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Original Research Article

Analysis of the relation between elevated neutrophil lymphocyte ratio, and erythrocyte sedimentation rate in *Helicobacter pylori* positive chronic gastritis patients

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ABSTRACT

Background: Aim of the study was to analyse the relation between elevated neutrophil lymphocyte ratio (NLR), and erythrocyte sedimentation rate (ESR) in *Helicobacter pylori (H. pylori)* positive chronic gastritis patients, as compared to the control group containing *H. pylori* negative chronic gastritis patients.
Methods: Chronic gastritis patients were segregated in equal numbers based on *H. pylori* status. NLR was calculated, and ESR noted from the observations, comparison was done between the control and the study groups.
Results: A total of 100 patients were included in the study. The 50 each from the control and study group. An observation of elevation in NLR and ESR in *H. pylori* positive chronic gastritis patients, as compared to the control group was seen. With an average NLR of 2.43 and 1.43, in the control and study group, respectively.
Conclusions: Raise in NLR in *H. pylori* positive chronic gastritis patients with an associated raise in ESR suggests, the severity of the infection and the need for eradication and prevent complications.

Keywords: *H. pylori*, Chronic gastritis, NLR, ESR

INTRODUCTION

H. pylori infection is one among the most prevalent infections in humans, with significant course of morbidity and mortality, it can cause acute as well as chronic gastritis. More prevalent in the developing countries than the developed countries, considering the prevalent ethnic, environmental, geographical location, sanitation conditions in a country like ours. It is a gram negative, spiral shaped bacterium, with predilection for growth in the gastric antral mucosa, due to increased mucus secreting areas in stomach favoring its growth. *H. pylori* is known to cause 90% of duodenal ulcers and 80% gastric ulcers.

It is well known to be the causative agent in chronic gastritis, which results in hypochlorhydria or achlorhydria resulting in inflammation and neutrophilic infiltration in the lining mucosa.[1] This acute gastritis can progress to form chronic active gastritis that is histologically identified with predominance of lymphocytes plasma cells, and macrophages.[2] Hypochlorhydria and achlorhydria in long run can progress to atrophic gastritis, causing proximal migration of the bacteria, causing multifocal gastritis, resulting in intestinal metaplasia, and cancer.[3] Thus, early diagnosis and eradication of *H. pylori* is important. The diagnostic tests can be categorized as invasive and non-invasive based on the need for endoscopy. Neutrophils and lymphocytes, ESR are among simple and reliable indicators of response to infection, inflammation. They represent innate and adaptive immune system, respectively. Thus, we studied the relationship between raised NLR and ESR in patients with chronic gastritis, who tested positive for *H. pylori*, confirmed through biopsy obtained from esophagoduodeno-scopy.

Inclusion criteria

Patients with aged above 18 years of age, with no gender preference, history of epigastric discomfort, nausea, vomiting, anorexia, bad breath, bloating and symptoms refractory to treatment were included in the study.

Exclusion criteria

Patients with upper gastrointestinal-scopy findings of gastrointestinal hemorrhage, gastric and duodenal ulcer, portal hypertension, diabetes mellitus, systemic diseases and chronic diseases, and nonsteroidal anti-inflammatory drug users, were excluded from the study.

METHODS

This is a retrospective study, conducted in Saveetha medical college and hospital in the department of medical gastroenterology. Sample size was calculated keeping unlimited population size equation, with confidence interval of 95%. The 106 patients of the age 18-80 years, with no gender, race specificity.

The 56 patients, age, sex matched, with dyspeptic symptoms, were used as control group. The 50 patients with chronic gastritis with biopsy confirmed *H. pylori* status were recruited for the study. Patients with uncontrolled hypertension, uncontrolled diabetes, renal failure, hepatic failure, coronary artery disease, immunosuppressant therapy, chronic systemic inflammatory disease, upper or lower gastrointestinal bleeding, bronchial asthma, were all excluded. Complete blood count and viral markers were routinely done in all the patients prior to esophagoduodenoscopy.

Ethical approval

The study was conducted retrospectively, based on data obtained from chronic gastritis patients, tested *H. pylori* positive, who underwent esophagoduodenoscopy. Ethical approval was not necessitated as the study was conducted retrospectively, from data that was available.

However, informed consent was obtained from all the patients prior to endoscopy (OLYMPUS CV-150) and biopsies were taken from the antrum by an experienced gastroenterologist, and sent for interpretation and detecting of *H. pylori* by experienced pathologist. Patients in the control group had no evidence of *H. pylori* growth in the biopsy taken from the gastric mucosa. NLR was obtained from complete blood count, analysed in patients with chronic gastritis with *H. pylori* positive status.

Statistical analysis

Data of patients who complied with the study criteria, were included in the study, between March 2022 and June 2022. A total of 106 Patient's data were collected retrospectively, compiled using MS excel for windows 365 version, descriptive statistic tool was used for statistical analysis. The results were compiled on a pie chart to obtain graphical representation.

RESULTS

Of the 50 patients who had tested positive for *H. pylori*, in the study group 24 were females and 26 were male. The 56% (28 out of 50) had raised NLR, 32% (16 out of 50) had raised ESR. It was observed that 74% (37 out of 50) of the affected population was women. 70% (35 out of 50) of the affected population was in the age group of 25-35 years, implying the early age of acquiring the infection.

In the control group, all 56 patients with chronic gastritis tested negative for *H. pylori* in the biopsy obtained via endoscopy.

The 30 females and 26 males, with similar age group distribution as in the study group were recruited. The 18% (10 out of 56) had raised NLR, there was no observation of raised ESR in the control group. The 60% (34 out of 56) of the raised NLR was observed in the female population.

Table 1: Gender wise group distribution.

H. pylori status with raised NLR	Male	Female
Positive	5 (26)	10 (24)
Negative	2 (26)	4 (30)

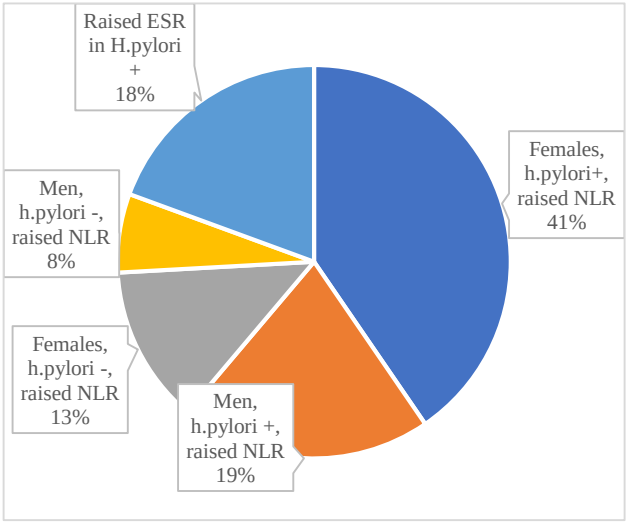

Figure 1: NLR and ESR in *H. pylori* positive and negative patients.

DISCUSSION

H. pylori infection is well known to be associated with the development of precancerous lesions such as chronic atrophic gastritis (AG), or gastric intestinal metaplasia (GIM), and cancer. Although *H. pylori* is a non-invasive organism, because of the antigenic substances it produces, such as heat shock protein, urease, and lipopolysaccharide,

it activates T cells. With an improved antigen presentation, IL-1, IL-6, IL-8, inflammatory cytokines, such as tumour necrosis factor-alpha (TNF-alfa), are released. In addition to that, B-cell response is produced both locally and systemically.[12] The person-to-person transmission of this infection is thought to occur *via* multiple routes: fecal-oral,as well as environmental transmission through a contaminated water supply.[4]

One hypothesis is the potential increase in oral-oral transmission of this infection due to the "family-style" sharing of meals and plates etc. typical in Asian countries, as stated by Axon et al.[5] Diagnostic testing for *H. pylori* can be divided into endoscopic and non-endoscopic techniques. The techniques could be direct (culture, histology, or detection of bacterial antigen in the biopsy tissue or stool) or indirect (using urease breath test, or an antibody response as a marker of disease). The choice of a suitable test depends upon a variety of issues such as cost, accessibility, clinical situation, any family history of gastric cancer. *H. pylori* on a human host stimulates neutrophils and many other pro inflammatory cytokines, that cause gastric mucosal injury. NLR and ESR are non-invasive, inexpensive reliable indicators of infection and inflammation, that can be done in OPD basis, to identify or suspect *H. pylori* infectivity in patients with chronic gastritis. *H. pylori* related chronic gastritis is defined histologically by lymphoid follicle hyperplasia, intestinal metaplasia, and varying degrees of neutrophil infiltrations within the lamina propria.[6,7] significant correlation exists between *H. pylori* count in the mucosa and severity of tissue inflammation.[8]

On reviewing the literature, In a study conducted, by Nalbant et al upper gastrointestinal endoscopy was performed in 91 patients with dyspeptic patients, an observation that reduction in the number of neutrophils, lymphocytes, and NLR, in *H. pylori* positive patients, was seen.[9] In a similar study conducted by Asil et al in a larger group of patients, 286 had chronic gastritis with positive *H. pylori* growth, and 130 as the control group with negative growth, the observed that *H. pylori* positive group had a higher NLR level compared to the control group, and also a decline in NLR ratio, post eradication of *H. pylori*.[10] A more complex study, was performed on 3 groups of patients, HP-positive gastritis, HP-negative gastritis, and patients with no pathologic findings and the histopathologic examination, proved that both mean neutrophil count and NLR were higher in HP-positive patients.[11] the results in our study were consistent with as observed in the literature. the NLR ratio was observed to be elevated in *H. pylori* patients as compared to the control group. in the sub group analysis, an observation that young adults of the age 25-35 years were affected, there was also an observation of female preponderance to the disease.

Limitation

Our study had certain limitations. The study was performed in a retrospective manner. Data regarding prior use of proton pump inhibitors before visiting for esophagoduodenoscopy was not reviewed. Follow up of these patients with regard to improvement of symptoms following treatment was not done.

CONCLUSION

This is the first study conducted in South Asian population, on *H. pylori* associated chronic gastritis. We observed that there was an increased NLR in the study group as compared to the control group of *H. pylori* negative patients, as stated in the literature. We also observed an elevated ESR in patients with *H. pylori* positive chronic gastritis, which is a new observation, not documented elsewhere. Thus, an observation of raised ESR and inflammatory markers such as NLR in *H. pylori* positive chronic gastritis patients, highlights the active disease process and the severity, and necessitates eradication of *H. pylori* organism, preventing further complication.

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

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