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RESEARCH ARTICLE

COMPARATIVE DIAGNOSTIC VALUE OF NEUTROPHIL-TO-LYMPHOCYTE AND PLATELET-TO-LYMPHOCYTE RATIOS FOR ACUTE APPENDICITIS

Dr. Akshaya Parthiban, Dr. Ali Reza Shojai, Dr. Akhil Guntupalli, Dr. Mohit Vardey, Dr. Nilind Jha and Dr. Shaunak Saha

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Abstract

Acute appendicitis is nearly an everyday occurrence in the emergency department and consists of 10% of patients presenting to emergency service with abdominal pain. When it comes to the diagnosis of acute abdomen, appendicitis is one of the most common cause13. Early Diagnosing of appendicitis with clinical examination is Sometimes not easy and challenging14. Neutrophil-to-lymphocyte ratio (NLR) which is easily calculated from complete blood count is a simple marker of subclinical inflammation. It is also observed that Changes in the neutrophil-to-lymphocyte ratio (NLR) can be an early sign of bacterial and viral infections.Platelets are cells that help in modulating various inflammatory conditions; therefore, changes in PLR may be a useful indicator of acute infection, including Acute Appendicitis.Aim is To compare Diagnostic utility of neutrophil to lymphocyte ratio vs platelet to lymphocyte ratio for diagnosis of acute appendicitis.objectives of the study as follows To calculate neutrophil to lymphocyte ratio To calculate platelet to lymphocyte ratio To compare Diagnostic utility of neutrophil to lymphocyte ratio vs platelet to lymphocyte ratio in diagnosing acute appendicitis. Our study has revealed that the Neutrophil-Lymphocyte Ratio (NLR) is significantly elevated in cases of acute appendicitis compared to the Platelet-Lymphocyte Ratio (PLR). While clinical diagnosis remains the gold standard for diagnosing acute appendicitis, NLR can also be a valuable investigative tool in the future. In our study, both NLR and PLR were elevated in response to acute appendicitis, but NLR showed a statistically significant increase. We also observed that NLR values were two to three times higher in cases of perforated or gangrenous appendicitis. Therefore, NLR is not only useful for diagnosing acute appendicitis but also for predicting complicated cases.

Introduction:-

Acute appendicitis is nearly an everyday occurrence in the emergency department and consists of 10% of patients presenting to emergency service with abdominal pain. When it comes to the diagnosis of acute abdomen, appendicitis is one of the most common cause[13]. Early Diagnosing of appendicitis with clinical examination is Sometimes not easy and challenging[14]. Neutrophil-to-lymphocyte ratio (NLR) which is easily calculated from complete blood count is a simple marker of subclinical inflammation. It is also observed that Changes in the

Corresponding Author:- Dr. Akshaya Parthiban

neutrophil-to-lymphocyte ratio (NLR) can be an early sign of bacterial and viral infections.Platelets are cells that help in modulating various inflammatory conditions; therefore, changes in PLR may be a useful indicator of acute infection, including Acute Appendicitis.

Aim and Objectives:-

Aim:-

To compare Diagnostic utility of neutrophil to lymphocyte ratio vs platelet to lymphocyte ratio for diagnosis of acute appendicitis

Objectives:-

To calculate neutrophil to lymphocyte ratio
To calculate platelet to lymphocyte ratio
To compare Diagnostic utility of neutrophil to lymphocyte ratio vs platelet to lymphocyte ratio in diagnosing acute appendicitis

Patients and Method:-

It is a prospective comparative study taken place in MGM Medical College and Hospital, Navi Mumbai in period of 1 year with study population of 60.

Institute Ethics Committee approvalobtained before the start of the study.

Plan of Study

All Patient presenting in emergency room with clinical suspicion of acute appendicitis. Written and informed consent will be obtained from each patient before his/her enrolment in the study. Patient presenting in ER with clinical suspicion of acute appendicitis and willing to consent for taking part in the study are included in the study.Pregnant female, Immunocompromised patients,Patients on steroids/ chemotherapy medications,patient undergoing Interval Appendicectomy,Patient not giving consent for the study, Histopathology report other than appendicitis

After obtaining informed written consent from each participant, they were enrolled in the study .Complete clinical history and CBC will be recorded in a case record form. Pre-operative radiological investigations were recorded. The patient will undergo open/lap appendicectomy according to the surgeon's call.On table, the appendix will be sent for HPE reporting. After 4 days HPE report will be compared with NLR and PLR and entered in the tabular column.

The 95% reference range of NLR in normal males and females are 0.43~2.75 and 0.37~2.87, PLR 36.63~149.13 and 43.36~172.68, respectively

Table 1:- Distribution of the NLR and PLR amongst the study population.

PARAMETER	MEAN	SD
NLR	4.17	2.25
PLR	134.09	90.03

Table 2:- Distribution of the study population according to the NLR values.

PARAMETER	N	%
NORMAL	11	18.33%
ABNORMAL	49	81.67%
TOTAL	60	100%

Results:-

Figure 1:- Age and genderwise distribution of the study population.

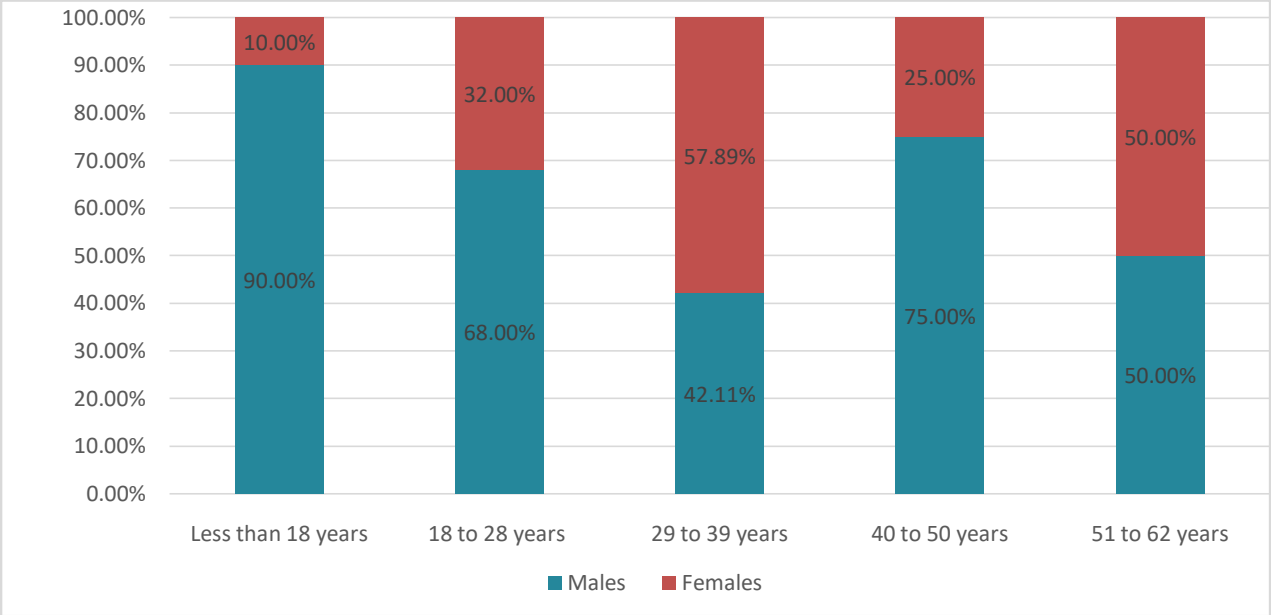

Figure 2:- Distribution of the study population according to the NLR values.

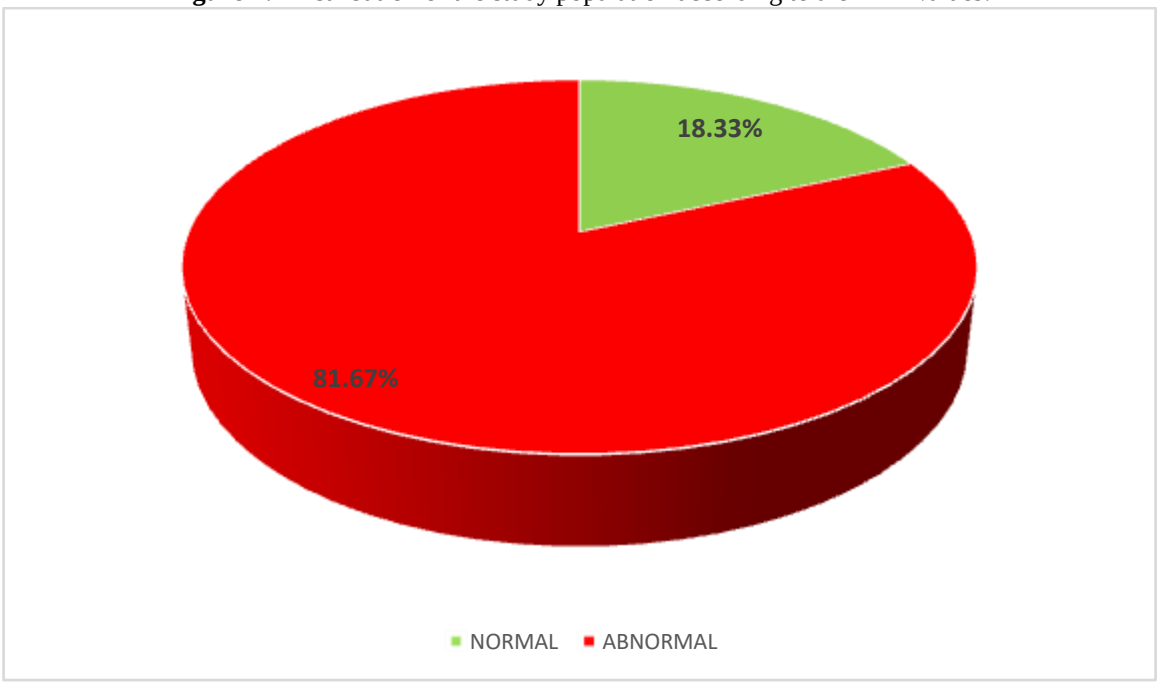

Table 3:- Distribution of the study population according to the PLR values.

PARAMETER	N	%
NORMAL	47	78.33%
ABNORMAL	13	21.67%
TOTAL	60	100%

Figure 3:- Distribution of the study population according to the PLR values.

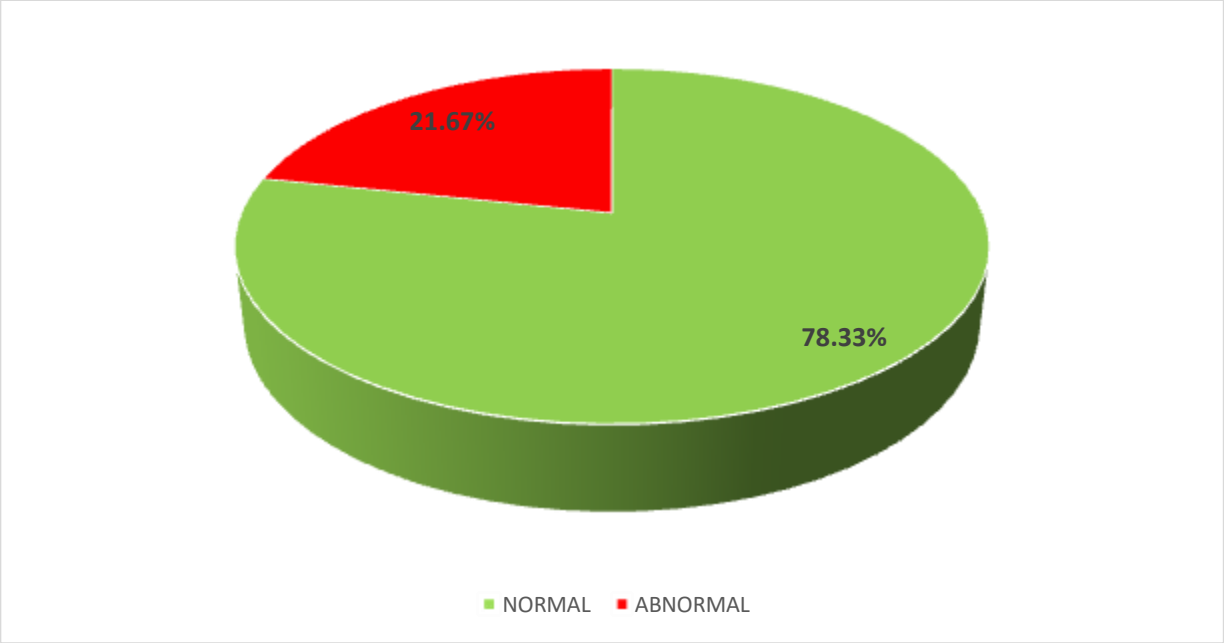

Table 4:- Correlation between NLR and PLR.

RISK FACTOR	CORRELATION COEFFICIENT (R)	P VALUE	INTERPRETATION
NLR	-0.01	0.04	significant
PLR	0.03	0.819	Insignificant

Discussion:-

In the present study, it was observed that the mean age of the study population was 26.88 ± 10.64 years. The mean age was similar in males and females, with a P value of 0.060. There was a preponderance of male population affected by acute appendicitis (63.33% vs 36.67%).

In the present study 95% of the cases underwent open appendicectomy while only 5% of the cases underwent laparoscopic surgery.

In the study by Ahmad K. et al[1], they observed that 95.85% of the cases underwent open appendicectomy. Same as this present study.

NLR:

In the present study, it was observed that the mean NLR of the study population was 4.17 ± 2.25. There was no genderwise difference in the NLR; P value: 0.270. When assessed with age, the correlation was statistically significant; P value: 0.004.

Furthermore, NLR was abnormal in overall 81.67% cases. There was no difference in genderwise abnormality of NLR; P value: 0.004.

With PLR, there was a weakly positive correlation (R^2 = 0.49), which was statistically significant; P value: less than 0.001.

In the study by Ahmad K. et al[1], they included a total of 338 cases undergoing appendicectomy under the suspicion of acute appendicitis.

They also concluded that NLR increased with the progression of inflammation and severity of acute appendicitis as correlated by HPE. Similar results were also observed in the studies by Mehmet U. et al[4], Celik B. et al[5], Kahramanca S. et al[7], Akgul N. and Gundes E.[8] and Rudiman R. et al[9].

PLR:

In the present study, it was observed that the mean PLR of the study population was 134.09 ± 90.03. There was no genderwise difference in the PLR; P value: 0.310. When assessed with age, the correlation was statistically insignificant; P value: 0.819.

Furthermore, PLR was abnormal in overall 21.67% cases. There was no difference in genderwise abnormality of PLR; P value: 0.072.

With NLR, there was a weakly positive correlation ($R^2 = 0.49$), which was statistically significant; P value: less than 0.001.

In the meta-analysis by Liu L. et al[6], they included a total of 11 studies having 3006 cases and 698 controls. They found that PLR levels were significantly higher in cases with acute appendicitis (SMD: 1.19, 95% CI: 0.75 to 1.62, P<0.001) than that of the controls.

Similar were the findings in the study by Mehmet U. et al[4], Celik B. et al[5] and Yazar F. M. et al[10].

In the study by Rajalingam V. et al[12], they included a total of 799 patients of uncomplicated and complicated appendicitis. They observed a positive correlation ($R^2 = 0.589$), which was statistically significant; P value: less than 0.5. This was almost similar to the present study.

Conclusion:-

Acute appendicitis is one of the most common conditions encountered daily in the Department of General Surgery. Our study has revealed that the Neutrophil-Lymphocyte Ratio (NLR) is significantly elevated in cases of acute appendicitis compared to the Platelet-Lymphocyte Ratio (PLR). While clinical diagnosis remains the gold standard for diagnosing acute appendicitis, NLR can also be a valuable investigative tool in the future.

In our study, both NLR and PLR were elevated in response to acute appendicitis, but NLR showed a statistically significant increase. We also observed that NLR values were two to three times higher in cases of perforated or gangrenous appendicitis. Therefore, NLR is not only useful for diagnosing acute appendicitis but also for predicting complicated cases.

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