Diagnostic Value of Mean Platelet Volume in Acute Appendicitis

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ABSTRACT

Objective — *To find out diagnostic value of mean platelet volume (MPV) in acute appendicitis.*

Study design — *Case control study.*

Place & Duration of study — *Department of Pathology,* Pakistan Atomic Energy Commission General Hospital (*PAEC), Islamabad, from June 2012 to November 2012.*

Methodology — *Patients who underwent appendectomy were included. The patients in control group were normal individuals who attended hospital for blood donation. Both groups were followed for four months. Data was collected through pre tested questionnaire. A correlation was applied to find out the relationship between MPV and other variables.*

Results — *A total 140 participants were included in this study with equal number of exposed and unexposed (70 each). There were 66.4% males and 33.6% females in exposed group while 55.4% males and 44.6% females in unexposed group. The mean age was 33.6±11.2 year among exposed while 30.8±10.1 year among unexposed group (p=0.407). Those individuals who underwent acute appendicitis surgery were more likely to have reduction in MPV than those who did not (Odds Ratio 1.21, 95% CI, p<0.001).*

Conclusions — *The patients of acute appendicitis had reduction in mean platelet volume. Mean platelet volume had lower diagnostic value as compared to leukocyte count.*

Key words — *Appendicitis, Mean platelet volume, Diagnostic value.*

INTRODUCTION:

Acute appendicitis refers to inner lining inflammation of vermiform appendix that spread to other parts of abdomen.[1] In United States the annual rate of acute appendicitis from 1993-2008 was found to be 7.62-9.38 per 10,000 population. The incidence of acute appendicitis was highest among young adults (10-19 years), while among elderly group (30-69 years) it was 6.3%, with males affected more than females.[2]

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The acute appendicitis is most common abdominal surgery performed in emergency. It includes a lifetime incidence of 7% among patients.[3] Male to female ratio of 1:4:1 is reported in literature.[4] Acute appendicitis has multi factorial association with dietary factors, luminal obstruction and familial factors.[4] Due to poor predictive value of laboratory tests and lack of pathogenic clinical features associated with acute appendicitis, it is difficult to diagnose.[5] The pathology of acute appendicitis is associated with inflammation. The laboratory test that were found to be very important indicators for acute appendicitis were leukocytosis with left shift, inflammation markers (c-reactive protein and sedimentation rate of erythrocytes) etc.[6]

Mean platelet volume is basically a measurement of size of platelets using full blood count analyzers. This occurs as part of routine blood count test.[7] Mean platelet volume is basically a marker of platelet

activation thus large platelets are found which are more active.[8]

Acute appendicitis is very common disease among individuals in Pakistan associated with unknown causes. A limited literature is available on this topic from Pakistan. This research planned to contribute knowledge regarding mean platelet volume in diagnosis of acute appendicitis. The study aimed to investigate the diagnostic value of mean platelet volume in acute appendicitis.

METHODOLOGY:

The study was a case control study conducted in the Department of Pathology, Pakistan Atomic Energy Commission General Hospital (*PAEC), Islamabad* from June 2012-November 2012. A sample size of 140 was achieved using WHO formula with 80% power, SD 1.09, anticipated population 7.55 and 5% significance level with exposed to unexposed ratio of 1:1. All patients who had the diagnosis for acute appendicitis, both genders and age greater than 18 year, were included. Patients with heart failure, hematological disease, hepatic disease, cancers, vascular diseases, pregnant and breast feeding women were excluded. After taking the list of patients who had been diagnosed for acute appendicitis surgery from the Department of pathology, exposed were randomly selected using random number computer generated table while controls were normal individual coming for blood donation in hospital, randomly selected, using simple random sampling matched with age and sex. Age, gender, MPV level, leukocyte count and CRP levels were measured in both the groups. Ethical approval was taken from ethical review board and consent taken from the participants. Both groups were followed for four months. Data was collected through pre tested questionnaire. Reliability of questionnaire was assessed after a pretest exercise of 10 questionnaires. Data was analyzed using SPSS software version 20.0. Descriptive statistics (percentages, mean, SD) was used to describe the data. A correlation test was performed to the relationship of MPV with other variables.

RESULTS:

A total of 140 participants were included in this study with equal proportion of exposed and unexposed. There were 66.4% males and 33.6% females in exposed group while 55.4% males and 44.6% females in unexposed group. The mean age was 33.6±11.2 year among exposed while 30.8±10.1year among unexposed (p=0.407) group (table I).

The mean CRP level among exposed was15.28±58.57mg/dl while the mean CRP among unexposed was 2.7±5.08 mg/dl. Mean CRP level was higher among exposed than unexposed (p<0.002). Similarly the mean MPV level was found to be higher among exposed (acute appendicitis group) than unexposed (normal blood donating group). The study also found that there was no correlation between MPV, leukocyte count and CRP level (table II).

The receiver operating characteristic curve analysis suggested best cutoff point for leukocyte count was 10450/mm^3 with sensitivity and specificity 91%, 74% respectively, while the cut off point for CRP level was 28.1 mg/dl with 97%, 41% sensitivity and specificity respectively (Fig I). The study found out that those individuals who underwent acute appendicitis surgery were more likely to have reduction in MPV than those who did not (Odds Ratio 1.21, 95% CI, p<0.001).

Table I: Demographic Characteristics Comparison Among Exposed and Unexposed Groups

Characteristics	Exposed		Unexposed		p- value
	Mean ± SD	Range	Mean ± SD	Range	
Age (Year)	33.6 ± 11.2	15-54	30.8±10.1	18-77	P=0.407
WBC (ul)	8017 ± 1067	3320 - 13000	12959 ± 4558	3800 - 28000	P<0.001
MPV (fl)	9.2 ± 1.7	5.1-13.2	7.5 ± 0.8	5.7-11.5	P<0.001

Table II: Correlation Between MPV, Leukocyte Count and CRP Level

Variables	Correlation Coefficient	P value
Leukocyte-MPV	0.032	0.50
Leukocyte-CRP	-0.04	0.49
CRP-MPV	0.006	0.8

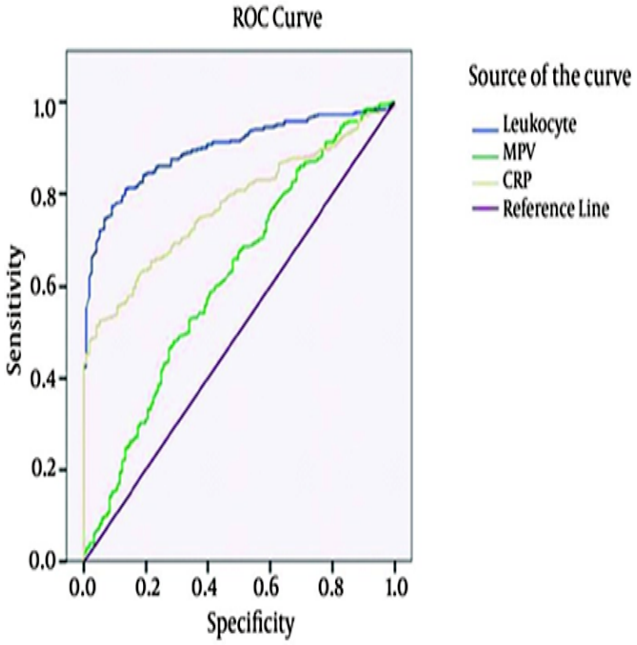

Fig I: Receiver operating characteristic curve

DISCUSSION:

A total 140 participants were included in present study. Males dominated in both the groups. Same has been reported in other study where males were 283 and females 220 in acute appendicitis group while there 69 males and 52 females in control group.[8] The present study found out that the mean CRP level among exposed was15.28±58.57mg/dl while the mean CRP among unexposed was 2.7±5.08 mg/dl. Another study reported median CRP level among cases as 15.26± 58.55 mg/dl and 2.6±5.09 mg/dl in controls.[9]

The MPV level was found to be lower among exposed and higher among unexposed in present study. Other studies reported that MPV was associated with reflection of young platelets due to a platelet activation indicator.[10] Another study found lower MPV level among patients of acute appendicitis.[11] In present study the receiver operating characteristic curve analysis suggested best cutoff point for leukocyte count as 10450/mm^3. This is different from reported literature where 84% specificity and 87% sensitivity based on MPV level after acute appendicitis were reported.[12]

CONCLUSIONS:

The patients of acute appendicitis had reduction in mean platelet volume while control group did not show any change. Mean platelet volume had lower diagnostic value as compared to leukocyte count.

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Kashif Jameel: Acquisition of data, revision for intellectual content.
Anam Altaf: Report writing, analysis, critical review.

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