Risk Factors of Chronic Atrophic Gastritis

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ABSTRACT

Background: *Chronic atrophic gastritis is a well-established precursor of gastric cancer. The development of atrophic chronic gastritis is multifactorial, involving the environment as well as host responses to the Helicobacter pylori (H. pylori) infection. The aim of this study is to determine prevalence and risk factors of chronic atrophic gastritis.*

Method: *The study was a cross sectional study on gastritis patients admitted to endoscopy units at Adam Malik General Hospital and Permata Bunda Hospital, Medan, from May-October 2014. A simple random sampling was performed to obtain 50 patients. Data concerning sociodemographic factors and H. pylori status were collected. H. pylori were considered positive from the positive results of the campylobacter like organism (CLO) test. Univariate and bivariate analyses were performed using the SPSS 22 with 95% confidence interval. Bivariat analysis was performed using a Chi-square test.*

Results: *Prevalence of chronic atrophic gastritis was 40%. There were associations between age and chronic atrophic gastritis (95% CI = 1.05-2.80; p = 0.021; OR = 1.73), body mass index and chronic atrophic gastritis (95% CI = 1.1-3.1; p = 0.011; OR = 1.85), and H.pylori infection and chronic atrophic gastritis (95% CI = 1.23-4.88; OR = 2.45; p = 0.001). There were no associations between gender, ethnicity, or rural-urban classification and chronic atrophic gastritis (p > 0.05).*

Conclusion: *Elderly status, low BMI, and H. pylori infection are risk factors for the development of chronic atrophic gastritis.*

Keywords: *chronic atrophic gastritis, Helicobacter pylori, gastric atrophy, body mass index*

ABSTRAK

Latar belakang: *Gastritis atrofi kronis merupakan prekursor utama kanker lambung. Perkembangan atrofi gastritis kronis adalah multifaktorial, meliputi lingkungan serta respon host terhadap infeksi Helicobacter pylori (H. pylori). Tujuan dari penelitian ini adalah untuk menentukan prevalensi dan faktor risiko gastritis atrofi kronis.*

Metode: *Penelitian ini adalah penelitian cross sectional pada pasien gastritis yang masuk unit endoskopi di Rumah Sakit Adam Malik dan Rumah Sakit Umum Permata Bunda, Medan, dari Mei-Oktober 2014. Sampling acak sederhana dilakukan untuk mendapatkan 50 pasien. Data mengenai faktor sosiodemografi dan status H. pylori dikumpulkan. H. pylori dianggap positif dari tes campylobacter like organism (CLO) yang positif. Analisis univariat dan bivariat dilakukan dengan menggunakan SPSS 22 dengan interval kepercayaan 95%. Analisis bivariat dilakukan dengan menggunakan uji Chi-square.*

Hasil: *Prevalensi gastritis atrofi kronis adalah 40%. Ada hubungan antara usia dan gastritis atrofi kronis (95% CI = 1,05-2,80; p = 0,021; OR = 1,73), indeks massa tubuh dan gastritis atrofi kronis (95% CI = 1,1-3,1; p = 0,011; OR = 1,85), dan infeksi H.pylori dan gastritis atrofi kronis [OR (95% CI): 2,45 (1,23-4,88), p = 0,001]. Tidak ada hubungan antara jenis kelamin, etnis, atau klasifikasi desa-kota dan gastritis atrofi kronis (p> 0,05).*

Simpulan: *Usia yang tua, indeks massa tubuh yang rendah, dan infeksi H. pylori merupakan faktor risiko berkembangnya gastritis atrofi kronis.*

Kata kunci: *gastritis atrofi kronis, Helicobacter pylori, gastritis atrofi, indeks massa tubuh*

INTRODUCTION

Gastric cancers causes around 700,000 deaths worldwide, ranking as the second most prevalent cause of cancer deaths.[1] Gastric carcinogenesis is an advancing process which causes both atrophy and metaplasia/dysplasia initially, and develops into adenocarcinoma. It is well-known that the majority of gastric cancers start with the conditions of atrophy.[2] Chronic atrophic gastritis is an essential precursor lesion in the development of a gastric cancer.[3]

Haziri et al reported a high prevalence (66%) of *Helicobacter pylori* (*H. pylori*) infection within patients who was diagnosed chronic atrophic gastritis.[4] *H. pylori* is a bacterium that mainly infects humans, specifically in the gastric tissue. *H. pylori* colonizes in the human gastric mucosa, and is capable of causing chronic gastritis, peptic ulcers, gastric cancer, and mucosa related tissue lymphoma.[5] The *H. pylori* infection was estimated to occur within 50% population worldwide, particularly 70-90% occurring in developing countries and only 40-50% in industrial countries. A high prevalence of the *H. pylori* infection is not associated with its development into gastric cancer. [6,7] This study was conducted to determine the prevalence of chronic atrophic gastritis and both socio-demographic determinants and *H. pylori* infection as the risk factors for the development of chronic atrophic gastritis.

METHOD

The study was a cross sectional study on gastritis patients admitted to endoscopy units at Adam Malik General Hospital and Permata Bunda Hospital, Medan, Indonesia from May - October 2014. A simple random sampling was performed to obtain 50 patients. A positive result of *H. pylori* infection was considered through the campylobacter like organism (CLO) test.

The inclusion criteria were all patients aged more than 18 years old who had experienced gastritis and whose diagnoses were made by a histopathology examination. The exclusion criteria were all patients with any experience of gastric cancer and history of gastric surgery such as a partial gastrectomy, which excised a part of the gastric mucosa.

An initial procedure of interviews was performed to obtain sociodemographic data consisting of age, gender, ethnicity, occupation, rural-urban classification. Patients were perfomed for their weight and height to calculate body mass index (BMI). A diagnosis of chronic atrophic gastritis was made by a histopathologic examination. The following procedure was done by taking a biopsy from the gastric antrum and corpus, staining them using a Hematoxillin-Eosin stain, and analyzing the pathology of the gastric mucosa at the laboratory of anatomical pathology in University of Sumatera Utara. All specimens were examined by the same professionals.

Data analysis was performed through univariate and bivariate analyses using the SPSS 22 with a 95% confidence interval. Bivariate analysis was performed using a Chi-square test with significance $p < 0.05$.

RESULTS

Table 1. Subject Characteristics

Variable	Chronic atrophic gastritis		Total
	Yes	No	
Sex			
Male	15 (30%)	20 (40%)	35 (70%)
Female	5 (10%)	10 (20%)	15 (30%)
Age			
<60	6 (12%)	19 (38%)	25 (50%)
≥60	14 (28%)	11 (22%)	25 (50%)
Ethnicity			
Batak	12 (24%)	14 (28%)	26 (52%)
Acehnese	1 (2%)	5 (10%)	6 (12%)
Javanese	7 (14%)	11 (22%)	18 (36%)
Occupation			
Entrepreneurs	7 (14%)	10 (20%)	17 (34%)
Employees	3 (6%)	6 (12%)	9 (18%)
Farmers	3 (6%)	1 (2%)	4 (8%)
Housewives	6 (12%)	9 (18%)	15 (30%)
Others	1 (2%)	4 (8%)	5 (10%)
Urban-rural classification			
Rural	9 (18%)	9 (18%)	18 (36%)
Urban	11 (22%)	21 (42%)	32 (64%)
Body mass index			
<21	14 (28%)	10 (44%)	24 (48%)
≥21	6 (12%)	20 (16%)	26 (52%)
Total	20 (40%)	30 (60%)	50 (100%)

The mean age of the 50 research subjects was 54 years old, ranging from the youngest patient at 19 years old to the oldest patient at 81 years old. The 50 research subjects were distributed into 35 (70%) male

patients and 15 (30%) female patients. Patients who had chronic atrophic gastritis consisted of 15 (30%) male patients and 5 (10%) female patients. Patients who had chronic non-atrophic gastritis consisted of 20 (40%) male patients and 10 (20%) female patients. Ethnic group distribution consisted of 26 (52%) Batak as the majority, followed by 18 (36%) Javanese, and 6 (12%) Acehnese. Three major occupations of the sample were entrepreneurs (34%), housewives (30%), and employees (18%). Urban inhabitants consisted of 64% of the total respondents. The BMI distribution consisted of 52% respondents with a BMI ≥ 21 and 48% with a BMI < 21.

Table 2. Chronic Inflammation, Neutrophil Infiltration, Atrophy, and Intestinal Metaplasia

Gastric histopathology	n (%)
Chronic inflammation	50 (100%)
Neutrophil infiltration	18 (36%)
Atrophy	20 (40%)
Intestinal metaplasia	8 (16%)

Referring to Table 2, 100% of the respondents had experienced chronic inflammation. About 36% of the specimens showed neutrophil activity, 40% showed atrophy, and 16% showed intestinal metaplasia.

Referring to Table 3, it is clear that there were significant associations between age and chronic atrophic gastritis (95% CI = 1.05-2.80; p = 0.021; OR = 1.73), BMI and chronic atrophic gastritis (95% CI = 1.1-3.1; p = 0.011; OR = 1.85), and also between *H. pylori* infection and chronic atrophic gastritis (95% CI = 1.23-4.88; p = 0.001; OR = 2.45). There were no significant associations between gender, ethnicity, rural-urban classification and chronic atrophic gastritis (p > 0.05).

DISCUSSION

Research results showed 40% prevalence of chronic atrophic gastritis in which 40% of the specimens showed chronic inflammation of the gastric mucosa with gastric gland atrophy. Chronic atrophic gastritis is diagnosed if histopathology showing chronic inflammation of the gastric mucosa with a loss of gastric glands. Chronic atrophic gastritis commonly occurs and correlates as the malignancy risks increase.[8]

International gastroenterology pathologists constructed a histological change spectrum array of atrophy cells to normal cells. The atrophy transformation phenotype consists of: 1) shrinkage or loss of glands, which are replaced as a wide array of lamina propria (fibrosis) such a situation results in a reduced glandular mass; 2) Replacement of the native glands by metaplastic glands which causes intestinal and/or pseudopyloric metaplasia. Shrinkage of glands is believed to be uncertain. Some metaplastic tissue replacements were believed to cause more appropriate tissue structure. Conditions that were parallel with the occurrence of gastric cancer make their risk factor indicators of gastric cancer.[9]

This research was aimed to determine the risk factors of chronic atrophic gastritis from sociodemographic determinants and *H. pylori* infection. There was a significant association between elderly status and chronic atrophic gastritis. This finding was in accordance with previous research by Adamu et al and

Table 3. Association between gender, age, ethnicity, nutritional status, *H. pylori* infection, and chronic atrophic gastritis

Variable	Chronic atrophic gastritis		Total	OR (95% CI)	p
	Yes	No			
Gender	15 (30%)				
Male	5 (10%)	20 (40%)	35 (70%)	0.67 (0.19-2.36)	0.529
Female		10 (20%)	15 (30%)		
Age					
<60	6 (12%)	19 (38%)	25 (50%)	1.73 (1.05-2.80)	0.021*
≥60	14 (28%)	11 (22%)	25 (50%)		
Ethnicity					
Batak	12 (24%)	14 (28%)	26 (52%)	0.81 (0.51-1.27)	0.355
Acehnese + Javanese	8 (16%)	16 (32%)	24 (48%)		
Urban-rural Classification					
Rural	9 (18%)	9 (18%)	18 (36%)	0.76 (0.45-1.29)	0.279
Urban	11 (22%)	21 (42%)	32 (64%)		
Body mass index					
<21	14 (28%)	10 (20%)	24 (48%)	1.85 (1.1-3.1)	0.011*
≥21	6 (12%)	20 (40%)	26 (52%)		
Helicobacter pylori infection					
Positive				2.45 (1.23-4.88)	0.001*
Negative	13 (26%)	6 (12%)	19 (38%)		
	7 (14%)	24 (48%)	31 (62%)		
Total	20 (40%)	30 (60%)	50 (100%)		

*p-value < 0.05

the Eurohepygast research group. Adamu et al reported increase of the incidence of chronic atrophic gastritis due to age. The range was spread between 0.5% rate at the youngest and 2.1% rate at the oldest. There existed a significant relationship between patients with elderly status and chronic atrophic gastritis.[10] The Eurohepygast research group reported a significant association between elderly status and the increasing risks of experiencing chronic atrophic gastritis with a 4.14 odds ratio. The study inquired the relationship between the dynamic prospective *H. pylori* infection or the aging effect and gastric mucosa.[11]

There was a significant association between low body mass index and chronic atrophic gastritis. The distribution consisted of 14 subjects with experience of chronic atrophic gastritis from 24 subjects having BMI < 21, and 20 subjects without experience of chronic atrophic gastritis from 26 subjects having BMI ≥ 21. This research result was in accordance with research performed by Torisu et al, in which the group that had a low BMI experienced more incidence of chronic atrophic gastritis than the control group (23.47 ± 3.05 vs. 24.18 ± 3.25, p = 0.010). Torisu et al. concluded a negative correlative relationship between BMI and the incidence of atrophic gastritis.[12]

There was significant association between *H. pylori* infection and the prevalence of chronic atrophic gastritis in which infected patients encountered a 2.45 times higher occurrence risk of chronic atrophic gastritis than uninfected patients. This research result was in accordance with research performed by Weck et al, Vrobjova et al, and Ozasa et al, in which there existed significant relationship between *H. pylori* infection and chronic atrophic gastritis.[13-15] The conclusion was also made through other researches regarding the eradication of *H. pylori* which showed significant improvement of chronic atrophic gastritis after implementing the eradication of *H. pylori*.[16,17] Detection of *H. pylori* was essential. It enabled an effective eradication attempt resulting in a better prognosis. A cross sectional study of the Eurohepygast research group reported some chronic atrophic gastritis in some populations in Europe. It found not only non-ulcerative dyspepsia, chronic gastritis, and atrophy through a histological examination, but also *H. pylori* infection.[11] Adamu et al reported a similar finding that *H. pylori* infection was positively correlated with the incidence of chronic atrophic gastritis with a 3.4 odds ratio in an infected group with negative CagA and a 5.9 odds ratio in an infected group with positive CagA.[10] There were no significant associations between gender, ethnicity, or rural-urban classification and chronic atrophic gastritis ($p < 0.05$).

CONCLUSION

Elderly status, low BMI, and *H. pylori* infection are risk factors for the prevalence of chronic atrophic gastritis.

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