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The frequency of nodular gastritis in adult patients and the relation of this type of gastritis with *Helicobacter pylori* and histopathologic findings

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ABSTRACT

Objectives: Endoscopic nodular gastritis is usually used to describe the miliary nodular appearance of the gastric mucosa during endoscopy. Recent studies have shown that nodular gastritis is closely related to *Helicobacter pylori* (*H. pylori*) infection and may cause stomach cancer, especially in young women. We aimed to determine the frequency of nodüler gastritis in this study, other lesions seen during endoscopy, *H. pylori* frequency and histopathological findings.

Methods: Adult patients who underwent endoscopy between March 2015 and April 2017 were identified. Medical records of patients; demographic characteristics, endoscopic features and pathologic were investigated retrospectively. Patients with nodular gastritis were compared with age and gender matched control group.

Results: Of the 1877 patients evaluated, 39 patients with endoscopic nodular gastritis and 72 as control group were enrolled. The prevalence of *H. pylori* infection was significantly higher in patients with endoscopic nodular gastritis than in the control group (74.35% versus 63.88, $p < 0.0001$). The most common concurrent endoscopic findings were erosions (25.64%). Histopathologically, the prevalence of atrophic gastritis and intestinal metaplasia in the patients with endoscopic nodular gastritis was also higher than in the control group ($p < 0.05$).

Conclusions: Nodular gastritis is often caused by chronic *H. pylori* infection. It is observed more frequently in women and children. Most patients with *H. pylori* infection have no specific symptom or complication, but some patients may develop premalign conditions such as active gastritis, atrophic gastritis and intestinal metaplasia. For this reason, *H. pylori* eradication in patients with nodular gastritis may reduce the development of peptic ulcer and possibly gastric malignancy.

Keywords: *Helicobacter pylori*, nodular gastritis, atrophic gastritis, metaplasia

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Helicobacter pylori (*H. pylori*) is a gram-negative bacteria which has the ability to be colonized in and to infect the stomach. After feco-oral transmission, the bacteria pierces the mucous membrane of the stomach and settles on the luminal surface of the stomach, then causes an intense inflammatory response.

H. pylori infection is strongly associated with the risk of stomach cancer. Stomach cancer rates vary between countries. These differences can be explained by the variability in the *H. pylori* genotypes and their variability in the expression of the cagA and vacA genes (virulence genes associated with the develop-

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ment and progression of gastric atrophy). It is known that CagA-positive *H. pylori* infection is responsible for various gastric diseases such as chronic gastritis, gastroduodenal ulcers, mucosa associated lymphoid tissue lymphoma, immunological thrombocytopenia and stomach cancer [1]. It is known that there are precursor lesions as superficial gastritis-atrophic gastritis-intestinal metaplasia-gastric displasia before stomach cancer occurs [2].

Endoscopic nodular gastritis is usually used to describe the miliary nodular appearance (similar to chicken skin) of the gastric mucosa during endoscopy. There is no consensus about the precise endoscopic definition of nodular gastritis and whether it can be classified as an acute or chronic lesion. Nodular gastritis is a well-known, common form of *H. pylori* infection in children. It characterized by the pathologically distinct lymphoid follicles in the stomach antrum and the infiltration of mononuclear cells. Macroscopic nodularity is thought to be a reflection of the presence of these lymphoid follicles [3-4]. Recent studies have shown that nodular gastritis is closely associated with *H. pylori* infection and may cause stomach cancer, especially in young women [5].

In this study, it was aimed to determine the frequency of nodular gastritis and the relationship of this gastritis with *H. pylori* among adult patients who were evaluated endoscopically in our clinic; and at the same time, it is aimed to reveal the demographic data and associated histopathological findings of patients with nodular gastritis.

METHODS

A total of 1877 adult patients underwent endoscopy between March 2015 and April 2017 were identified. The medical records were retrospectively reviewed regarding the demographic characteristics, clinical features, endoscopic features and pathologic features of the patients. Thirty-nine patients with nodular gastritis were included in the study. Endoscopic nodular gastritis was defined as a miliary nodular appearance in the antrum and/or corpus of the gastric mucosa on the endoscopy. The control group consisted of 72 randomly selected patients whose biopsies were taken and had an endoscopic appearance of 3 normal. All endoscopic procedures were performed by a specialist gastroenterologist with a high resolution white light source endoscopy instrument (Olympus). Two biopsies from the antrum and two biopsies from the corpus were taken from all patients in the control group with endoscopic nodular gastritis. Biopsy specimens were fixed in 10% formalin and transferred to the laboratory under appropriate conditions. Giemsa, and hematoxylin and eosin staining were performed to detect *H. pylori* histologically.

Statistical Analysis

Comparisons between the two groups were analyzed using chi-square test for categorical variables and t-test for continuous variables. Two-way $p < 0.05$ values were considered statistically significant. Statistical analyzes were performed with SPSS 15.0. The proportions of pathological lesions were adjusted according to gender and age, and analyzed with logistic regression.

RESULTS

The mean age of the patients with endoscopic nodular gastritis and control group was 47.19 ± 15.32 years and 46.72 ± 14.26 years, respectively. Patient ages ranged from 17 to 91 years. In the study group 14 (35.89%) males and 25 (64.10%) females were detected.

In adults who underwent endoscopy, the incidence of nodular gastritis was 1.97% (39/1877). Histological *H. pylori* infection was detected in 74.35% of patients with endoscopic nodular gastritis, whereas this rate was 63.88% in the control group. The prevalence of *H. pylori* infection was significantly higher in patients with endoscopic nodular gastritis than in the control

Table 1. Endoscopic findings accompanying gastric nodules.

Endoscopic findings	n	%
Erosion	10	25.64
Bulbit	9	23.07
Duodenal ulcer	4	10.25
Gastric ulcer	1	2.56
Gastric polyp	1	2.56

Table 2. Histopathological findings

	Study group n = 39	Control group n = 72
Atrophic gastritis	2 (5.12%))	2 (2.77%)
Intestinal metaplasia	3 (7.69%)	2 (2.77%)
Dysplasia	-	-
Lymphoid follicle	12 (30.76%)	11 (15.27%)

group ($p < 0.0001$).

Regarding the endoscopic findings in 39 patients with nodular gastritis, noduls were found in 27 (69.23%) patients in the antrum and in 12 (30.76%) patients in the other regions in addition to antrum. Duodenal ulcer was found in 4 (10.25%) patients, gastric ulcer in 1 (2.56%) patient and erosive gastritis in 10 (25.64%) patients. In 9 (23.07%) of the patients bulbitis besides gastritis was detected. One (2.56%) patient had gastric polyps. There was no appearance suggesting atrophy, metaplasia or stomach cancer (Table 1).

In the histopathological examination, the rate of atrophic gastritis in endoscopic nodular gastritis patients and control group were 5.12% (2/39) and 2.77% (2/72), respectively. Intestinal metaplasia was detected in 7.69% (3/39) of patients with endoscopic nodular gastritis, but only 2.77% of the control group had intestinal metaplasia findings. These findings were statistically significant ($p < 0.05$). Lymphoid follicle formation was higher in patients with nodular gastritis (30.76%) than in the control group (15.27%) ($p < 0.05$) (Table 2). Displasia was not found histopathologically in neither the study group nor the control group.

DISCUSSION

While the prevalence of nodular gastritis in this study was 1.97%, Chen *et al*. [6] reported a rate of 2.9%; Miyamoto *et al*. [7] 0.19%; Önal İK *et al*. [8], 1.86%; Maghidman *et al*. [9] 7.2%. These differences in proportions may be due to sample selection. Symptomatic patients were taken in our study; studies reporting a lower prevalence rate also included symptomatic and asymptomatic individuals during endoscopy. Other reasons for variability in prevalence may be related to study design, host, bacterial or environmental variables. On the other hand, there is no common definition for the endoscopical appearance of nodules and the term "nodular gastritis" needs to be clarified further. The great difference in nodular gastritis prevalence in various studies may be mainly due to this subjective definition of endoscopists instead of different *H. pylori* prevalence among study groups.

As in previous studies [6-10], we have seen that female patients are affected more than men. The incidence of *H. pylori* infection does not differ according to sex, but the high proportion of women corresponds to this idea. However, it supports the hypothesis that the result of *H. pylori* infection may be related to a sex-specific host immune factor [11].

Previous studies have reported *H. pylori* positivity in 67-98.5% of patients with nodular gastritis [6-10].In our study, the prevalence of *H. pylori* in patients with nodular gastritis was 74.35% which is higher than the control group (63.88%). Several studies suggest that the presence of antral nodularity is highly indicative of *H. pylori* infection. Similarly, it has been suggested that the specificity and the positive predictive value of nodular gastritis for *H. pylori* infection are high [12,13]. For this reason, endoscopically detected nodular gastritis may be indicative of the possibility of *H. pylori* infection.

In this study, atrophic gastritis and intestinal metaplasia were more frequent in patients with endoscopic nodular gastritis. Dysplasia is not detected in neither of the groups. These results were consistent with the literature [8-10, 14-16].

Our study revealed that the formation of lymphoid follicle and/or aggregate was more frequent in patients with *H. pylori* positive nodular gastritis. In a series of 261 patients, Maghidman *et al*. [9] found that nodular gastritis was not associated with the presence and

number of lymphoid follicles. In contrast, Sokmensuer *et al*. [14] have shown that intraepithelial lymphocytosis is more prominent in nodular gastritis patients and may contribute to nodule formation. Rafeey *et al*. [15] have shown that nodular gastritis frequency is associated with the presence, density and histological grade of gastritis of *H. pylori* infection. Nodularity is probably associated with the intensity of *H. pylori* at the onset of infection, so large inoculations trigger an exaggerated immune response [16]. *H. pylori* is predominantly acquired in childhood and nodular gastritis is often found in children who undergo endoscopy [12, 15]. However, nodular gastritis is present in the minority of adult patients with *H. pylori* infection. It is not clear how and why this particular model develops in only a small part of adult patients. Variations in bacterial strains, host factors, or complex interactions between host and bacterial factors have all been considered as explanations [17].

In this study, none of the patients had stomach cancer. Recent studies have shown that nodular gastritis is closely associated with *H. pylori* infection and may cause gastric cancer in young women in particular [5]. The prevalence of premalign lesions such as atrophic gastritis and metaplasia was higher than that of non-nodular gastritis group, although dysplasia was not detected in this study. These results were consistent with other studies in the literature [5, 8-10, 16, 17]. On the other hand, the high prevalence of *H. pylori* infection in histologic premalign lesions and in cancer patients has been described [17, 18]. For this reason, *H. pylori* infection may be one of the possible causes of histologic premalign lesions in endoscopic nodular gastritis patients.

CONCLUSION

Nodular gastritis is caused by chronic *H. pylori* infection. They are more common in women and children. Patients infected with *H. pylori* at an early age do not have a specific symptom or complication in the majority, but some patients may develop premalign conditions such as active gastritis, atrophic gastritis and intestinal metaplasia. For this reason, *H. pylori* eradication in patients with nodular gastritis possibly reduces the risk of peptic ulcer and gastric malignancy. The definition and clinical significance of nodular gastritis and associated histopathology will become clearer with prospective long-term follow-up studies, including a large number of patients.

Conflict of interest

The author disclosed no conflict of interest during the preparation or publication of this manuscript.

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