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THE PREVALENCE OF ATROPHIC GASTRITIS IN DYSPEPTIC PATIENTS AND ITS RISK FACTORS

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ABSTRACT

Gastric cancer is the fourth most common cancer after lung, breast and colorectal cancer. The development of gastric cancer (GC) includes gastritis, atrophic gastritis (AG), intestinal metaplasia, dysplasia and gastric cancer as well. Atrophic gastritis (AG) has been identified as a risk factor for GC and cancer incidence is associated with the severity and extension of AG. This study aimed to evaluate the prevalence of AG and its risk factors in dyspeptic patients. This is a cross-sectional study. A total of 1650 dyspeptic patients presented to endoscopy department in Shohada-y-Ashayer and Shahid Rahimi hospitals in Khorramabad, Iran were selected and invited to participate in the study during October 2015 to August 2016. In patients with gastric lesion, the biopsy sample was taken from lesion. Data were analyzed by SPSS.ver.22. 1016 patients were studied. The mean age of the patients was 47±16 years. According to pathologic findings, the prevalence of AG was 12.2% (124/1016); with the prevalence of mild, moderate and severe AG of 54.8% (68/124), 32.3% (40/124) and 12.9% (16/124) respectively. Statistical analysis showed significant association between AG with age ($p<0.001$), BMI ($p=0.007$), place of residence ($p<0.001$), education ($p=0.001$) and smoking ($p=0.021$). The results showed that the prevalence of AG in dyspeptic patients is in a high range. AG is a risk factor for gastric cancer. Based on the relationship between age, BMI, place of residence, educational level and smoking with AG, it is recommended to provide prevention procedures of gastric cancer in elderly dyspeptic patients.

KEYWORDS: *Atrophic gastritis, Prevalence, Risk factor, Iran*

INTRODUCTION

Atrophic gastritis (AG) is characterized by chronic inflammatory process of gastric mucosa that is visible in endoscopic examination as submucosal vessels that gradually lead to the loss of glandular structure and a reduction of gastric acid secretory function. It is also related to hypochlorhydria, or achlorhydria.[1,2] The presence of AG is known to be as a risk for gastric cancer and cancer incidence rate is associated with the severity and extension of AG as well.[3] Gastric cancer progress rate is known as Correa's waterfall. It is consisted of intermediate steps or precancerous lesions such as: chronic gastritis, AG, intestinal metaplasia, dysplasia and finally gastric cancer.[4-6] It is estimated that patients with gastric precancerous lesions have a serious risk of showing cancer over the next 10 years.[7] In a systematic review the prevalence of AG has been reported in a variable range from 9.4% to 63.8% based on histopathological findings.[1] In a meta-analysis study the incidence of AG has been reported to be about 0-10.9% per year.[8] Although the risk factors for gastric atrophy are not fully understood, it seems to have the same risk factors for gastric cancer.[9,10] According to different studies, the AG risk factors included: Helicobacter pylori infection, aged over 40 years, male gender, family

history of gastric cancer, low educational level, living in rural areas, smoking, alcohol consumption, etc.[3,11] Dyspepsia is defined as epigastric pain or burning after eating a meal, early satiety or fullness after eating meals.[12] Structural diseases such as gastritis and malignancies can be presented as dyspepsia. The most important and most common clinical diagnosis for dyspepsia is gastric cancer and peptic ulcer respectively. Therefore the upper endoscopy is the best diagnostic method due to its high accuracy and the possibility of getting biopsy samples.[13-16] Detection of precancerous lesions and lesions associated with gastric cancer is very important in order to provide screening programs, early diagnosis and more accurate preventive measures to follow-up. So it was decided to determine the prevalence of AG as a precancerous lesion and study its related risk factors.

MATERIALS AND METHODS

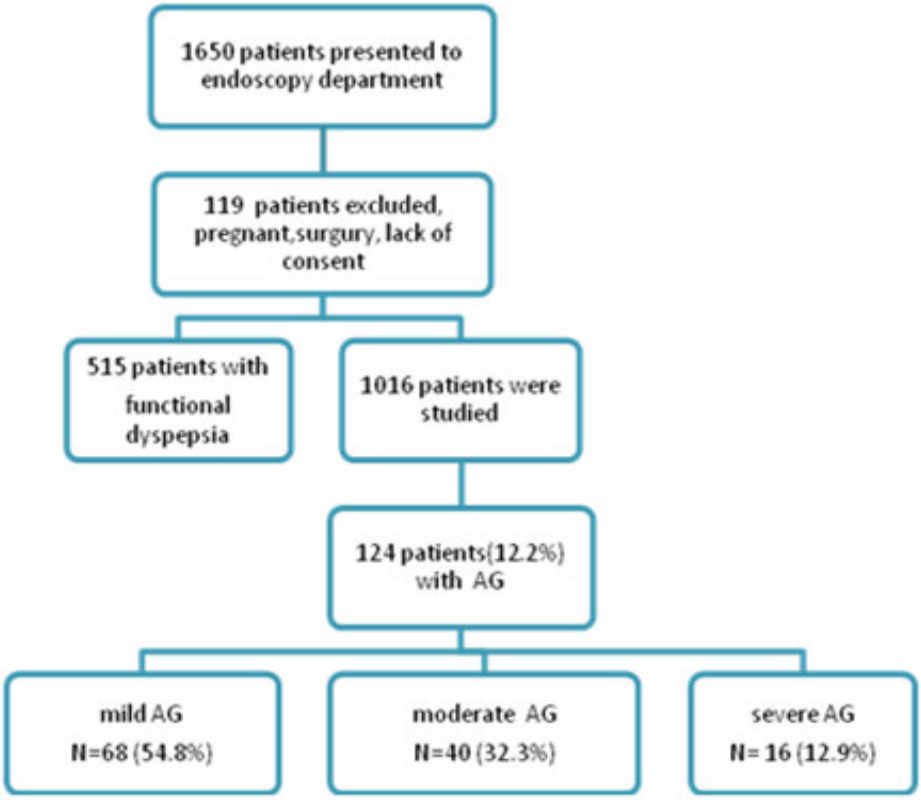
This is a cross-sectional study. All of the dyspeptic patients who were presented to endoscopy department of Shohada-y-Ashayer and Shahid Rahimi hospitals in Khorramabad, Iran were selected and invited to participate in the study during October 2015 to August 2016. Prior to endoscopy the patients were informed about the study objectives and written informed consent was obtained from all participating subjects. Patients above 15 years who filled the informed consents and were diagnosed with dyspepsia (epigastria pain or burning after eating a meal, early satiety or fullness after eating meals)[12] were taken up for the study. Pregnant women and people with the history of upper gastrointestinal surgeries were excluded from this study. After that, the patients were asked to fill a questionnaire including demographic data and some questions about their lifestyle such as smoking, opium, alcohol consumption, family history of gastric cancer and etc. Then the subjects underwent a clinical interview for upper endoscopy by two gastroenterologists. During upper endoscopy, patients were examined in terms of erythema, inflammation, scarring, atrophy, mass, gastric outlet obstruction or ulcer. In AG, submucosal vessels were easily visible in the endoscopy. Biopsy samples were taken from the mucosal of atrophic area for pathologic examination and then were fixed in 10 % formalin solution and finally were sent to the pathology laboratory. Biopsy samples were analyzed by an expert pathologist in terms of chronic gastritis and its severity, AG and its severity, intestinal metaplasia and its type, dysplasia and its severity, presence of H. pylori infection and malignancy. The main criteria for diagnosis of AG was based on histologic results.

STATISTICAL ANALYSIS OF DATA

Data was analyzed by SPSS.ver.22. To analyze the relationship between AG and its risk factors, descriptive statistics (Means, standard deviation, and frequency) and chi-square statistics were used and the significance level was considered less than 0.05.

RESULTS

In this study a total of 1650 dyspeptic patients were surveyed. 119 of them were excluded due to pregnancy, history of upper gastrointestinal surgeries and gastric outlet obstruction or lack of consent to participate in the study; so 1531 patients remaining were selected and underwent endoscopy. 515 (33.6%) patients had normal endoscopy, or in other words they had functional dyspepsia. Finally 1016 of them who had biopsy samples were included in the study in order to analyze the prevalence of AG (Figure 1).



Of the 1016 patients, 45.8% (465/1016) were male and 54.2% (551/1016) were female. The mean age of them was 47±16 years. The majority of cases (38.3%) were under 40 years and 76.7% were under graduates. Family history of gastric cancer, smoking, hookah, opium and alcohol consumption was reported respectively 16.2% (164/1016), 15.2% (152/1016), 9.3% (95/1016), 6.8% (69/1016) and 1.4% (14/1016). (Table 1)

Figure 1
The patients entered the study

Table 1
Demographic data of 1016 patients

Risk factors		frequency	percent
Age (year)	<40	389	38.3
	49-40	185	18.2
	59-50	190	18.7
	≥ 60	252	24.8
Sex	male	465	45.8
	female	551	54.2
Educational level	Under graduates	779	76.7
	Graduates	237	23.3
BMI	BMI >25 kg/m2	502	49.4
	BMI <25 kg/m2	514	50.6
Place of residence	urban	736	72.4
	village	280	27.6
Family history of gastric cancer	no	852	83.8
	yes	164	16.2
Smoking	no	862	84.8
	yes	154	15.2
Hookah smoking	no	921	90.7
	yes	95	9.3
Opium	no	947	93.2
	yes	69	6.8
Alcohol consumption	no	1002	98.6
	yes	14	1.4

The most common endoscopic findings were mild erythematic 70.3% (714/1016) and erosion 53.8% (547/1016). The most common anatomic site for abnormal findings on endoscopy, was antrum (Table 2).

Table 2
Prevalence of endoscopic findings in 1016 dyspeptic patients

	Cardia N (%)	Body N (%)	Antrum N (%)	Total N (%)
Erosions	1 (0.2)	199 (36.4)	347 (63.4)	**547 (100)**
Mild erythm	33 (4.6)	275 (38.5)	406 (56.9)	**714 (100)**
Severe erythm	1 (0.3)	166 (47.8)	180 (51.9)	**347 (100)**
Ulcer	17 (11.9)	28 (19.6)	98 (68.5)	**143 (100)**
Mild atrophy	11 (13.1)	15 (17.9)	58 (69)	**84 (100)**
Severe atrophy	5 (5.6)	37 (41.6)	47 (52.8)	**89 (100)**
Nodularity	6 (2.5)	126 (53.4)	104 (44.1)	**236 (100)**
Total*	**74 (3.4)**	**846 (39.2)**	**1240 (57.4)**	**2160 (100)**

**** Due to the presence of more than one lesions in some patients, the total is not equal to the number of samples.***

Among the subjects, 4.3% (44/1016) had normal pathology completely. The prevalence of H. pylori infection was 53.4% (543/1016). The most common pathologic findings were moderate gastritis 41.4% (421 /1016) and mild gastritis 13.6% (138 /1016) (Table 3).

Table 3
Spatial distribution of pathological lesions in 1016 dyspeptic patients

	Cardia N (%)	Body N (%)	Antrum N (%)	Total N (%)
Mild gastritis	2 (1.4)	24 (17.4)	112 (81.2)	**138 (100)**
Moderate gastritis	11 (2.6)	59 (14)	351 (83.4)	**421 (100)**
Severe gastritis	2 (4.2)	8 (16.7)	38 (79.1)	**48 (100)**
Mild atrophy	11 (16.2)	18 (26.5)	39 (57.3)	**68 (100)**
Moderate atrophy	5 (12.5)	13 (3.25)	22 (55)	**40 (100)**
Severe atrophy	5 (31.25)	6 (37.5)	5 (31.25)	**16 (100)**
Incomplete intestinal metaplasia (IIM)	6 (6.4)	5 (5.3)	83 (88.3)	**94 (100)**
Complete intestinal metaplasia (CIM)	1 (7.7)	2 (15.4)	10 (76.9)	**13 (100)**
Low-grade dysplasia (LGD)	0 (0)	0 (0)	11 (100)	**11 (100)**
High-grade dysplasia (HGD)	0 (0)	0 (0)	2 (100)	**2 (100)**
Helicobacter pylori infection	8 (1.5)	66 (12.1)	469 (86.4)	**543 (100)**
Polyps	10 (45.5)	3 (13.6)	9 (40.9)	**22 (100)**
Malignancy	11 (52.4)	4 (19)	6 (28.6)	**21 (100)**
Total *	**72 (5)**	**208 (14.5)**	**1157 (80.5)**	**1437 (100)**

**** Due to the presence of more than one lesions in some patients, the total is not equal to the number of samples.***

According to the pathological findings, the prevalence of AG was 12.2% (124/1016). The prevalence of mild, moderate and severe AG was 54.8% (68/124), 32.3% (40/124) and 12.9% (16/124) respectively. Among the risk factors, there was a significant meaning between increasing age, BMI, place of residence, educational level and smoking with AG ($p<0.001$, $p=0.007$, $p<0.001$, $p=0.001$, $p=0.021$ respectively). The prevalence of H. pylori infection in AG patients was 55.6% (69/124) in compare to non AG patients (44.3%, 55/124) ($p=0.335$). More information about other risk factors is shown in table 4.

Table 4
The relationship of AG and its risk factors

Risk factors		AG		p-value
		Yes N(%)	No N(%)	
Age(year)	<40	28(22.6)	361(40.5)	<0.001*
	40-49	16(12.9)	169(18.9)	
	50-59	26(21)	164(18.4)	
	≥60	54(43.5)	198(22.2)	
Sex	male	63(50.8)	402(45.1)	0.134
	female	61(49.2)	490(54.9)	
BMI	BMI >25 kg/m2	48(38.7)	454(50.9)	0.007*
	BMI <25 kg/m2	76(61.3)	438(49.1)	
Place of residence	Urban area	70(56.5)	666(74.7)	<0.001*
	Rural area	54(43.5)	226(25.3)	
Educational level	none	61(49.2)	303(34)	0.001*
	College	29(23.4)	208(23.3)	
	Academic	34(27.4)	381(42.7)	
Family history of gastric cancer	Yes	17(13.7)	147(16.5)	0.260
	No	107(86.3)	745(83.5)	
Smoking	Yes	11(8.9)	143(16)	0.021*
	No	113(91.1)	749(84)	
Hookah smoking	Yes	17(13.7)	78(8.7)	0.058
	No	107(86.3)	814(91.3)	
Opium	Yes	10(8.1)	59(6.6)	0.328
	No	114(91.9)	833(93.4)	
Alcohol consumption	Yes	2(1.6)	12(1.3)	0.525
	No	122(98.4)	880(98.7)	
H. Pylori infection	Yes	69(55.6)	474(53.1)	0.335
	No	55(44.4)	418(46.9)	
Peptic ulcer	Yes	13(10.5)	130(14.6)	0.137
	No	111(89.5)	762(85.4)	

Statistical significant difference (P<0.05); (n=124)

DISCUSSION

The incidence ratio of gastric cancer begins from superficial gastritis to AG, intestinal metaplasia, dysplasia and eventually to gastric carcinoma, which may extend over decades, provides a suitable opportunity for early detection and intervention to prevent further progression or regression of the gastric cancer process.[17] In this study, the prevalence of AG was 12.2% based on pathologic findings. The prevalence of gastric IM and AG in the general population is known to vary around the world, mostly depending on H. pylori status.[18-21] However only a fraction of the incidence that we observed among patients with dyspepsia, was reported in the different studies. This study was limited to patients who underwent gastroscopy with biopsy for clinical indications. This group may differ from the general population in several ways, and the findings cannot be readily generalized to non-patients (or healthy people who undergo screening). On the other hand, the prevalence could differ in every research based on its population of study. In this study, analysis was done on cardia, body and antrum so this may explain the reason for the results and may extend the value of the findings.In our study of the 124 patients, 54.8% (68/124) had mild AG, 32.3% (40/124) had moderate AG and 12.9% (16/124) had severe AG. In Yi Yu study (2014), a significantly higher proportion of patients had moderate/severe chronic superficial gastritis and moderate chronic atrophic gastritis compared with the uninfected patients. These differences suggest that H. pylori infection is closely associated with the type and severity of chronic gastritis. Generally, the patients have a low prevalence of chronic atrophic gastritis, and no patients had severe chronic atrophic gastritis or

intestinal metaplasia.[21] Among the risk factors, there was a significant impact caused by increasing age, BMI, place of residence, educational level and smoking with AG in the present study. As the result people above the age of 60 and male gender were identified as a risk factor for AG. In Young et.al study the prevalence of AG based on endoscopic criteria was 40.7%. In this study, people above the age of 40, male gender, H. pylori infection (based on serology), IM and lower level of academic education were identified as the risk factors for AG.[3] In Cazacu (2009) study that investigated the risk factors of AG and IM,subjects over the age of 50 and 60 years were diagnosed for AG and IM respectively. Living in rural areas, smoking and alcohol consumption were diagnosed as the other risk factors for AG and IM.[11] This study has several potential limitations. First, biopsies may not have been taken in adequate number and from the same part of the stomach. Second, results of the study may be affected by the lack of medical history such as antibiotic usage in some patients. Finally, diagnosis of H. pylori infection was only made by histological examination.

CONCLUSION

In this study, we found a high rate of precancerous conditions of the stomach after the age of 60 years. This late onset of the development of H. pylori related gastric cancer may be because of the genetic and bodily functional. We also suspect that the presence or absence of H pylori was not consistently reported. It is also mostly common to observe the gastric cancer lesions among people with normal mucosa, which is inconsistent with a strong link between lifestyle or genetic determinants for gastroscopic examinations and future risk of gastric cancer. Another caveat to consider is sampling error. Finally, there were no information on the other risk factors affecting GA prevalence. Future studies in other settings might consider the collection of additional information on detailed lifestyle factors and other biomarkers to facilitate further risk stratification.

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CONFLICT OF INTEREST

Conflict of interest declared none.

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