Correlation between the ABO blood group system and gastritis

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ABSTRACT

Introduction: *Helicobacter pylori* (HP) infection and environmental factors are important risk factors for gastritis. Studies show a correlation between the ABO system and gastrointestinal diseases. **Aims:** To characterize the sociodemographic profile of patients with gastritis and HP and its correlation with the ABO blood group system. **Materials and methods:** Prospective and descriptive study, carried out in Aracaju, Sergipe, Brazil, from April / 2018 to May / 2019. Samples were collected from 133 patients who underwent upper digestive endoscopy, histopathological analysis, and blood typing. Out of which, 93 patients were diagnosed with gastritis. A sociodemographic and clinical questionnaire was also used. Data analyzed by RCore Team 2019 and submitted to descriptive and inferential analyzes. **Results:** Average age 53.7 (SD 17.4) with 48 (51.6%) being male (p = 0.018), 56 (65.9%) brown, 45 (52.9%) married and 33 (35.5%) pursuing permanent jobs. Fifty-nine patients (63.4%) out of those with gastritis were blood type O. Among the types of gastritis, 31 (33.4%) were mild enanthematous and 16 (51.6%) of these were type O. There was a prevalence type O in all degrees of inflammatory activity. *H. pylori* were detected in 29 (31.2%) patients; the most prevalent phenotype being the moderate and severe degrees of infection. **Conclusion:** Men were mostly affected by gastritis, regardless of the type according to the Sydney classification. The blood phenotype O was more prevalent in patients with gastritis, in those who had inflammatory activity at histology and in patients with moderate, and severe *H.pylori.*

Key words: Epidemiology; Gastritis; Helicobacter pylori; ABO Blood Group System.

INTRODUCTION

Gastritis, inflammation of the mucous lining of the stomach, promotes changes in the stomach lining [1]. Its etiology is multifactorial and can be classified as acute or chronic activity, pathogenicity mechanism, histological characteristics and anatomical location [2].

Most classification systems distinguish the acute short-term illness from the long-term chronic one. The terms "acute" and "chronic" are also used to describe the type of inflammatory cell infiltrate. The acute inflammation is represented by neutrophilic infiltration while the chronic one is characterized by mononuclear cells, mainly lymphocytes, plasmocytes and macrophages[1].

The *Helicobacter pylori* (HP), a gram-negative bacillus, is considered the main etiologic factor of gastritis. This bacterium has a universal distribution, with a prevalence of around 50% in the world population, affecting older ages mostly, its transmission occurs via oral-oral, fecal-oral and iatrogenic routes[3, 4].

Acute gastritis can be classified into three subtypes: related to infection by *Helicobacter pylori*; suppurative gastritis or by acute lesion of the gastroduodenal mucosa; secondary to the use of alcohol and medications, such as acetylsalicylic acid, anti-inflammatories, and corticosteroids[5]. Chronic gastritis occurs when there is a chronic inflammation of the gastric mucosa caused by environmental or autoimmune conditions and classified into HP gastritis, autoimmune atrophic gastritis, reactive gastropathy, multifactorial atrophic gastritis, idiopathic granulomatous gastritis, and eosinophilic gastritis[6].

Upon histopathological examination, chronic gastritis may present a large number of lymphocytes and plasma cells in the lamina. *H. pylori* gastritis can have a very characteristic aspect due to the presence of lymphoid follicles

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with the germinal center. In the presence of active infection by *H. pylori*, there may be neutrophilic elements that disappear with its eradication. However, the chronic inflammatory infiltrate disappears more slowly and may be present in gastric biopsies even after eradicating the bacteria[7].

In 1990, the Sidney System was created based on evaluating two interconnected classifications of gastritis, one endoscopic and the other histological. In 1994, this System was updated, based on nosological patterns of gastritis. The endoscopic classification is based on topography (pangastritis, gastritis of the antrum and gastritis of the body); category (enanthematous, flat erosion, high erosion, atrophic, hemorrhagic, reflux, mucous folds, hyperplastic); the degree of intensity (mild, moderate and severe). Therefore, endoscopic and histological exams are the main methods by which gastritis is diagnosed, using a detailed, systematic and standardized description of mucosal changes[8].

Blood groups can determine the susceptibility of some individuals to develop certain gastrointestinal diseases, depending on the types of blood phenotypes [9]. Individuals under blood group O are more likely to acquire HP bacteria and are more likely to develop inflammatory lesions in the gastric mucosa that trigger gastritis [10, 11].

Unveiling the mechanisms and elucidating the sociodemographic and diagnostic aspects of people with gastritis is a major challenge. Few studies seek evidence regarding the prevalence of the ABO-type blood system with gastritis and HP in addition to little epidemiological data on this disease, a fact that encourages further research. The current panorama of the influence of the ABO and HP system with gastritis reflects the need for preventive measures. This study aimed at presenting the sociodemographic and diagnostic characteristics of patients with gastritis and their correlation with the ABO blood group system.

MATERIALS AND METHODS

This is a cross-sectional, prospective and descriptive study conducted from April / 2018 to May / 2019, in Aracaju, Sergipe. Endoscopic and laboratory tests were performed to analyze the AB blood group system and the histopathological study of the gastric mucosa. The sample consisted of 133 patients who underwent upper digestive endoscopy, histopathological analysis and blood typing. Of this total, 93 patients of both sexes aged over 17 were diagnosed with gastritis through upper digestive endoscopy (EDA).

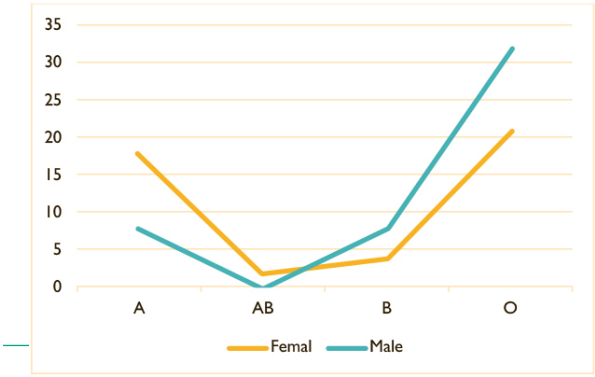
People with decompensated comorbidities and individuals who did not have cognitive conditions to understand the procedure and answer the research instrument were excluded. All participants answered a semi-structured questionnaire to analyze their sociodemographic and clinical profile before undergoing digestive endoscopy and blood collection.

The collection of the blood sample for the ABO blood group typing was performed before the endoscopic examination. They were prepared and performed according to the service protocol, being properly monitored for oxygen saturation and heart rate. The topical anesthetic was applied to the pharynx with 10% lidocaine spray hydrochloride. For intravenous sedation, fentanyl, midazolam, and propofol were used, administered progressively until reaching an adequate level of sedation. Fragments of gastric mucosa were obtained for the rapid urease test, being immersed in a medium containing urea and pH indicator, and for the histopathological study identifying the following regions: body, fundus and gastric antrum.

The R Core Team 2019 system was used. The data were submitted to descriptive analysis (simple frequency and percentage), mean and standard deviation and mean and inferential analysis; Pearson's chi-square test to assess the independence of qualitative variables and Mann-Whitney test for calculating central measurement differences. The significance level adopted at 5%. The TALE (Free and Informed Consent Form) and the TCLE (Free and Informed Consent Form) were signed by all the patients. Study approved by the Human Research Ethics Committee of Universidade Tiradentes - CEP / UNIT under opinion No. 2,522,849 (CAAE: 83071818.5.0000.5371).

RESULTS

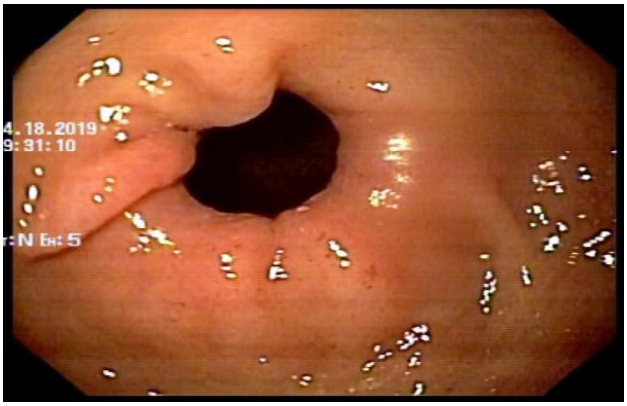
Results showed that 93 patients evaluated by the urease test for *H. pylori* research and blood sample to identify the ABO blood group system were diagnosed with gastritis. The average age was 53.7 (SD = 17.4) with 48 (51.6%) being male (p = 0.018) (Figure 1), 56 (65.9%) brown, 45 (52, 9%) married and 33 (35.5%) had permanent jobs.



Source: survey data, 2018-2019.

Figure 1: Classification of gastritis patients according to sex and ABO blood group system.

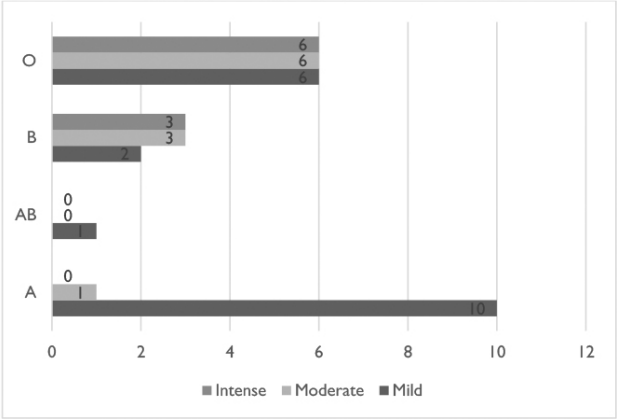
There was no statistical significance regarding the education background, residential area, smoking as well as legal or illegal drug use. Precisely 59 patients (63.4%), out of the total sample had the O blood phenotype. Considering the types of gastritis, according to Sidney's classification, 31 cases (33.4%) were mild enanthematous, (Figure 2), 16 of which (51, 6%) into blood type O.



Source: survey data, 2018-2019.

Figure 2: Mild enanthematous gastritis through endoscopy High Digestive.

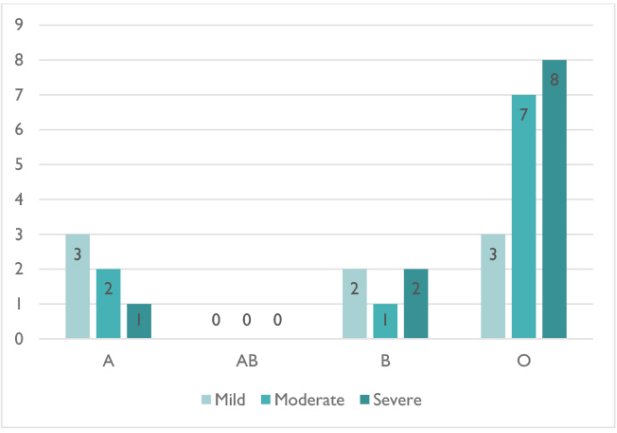
There was a prevalence of type O in all degrees of inflammatory activity. It was observed that 38 (40.9%) histopathological reports showed inflammatory activity, 20 (21.7%) classified as mild, 10 (10.9%) moderate and 8 (8.7%) intense (Figure 3).



Source: survey data, 2018-2019.

Figure 3: Correlation regarding the degree of inflammatory activity of the gastric mucosa and the ABO blood group system.

H. pylori was detected in 29 (31.2%) patients, 11 (37.9%) of which were severe, 10 (34.5%) moderate and 8 (27.6%) mild. The O phenotype was more prevalent in the moderate and severe degrees (Figure 4).



Source: survey data, 2018-2019.

Figure 4: Classification of gastritis patients according to the degree of *H. pylori* according to the ABO blood group system.

DISCUSSION

The results revealed that 70% of the 133 patients with dyspeptic symptoms who underwent upper digestive endoscopy had gastritis. Studies show similar data, which demonstrates the high incidence of gastritis in endoscopic diagnoses [2, 12].

Although some studies reveal a higher prevalence of gastritis in females [13, 14], this has shown that men (51.6%) were mostly affected among the research participants. Despite that, it is not sure whether the female gender is more diagnosed with gastritis, since they resort to medical assistance more frequently due to dyspeptic symptoms [15].

On the other hand, it is not possible to state that males are more likely to contract gastritis, even though this is a group of individuals that tends to be associated with various risk factors, such as alcohol consumption, inadequate food intake, obesity and less hygienic care[2].

The literature [16, 17] points out that the highest incidence of gastritis has taken place from the fifth decade of life. Such fact has also been observed in our study, in which the average age was around 53.7.

It is observed that gastritis caused by an acute lesion of the gastric mucosa, firstly affects all regions of the stomach and then predominance in the antral region takes place [5, 18, 19]. However, in our study, the fundus and gastric body regions were the most affected, and enanthematous endoscopic gastritis, according to Sidney's classification, was the most prevalent alteration, a piece of data also mentioned by another Brazilian study [2].

The *H. pylori* bacterium is one of the etiological agents most involved in the inflammatory process of the gastric mucosa; it triggers vulnerability and predisposition to hydrochloric acid attack, leading, not only to chronic gastritis, but to acute gastritis [20] as well. Of the 93 gastritis patients, 29 (31.2%) participants had *H. pylori* detected by the urease test, which reinforces the high prevalence of the bacterium in this group.

The ABO blood system has gained significant relevance in scientific researches since some of the blood types of this system are correlated with risk factors for many diseases, such as gastrointestinal pathologies [21, 22]. Of the 93 patients with gastritis, 53 (57%) belonged to the blood phenotype O, which shows the high prevalence of the association of this phenotype with gastritis, compared to other blood types.

Studies suggest that *H. pylori* infection is more common in blood type O [10, 11]. In our study, 29 (31.2%) patients with gastritis had *H. pylori*, 18 (62%) belonging to blood type O. Boren et al (1993) reported that individuals in group O would be more susceptible to contracting HP due to the easier adhesion of this bacterium to the gastric epithelium. Group O individuals, however, for not expressing antigens A and B, have more receptors for HP compared to individuals in other groups.

The sample size of this study may represent a limiting factor to assert the correlation between the relevant association of phenotype carriers O and gastritis. In addition, it is not possible to rule out the possibility of selection bias since the sample was for convenience.

CONCLUSION

Male patients with dyspeptic complaints, submitted to upper digestive endoscopy, had a high prevalence of gastritis. According to the Sydney classification, the blood phenotype O was the most prevalent one of the sample diagnosed with gastritis. Considering those with positive *Helicobacter pylori* gastritis, those who presented a moderate and severe degree of infection also had a prevalence of blood group O, as well as a higher frequency of inflammatory activity. More robust future studies are suggested, such as a randomized clinical trial, which better demonstrates this possible relationship, since instituting early treatment and carrying out preventive follow-up may minimize other outcomes.

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