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RELATIONSHIP OF PERIPHERAL BLOOD NEUTROPHIL TO LYMPHOCYTE RATIO, PLATELET TO LYMPHOCYTE RATIO AND PLATELET DISTRIBUTION WIDTH WITH IRRITABLE BOWEL SYNDROME ACCORDING TO ROME IV CRITERIA

Gastroenterology

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ABSTRACT

Background: Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder of Gut-brain axis impairment with subclinical inflammation. Its diagnosis based on mainly patient history .There is no specific biochemical test for its diagnosis. This study is to compare novel inflammatory markers derived from hemogram between IBS group and Healthy control group. **Material and Method:** The platelet distribution width (PDW), Neutrophil to lymphocyte ratio (NLR) and Platelet to lymphocyte ratio (PLR) of patients of irritable bowel syndrome (IBS) diagnosed as per Rome IV criteria over a duration of one year compared with healthy population. **Result:** PDW value was higher in IBS group than control group i.e. 16.5±1.2 and 15.1±1.8 respectively which was statistically significant. Similarly NLR value of IBS group was higher than control group i.e. 2.32±0.4 and 1.7±0.32 respectively which was also statistically significant. The PLR value of IBS group was 134±48 and control group was 120±42 with p< 0.05. **Conclusion:** PDW, NLR and PLR could be inflammatory novel marker to differentiate between IBS and healthy people .These tests can be supportive to clinical diagnosis

KEYWORDS

irritable bowel syndrome (IBS), Neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR) and platelet distribution width (PDW).

INTRODUCTION

Irritable bowel syndrome (IBS) is a chronic disorder of gut-brain interaction(1). It is a functional gastrointestinal disorder. Previously it was diagnosed as diagnosis of exclusion but now it is diagnosed with positive diagnostic strategy (2). As per Rome IV criteria patients with IBS should report symptoms of abdominal pain at least once weekly (on average)in last 3 month in association with a change in stool frequency, a change in stool form, and/ or relief or worsening of abdominal pain related to defecation (3).IBS has four subtypes based on pattern of stool form i.e. IBS with constipation(IBS-C), IBS with diarrhea(IBS-D), mixed IBS(IBS-M) and unclassified IBS(IBS-U) . IBS has a significant impact on patients' quality of life and it is also causing great burden to health care system. A recent population-based survey using census-adjusted Rome IV functional bowel disorders reported that prevalence of IBS in Western countries ranges from 4.4%-4.8% and it is female predominant (4). Prevalence of IBS in India is 4.2%-7.5%(5).

The pathophysiology of IBS is not well understood. It is traditionally considered a multifactorial disorder with impaired brain-gut function, altered intestinal motility and visceral hypersensitivity (6). Although IBS is considered a noninflammatory disease but studies suggest a possible role for alterations in the intestinal immune function and low grade inflammation in its pathogenesis (7). IBS diagnosed based on symptoms and with exclusion of organic causes. But till now there is no specific biochemical or radiological investigation for diagnosis of IBS. Neutrophil-to-lymphocyte ratio (NLR), Platelet-to-lymphocyte ratio (PLR) and Platelet distribution width(PDW) are suggestive of inflammatory predictor of certain diseases like Chronic obstructive pulmonary disease, rheumatoid arthritis and Crohn's disease (CD) –"–(810).So these hemogram parameters may be abnormal in IBS.

The purpose of this study is to compare NLR, PLR and PDW of IBD Patients with healthy volunteers.

MATERIALAND METHODS

This study was conducted from January 2021 to December 2021 at Rajiv Gandhi Government General Hospital; Chennai in the Department of Medical Gastroenterology. Patients diagnosed an IBS according to Rome IV criteria included in IBS group. Outpatients without any co morbidities came for routine checkup were kept as healthy control group. Subjects with age less than 18 years, psychiatric disorder, rheumatic disorder, inflammatory bowel disease, chronic kidney disease and with malignancy excluded from the study. Detail history was taken and physical examinations were done in detail.

Complete blood count (CBC) was analyzed by using automated analyzer within 24 hours. Other routine investigation like serum urea, Creatinine, Liver function test, Thyroid function test and stool examination was done. Hemoglobin (Hb) , total platelet count(TPC), PDW, absolute Neutrophil count and absolute lymphocyte count were obtained from CBC .NLR and PLR were calculated by division of Neutrophil count and platelet count by lymphocyte count respectively.

STATISTICALANALYSIS

Data were entered in MS Excel sheet and analysis was done using SPSS 21.0 version. Data were presented as Mean and standard deviation or Median and interquartile range (Non-parametric) for continuous variable and as percentage for categorical variables. Unpaired t test was done to compare two group means and Mann Whitney U test was done to compare two groups of medians. Chi-square test was done to find out association between categorical variable. P value of less than 0.05 was considered significant.

RESULT

Total 190 patients were diagnosed to have IBS according to Rome IV criteria .15 patients were excluded from the study after applying exclusion criteria. Total 175 patients were included in IBS group. Control group consisted 164 healthy volunteers. The mean age of IBS group and control groups were 35.4±4.23 and 34.2±0.34 years respectively (p=0.62). There were 110(62) female and 65(38%) male in IBS group .In control group 115(70%) were female and 49(30%) were male.

CBC parameters like hemoglobin, total leukocyte count, absolute Neutrophil count, absolute lymphocyte count and total platelet count were not statistically significant between IBS group and control group. But PDW value was higher in IBS group than control group i.e. 16.5±1.2 and 15.1±1.8 respectively which was statistically significant. Similarly NLR value of IBS group was higher than control group i.e. 2.32±0.4 and 1.7±0.32 respectively which was statistically significant. The PLR value of IBS group and control group were134±48 and 120±42 respectively, which was also statistically significant (Table-1).

TABLE 1: Basic characteristics of patients

Parameter	IBS Group	Control Group	P
Age(years)	34.5±4.24	34.2±7.34	0.62
Female	110(62%)	115(70%)	0.29
Male	65(38%)	49(30%)	0.24
TLC-Median(IQR)	7800	6900	0.32

Hb(Mean ± SD)(gm/dl)	12.2±2.3	12.8±2.1	0.15
Neutrophil(Mean± SD)(×109/L)	4.42 ±1.5	4.02±1.2	0.31
Lymphocyte(Mean ± SD) (×109/L)	2.47±0.67	2.69±0.7	0.22
Platelet (Mean ± SD) (×109/L)	354,764±8.81 1	301,401±6.11	0.28
PDW (%)	16.5±1.2	15.1±1.8	0.012
NLR (%)	2.32±0.4	1.7±0.32	0.031
PLR (%)	134±48	120±41	0.014

(IBS- Irritable Bowel Syndrome, TLC-Total leukocyte count, PDW-Platelet Distribution width, NLR –Neutrophil lymphocyte ratio, PLR- Platelet lymphocyte ratio, SD-Standard deviation, IQR-Interquartile range)

DISCUSSION

In this cross sectional study there was no significant difference of total number patient, male, female and age between IBS group and Control group. Total leukocyte counts, absolute Neutrophil counts, absolute lymphocyte counts and total platelet counts were not significantly different between the two groups. Other important outcome of this study is that parameters like NLR, PLR and RDW were higher in IBS group than Control group which was statistically significant. Elevated NLR and PLR could be due to either decrease in absolute lymphocyte count or increase in Neutrophil count and platelet count. So increase Neutrophil and platelet count indicate systemic inflammation and contribute to innate and adaptive immune response

Study conducted by Cagri Akalin et al showed that both NLR and PLR was high in IBS-C group compared to control group but only difference of NLR between two group was statistically significant . Similar study conducted by Guclu et al found that NLR as a reliable, precise indicator of inflammation in constipation-predominant IBS patients, was slightly elevated and statistically significant compared to the control group (11).Gulati et al study showed that in IBS group inflammatory marker like PDW, NLR, PLR and Monocyte to lymphocyte ratio(MLR) higher in IBS group than control group which was statistically significant(12)

Limitation of the study is small sample size and single center study. NLR and PLR not specific to IBS, it may increase in other condition also. Exclusion criteria applied was based on patient history of patient along with limited blood and stool examination and invasive procedure like Colonoscopy was not done.

CONCLUSION

So PDW, NLR and PLR could be inflammatory novel marker to differentiate between IBS and healthy people .These biomarker has advantage of being routinely available, noninvasive and low cost. And it needs further prospective study with large sample size.

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