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Original Research Article

A study on clinical profile of patients with ulcerative colitis and association of neutrophil-lymphocyte ratio with disease severity

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ABSTRACT

Background: Ulcerative colitis (UC) is an immune mediated chronic inflammatory condition. Systemic inflammatory conditions like UC are associated with increased WBC count and inflammatory markers. A growing body of evidence suggested that neutrophil-lymphocyte ratio (NLR) is a useful bio-maker of systemic inflammatory response.
Methods: An observational study was carried out at department of digestive health and diseases, government Kilpauk medical college, Chennai, from October 2020 to September 2021. All the patients diagnosed as UC were included. Age and sex matched controls were included. Clinical details and colonoscopic findings and laboratory values including WBC, ESR, NLR were noted and analyzed.
Results: A total of 70 patients of UC came during this period. The 32 patients had active UC and 38 patients had inactive UC. 40 age and sex matched controls were included. Mean age of the patients with UC was 40.76±9.81 years. Out of UC cases, 58.57% were females. Maximum patients presented with bloody diarrhoea (88.57%) and left sided colitis was more common (41.43%). On analyzing laboratory values, the NLR values of active UC group were significantly elevated compared with those of the patients with inactive UC and controls (2.84±0.66, 2.05±0.21 and 1.60±0.25 respectively) $p<0.001$.
Conclusions: UC is an inflammatory condition with bloody diarrhoea as the primary presenting symptom. NLR was significantly elevated in patients with active disease. NLR is a useful biomarker of systemic inflammatory response and it maybe a promising marker of disease severity in UC.

Keywords: UC, NLR, Inflammation, Bloody diarrhoea

INTRODUCTION

UC is an inflammatory bowel disease and it leads to chronic and relapsing gastrointestinal (GI) tract inflammation. Reportedly the incidence of UC has been increasing in Asia.[1] Early evaluation of the activity of UC can determine the treatment of patients and reduce the rate of operation and mortality.[2] Endoscopy remains the most important modality in diagnosis and treatment as well as follow-up of the patients with UC. Although endoscopic biopsy along with histopathological analysis remains the gold standard for diagnosis of UC, it is invasive and expensive.[3] So the need to have better and less invasive predictors of UC remains.

Systemic inflammatory conditions like UC are associated with increased inflammatory markers. C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), white blood cells (WBC), acid glycoprotein, platelet count and albumin are in common use but have only modest accuracy in reflecting UC disease activity.[4-6]

NLR is an effective marker of inflammation. NLR is superior to WBC in the prediction of adverse outcomes in a variety of inflammatory conditions. Extensive research

has considered NLR as a useful biomarker of systemic inflammation and prediction of mortality in some diseases as malignancy, including gastrointestinal malignancies.[7-10]

Our aim was to study the clinical profile of patients with UC and association of NLR with disease severity.

METHODS

The study was carried out at the department of digestive health and diseases, Kilpauk medical college, Chennai over a period of 1 year from October 2020 to September 2021. It was an observational study. All the patients coming to our hospital during this time period who were diagnosed as UC were included (70 patients). These patients were further classified into two groups as group 1-active UC (32 patients) and group 2-inactive UC (38 patients) according to modified Truelove-Witt's classification. Age and sex matched controls were included, which were labelled as group 3 (40 patients). Patients with any infections, hematological or neoplastic disorders, chronic renal failure, chronic liver or heart diseases or autoimmune diseases were excluded. The study was conducted after clearance from the institutional ethics committee. All patients were included in the study after obtaining an informed consent.

A detailed history was collected and a complete physical examination was carried out. Colonoscopic findings and laboratory values including WBC, ESR and NLR noted.

The disease was divided according to the site and extent of the colonic involvement as the following according to the Montreal classification: E1-ulcerative proctitis, E2-left side colitis and E3-extensive colitis or pancolitis.

The NLR was calculated from the differential count by dividing the absolute neutrophil count by the absolute lymphocyte count.

All data was collected and tabulated in MS excel sheet. SPSS software was used for analysis of the data. Chi-square test and One way ANOVA test (for comparison between more than two groups) were used. $P<0.05$ was considered statistically significant.

RESULTS

A total of 70 patients of UC were included in the study. Out of these, 32 patients (45.71%) had active disease and 38 patients (54.29%) had inactive UC classified according to modified Truelove-Witt's classification. The 40 other age and sex matched healthy individuals were taken as controls (Figure 1).

The mean age of patients with UC was 40.76±9.81 years, with a range 26-60 years. Mean age in control group was 41.56±11.47 years.

Out of the 70 patients, 41 were females (58.57%) and 29 were males (41.43%) (Figure 2).

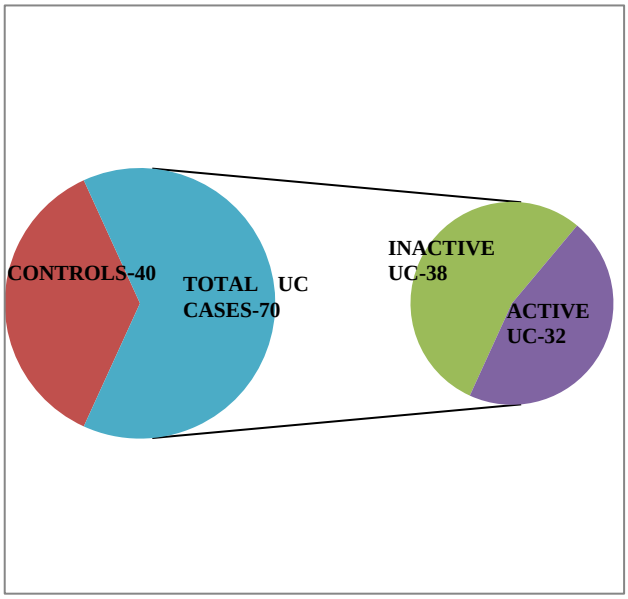

Figure 1: Patients included in the study.

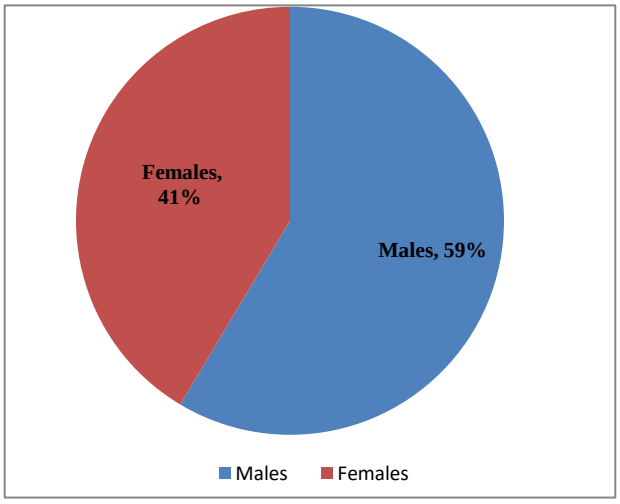

Figure 2: Distribution of UC cases according to gender (in percent).

Maximum patients, 71.43% had normal BMI, 11.43% were underweight and 17.14% fell into the category of overweight and obese. The 15 out of 70 were alcoholic and 17 out of 70 were smokers.

On history taking it was found that bloody diarrhoea was the commonest presenting symptom, seen in 62 (88.57%) patients. Other presenting symptoms were loss of weight (61.43%), mucous in stools (70%), pain abdomen (72.85%) and fever (21.43%) (Figure 3).

Extra-intestinal manifestations were seen in 28.57% patients. Peripheral arthralgias were the most common extra intestinal manifestation.

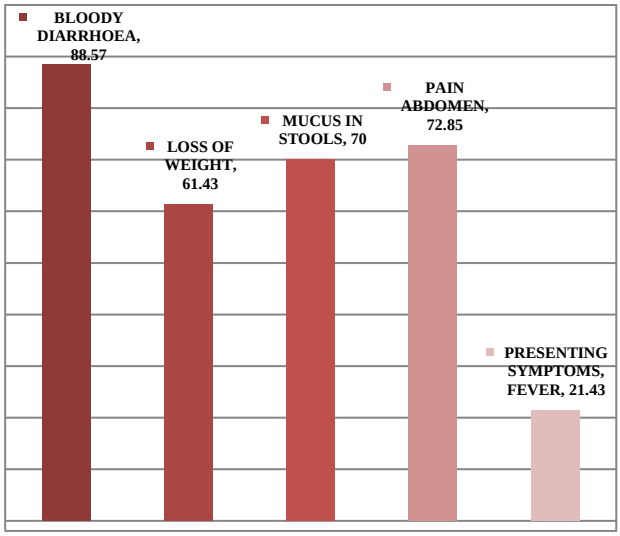

Figure 3: Presenting symptoms in patients of UC in percentage.

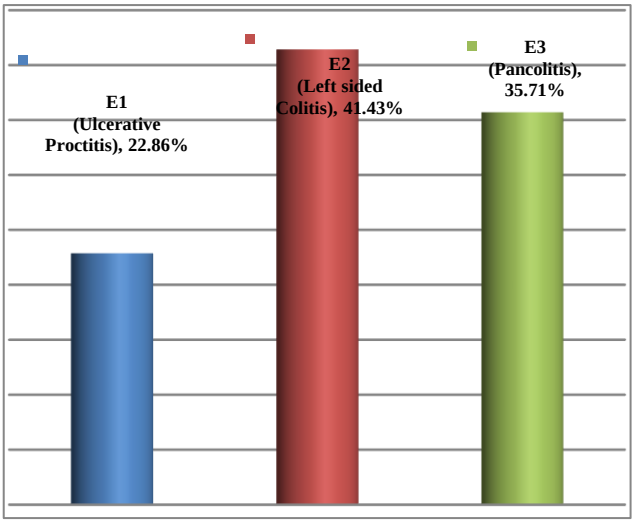

Figure 4: Percentage of cases according to Montreal classification.

The disease was divided according to the site and extent of the colonic involvement as the following according to the Montreal classification: E1-ulcerative proctitis, E2-left sided colitis, and E3-extensive colitis or pancolitis. It was found that 22.86 % patients had ulcerative proctitis (E1), 41.43% had left sided colitis (E2) and 35.71% patients had pancolitis (E3) (Figure 4).

Laboratory parameters including WBC count, ESR, absolute neutrophil count and absolute lymphocyte count were noted and analyzed.

The NLR was calculated from the differential count by dividing the absolute neutrophil count by the absolute lymphocyte count.

It was found that WBC count was significantly elevated in UC patients. Mean WBC count in active, inactive and control group were 10326.25±2592.07/mm^3, 8712.11±713.63/mm^3 and 6628.41±1009.17/mm^3. Mean ESR value in active UC cases was 24.25±6.14 mm/hr, in inactive group 17.84±4.66 mm/hr and in controls 10.16±4.24 mm/hr (Table 1).

Table 1: Mean values of laboratory parameters in UC patients and controls.

Parameters	Active UC	Inactive UC	Controls	P value
WBC	10326.25±2592.07	8712.11±713.63	6628.41±1009.17	<0.001 (significant)
NLR	2.84±0.66	2.05±0.21	1.6±0.25	<0.001 (significant)
ESR	24.25±6.14	17.84±4.66	10.16±4.24	0.074 (not significant)

The NLR values of active UC group were elevated compared with those of the patients with inactive UC and controls and the mean values of NLR were 2.86±0.68, 2.05±0.21 and 1.60±0.24 respectively. And were found to statistically significant (p<0.001) (Figure 5).

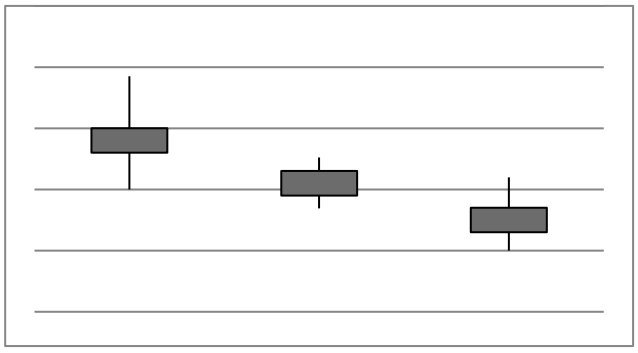

Figure 5: Mean values of NLR in active UC, inactive UC and control group.

DISCUSSION

UC is an inflammatory bowel disease and it leads to chronic and relapsing GI tract inflammation.

Endoscopy remained the most important modality in diagnosis and treatment as well as follow-up of the patients with UC. Although endoscopic biopsy along with histopathological analysis remained the gold standard for diagnosis of UC, it was invasive and expensive.[3] So the need to have better and less invasive predictors of UC remains.

The mean age of patients with UC in our study was 40.76±9.81 years, with a range 26-60 years. Other similar studies had mean age of patients 46±14.7 years Demir et al and 38.9±14.8 years Jeong et al that was comparable to our study.[11,12]

Out of the 70 patients, 41 were females (58.57%) and 29 were males (41.43%). Female preponderance was also seen in a study by Okba et al in which 57.5% patients of UC were females.[13]

Maximum patients in our study, 71.43% had normal BMI, 11.43% were underweight and 17.14% fell into the category of overweight and obese. A study by Mendall et al 2019, concluded that low BMI in young men was associated with an increased risk of UC.[14] Rahmani et al in a meta-analysis concluded that no difference in risk of UC was seen in patients with normal BMI, obesity or underweight.[15]

Bloody diarrhoea was the commonest presenting symptom, seen in 62 (88.57%) patients. Extra-intestinal manifestations were seen in 28.57% patients. In a study by Dignass et al the primary presenting symptom of UC was visible blood in the stools, which was reported by more than 90% of UC patients.[16]

In our study, it was found that 22.86% patients had ulcerative proctitis (E1), 41.43% had left sided colitis (E2) and 35.71% patients had pancolitis (E3). In a study by Jeong et al maximum patients 41.7% had pancolitis (E3).[12] In another study by Okba et al maximum patients had left sided colitis (E2).[13]

It was found that WBC count was significantly elevated in UC patients in this study. It was consistent with study by Jeong et al and Okba et al.[12,13] No significant elevation in WBC count was seen in a study by Demir et al.[11] The NLR values of active UC group were elevated compared with those of the patients with inactive UC and controls were 2.86±0.68, 2.05±0.21 and 1.60±0.24 respectively and were found to statistically significant ($p<0.001$). Recent studies also demonstrated that the NLR was higher in patients with active UC.[17-19] Various studies conducted in different parts of world found that NLR was higher in active UC cases. Demir et al conducted a study in Turkey and found that in Active UC cases the value of NLR was 2.59±1.47.[11] In an Egyptian study, Okba et al obtained NLR value of 2.63±0.43.[13] A recent study published by Jeong et al from South Korea, found that NLR was significantly elevated in active UC patients with a value of 3.24±2.78.[12] The findings of our study were consistent with these studies.

According to a meta-analysis by Ma et al published in 2021, the best cut-off points for the NLR ratio of UC during the active period ranges from 1.91 to 3.10.[20]

NLR was an effective marker of inflammation and it maybe a promising marker of disease severity in UC.

CONCULSION

UC is an inflammatory condition with bloody diarrhoea as the primary presenting symptom. Extra-intestinal manifestations were seen in significant number of patients among those peripheral arthralgias were most common. UC is associated with increased WBC count and inflammatory markers. NLR was significantly elevated in patients with active disease. We concluded that NLR is a useful biomarker of inflammatory response and it maybe promising marker of disease severity in UC.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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