive value) was more than seventeen percent and accuracy rate was sixty one percent as described in Table-3.

**Table III: Representing the values of test and disease positive (n=100)**

	Histopathology Positive	Histopathology Negative	Total
Alvarado $\geq 7$	53	1	54
Alvarado $< 7$	38	8	46
	91	9	100



### DISCUSSION:

Alvarado score is reliable, cheap, safe and simple method for the discovery of the painful and swollen appendix. But there was no disparity in the diagnosis of this disease with the help of Alvarado score and normal operation procedures [6, 10-14]. Various research works are in favour of Alvarado score but many research works are in favour of normal procedures [15, 16]. In this research work, ninety eight percent patients with greater than seven Alvarado score have confirmation of painful and swollen appendix on histopathology with PPV of more than ninety eight percent and sensitivity of fifty eight percent which is similar to the results of research work of Ahmed [17] providing sensitivity of more than fifty three percent. Matija concluded in his research work that hundred percent PPV of score greater than seven in the discovery of this disease in the females. Hizbullah [12] research reported that PPV of eighty five percent at score more than seven. Ikramullah research work concluded that PPV was more than eighty percent in the youngsters [11]. Case study of Pruekprasert [18] concluded sensitivity of more than seven score was seventy nine percent but the sensitivity was ninety six percent in traditional methods and in this research work sensitivity was ninety one percent in the case of traditional methods. This research work showed the negative appendicectomy was about two percent which is close to the research work of Matija [3] who reported no such case. Ikramullah [11] concluded in his research work that it was about sixteen percent.

Khalid [19] reported negative appendicectomy as eleven percent in his research work. There was only a single female with normal appendix at the score of

more than seven in this research work. The content of this complication defines that further interrogation of the disease are required in case of females for proper detection of the disease. Michael [20] jointed the Alvarado score and laparoscopy in young women to increase the precision of detection of the disease. It was zero percent in this research work at a score of greater than seven. Ajaz [21] concluded the utilization of AS with PPV at score greater than seven was eighty percent and it gave a very high negative appendicectomy occurrence in the females. Ajaz [21] concluded the PPV about sixty seven percent in case of less than seven score. Arsalan [15] in his research provides negative appendicectomy of five percent at a score greater than four with PPV of ninety four percent.

### CONCLUSION:

Medical outcomes and knowledge are of vital importance in the discovery of painful and swollen appendix. Alvarado score is a practical method in the detection of the swollen and painful appendix at both corners of the scale. The discovery of this disease in the patients with ambiguous features is very complicated. There should be a different cut off value of score for different populations in the diagnosis of this disease.

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