

Identification of high-risk premalignant gastric lesions: Experience at a tertiary care hospital in Guayaquil

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ABSTRACT

Gastric cancer (GC) represents the leading cause of cancer-related mortality in Ecuador. Timely identification of preneoplastic lesions using standardized histological staging systems is crucial for early diagnosis and mortality reduction. This study analyzed the prevalence of premalignant gastric conditions and stratified the histological risk of progression to GC using the OLGA (Operative Link on Gastritis Assessment) system in patients at a tertiary care hospital in Guayaquil, Ecuador. A cross-sectional, retrospective study was conducted at Hospital Teodoro Maldonado Carbo. The initial population comprised 300 patients evaluated for dyspeptic symptoms between 2015 and 2019. After excluding patients with prior gastric surgery, confirmed esophagogastric neoplasms, or incomplete histopathological reports, 130 patients who underwent upper endoscopy with gastric biopsy were included. Tissue samples were processed according to the modified Updated Sydney System Protocol, with biopsies from the antrum, body, and incisura angularis, and subsequently classified according to the OLGA system. The prevalence of chronic atrophic gastritis was 18.5%. OLGA staging identified 2.3% of patients (n = 3) as high-risk stage III, with a higher frequency among individuals over 60 years. No stage IV cases were recorded. The prevalence of atrophy was lower than historical averages reported in Ecuador's inter-Andean region and highland (Sierra) populations. The OLGA system proved feasible and clinically valuable for individualizing risk and optimizing endoscopic surveillance intervals for secondary prevention of GC.

Keywords: Atrophic gastritis, Ecuador, Gastric cancer, OLGA system, Precancerous conditions, Endoscopic surveillance.

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Highlights of this paper

- Premalignant gastric conditions were assessed using the OLGA system.
- Gastric atrophy was found in 18.5% of patients, with 2.3% classified as OLGA Stage III.
- The OLGA system supported individual risk stratification and endoscopic surveillance.

1. INTRODUCTION

Gastric cancer (GC) is one of the most common malignancies worldwide. In 2022, it ranked fifth in incidence and fourth in mortality, with approximately 968,000 new cases and 660,000 deaths [1]. It is the fourth most common malignancy among men, whereas it ranks seventh among women [1]. In Ecuador, GC has an incidence rate of 12.8 cases per 100,000 inhabitants and represents the leading cause of cancer-related mortality in both sexes [2, 3].

Approximately 90% of GC cases are histologically classified as adenocarcinoma [4]. Globally, 85% of cases are located in the gastric body or antrum, whereas the remaining 15% originate in the cardia [4]. The main identified risk factors include *Helicobacter pylori* infection, alcohol and tobacco consumption, and obesity [5, 6].

H. pylori has been classified as a Group I carcinogen by the World Health Organization and is considered the main risk factor for GC. In fact, approximately 90% of non-cardia GC cases are estimated to be associated with the infection [7]. Although its global prevalence has declined over the past three decades—from 52.6% in 1990 to 43.9% in 2022—Ecuador remains among the countries with the highest prevalence of *H. pylori* infection in adults (85.7%) [8]. This bacterium induces a chronic inflammatory response and a state of oxidative stress in gastric mucosal cells, leading to DNA damage, disruption of apoptotic mechanisms, and promotion of neoplastic cell proliferation [9].

Although the pathogenesis of GC remains under investigation, the Correa cascade describes the progressive sequence of histological changes through which normal gastric mucosa transforms into adenocarcinoma. This process progresses from non-neoplastic conditions, such as superficial gastritis, to precancerous conditions, including chronic atrophic gastritis and intestinal metaplasia, and ultimately to premalignant lesions, such as low- and high-grade dysplasia [10, 11]. According to de Vries et al., the cumulative risk of developing GC varies according to the baseline lesion. At 1, 5, and 10 years after diagnosis, the incidence of GC was 0.3%, 0.6%, and 0.8% for atrophic gastritis; 0.7%, 1.2%, and 1.8% for intestinal metaplasia; 2.1%, 3.1%, and 3.9% for mild-to-moderate dysplasia; and 24.9%, 29.5%, and 32.7% for severe dysplasia, respectively [12].

The understanding of GC pathogenesis led to the development of histological staging systems such as the *Operative Link on Gastritis Assessment* (OLGA). This system allows for the assessment and stratification of the individual risk of progression to GC in patients with atrophic gastritis by quantifying the extent and severity of atrophic changes in the gastric mucosa [13, 14].

The prognosis of patients with GC is associated with tumor stage at the time of diagnosis, with higher survival rates observed in early-stage disease [15]. The five-year survival rate is 75% for localized disease, 35% for locally advanced disease (with regional lymph node involvement), and less than 7% for metastatic disease [16]. In Ecuador, approximately 75% of cases are diagnosed at advanced stages (14% at TNM stage III and 60.5% at stage IV) [2].

Timely identification of patients with high-risk preneoplastic lesions is crucial for the early diagnosis of gastric cancer, improving not only survival rates but also reducing costs to public healthcare systems [17]. Despite the high prevalence of *H. pylori* infection and the alarming rate of late-stage diagnoses in Ecuador, the systematic implementation of the OLGA system to guide endoscopic surveillance remains limited in the country. Therefore, local evidence is needed to validate its clinical utility. Based on this premise, the objective of our study was to analyze the prevalence of premalignant conditions and stratify histological risk using the OLGA system in a cohort of patients treated at a tertiary care hospital in Guayaquil, Ecuador.

2. MATERIALS AND METHODS

An observational, retrospective, cross-sectional study was conducted in the Gastroenterology Department of the Teodoro Maldonado Carbo Specialty Hospital in Guayaquil, Ecuador, from 2015 to 2019. The initial study population consisted of 300 patients who underwent endoscopic evaluation for dyspeptic symptoms. Using non-probability convenience sampling and after applying the selection criteria, a final sample of $n = 130$ patients was included in the study.

Individuals with a history of upper gastrointestinal tract surgery, incomplete endoscopic procedures, or inadequate histopathological mapping were excluded. Given the retrospective nature of the study design, the analysis was limited to the variables recorded in the clinical and histopathological reports available in the hospital's information system.

The diagnosis and staging of gastric atrophy were based on the Updated Sydney System and the OLGA system (Table 1). The presence of *H. pylori* was classified dichotomously (positive/negative) based on direct histological examination, without quantifying the density of colonization.

Table 1. Operative Link on Gastritis Assessment.

Atrophy		Corpus			
		No	Mild	Moderate	Severe
Antrum	No	0	I	II	II
	Mild	I	I	II	III
	Moderate	II	II	III	IV
	Severe	III	III	IV	IV

The data were analyzed using descriptive statistics (absolute frequencies and percentages). Bivariate associations between the presence of gastric atrophy and clinical/demographic factors were assessed using Pearson's chi-square test or Fisher's exact test, as appropriate. P values <0.05 were considered statistically significant. Given the limited sample size, values of $0.05 \leq p \leq 0.10$ were interpreted as marginal trends. No multivariable regression analyses were performed due to the exploratory nature of the study and the limited availability of variables in the data sources.

Table 2. Clinical, demographic and histopathological characteristics of the study population (N = 130).

Variable	Frequency	Percentage
Total population (N= 130)		
Sex		
Female	74	56.9%
Male	56	43.1%
Gastric atrophy findings		
Presence of atrophy	24	18.5%
Absence of atrophy/Normal	106	81.5%
Subgroup with gastric atrophy (n= 24)		
Type of atrophy		
Metaplastic	14	58.3%
Non-metaplastic	10	41.7%
OLGA staging		
Stage I (Low risk)	13	54.2%
Stage II (Low risk)	8	33.3%
Stage III (High risk)	3	12.5%
Stage IV (High risk)	0	0.0%
Presence of dysplasia		
Low-grade dysplasia	3	12.5%
High-grade dysplasia	0	0.0%

3. RESULTS

Among the final study population (n=130), 56.9% (n=74) were female and 43.1% (n=56) were male (Table 2). The predominant endoscopic diagnoses were nonspecific gastropathy, erosive gastropathy, and hemorrhagic gastropathy.

Histological evaluation identified gastric atrophy in 18.5% (n=24) of the 130 patients evaluated. Within this subgroup, metaplastic atrophy was present in 14 patients (58.3% of cases with atrophy).

Patient stratification according to the OLGA system showed a predominance of early stages: Stage I accounted for 54.2% (n=13), Stage II for 33.3% (n=8), and Stage III for 12.5% (n=3). No Stage IV cases were documented. Regarding advanced preneoplastic lesions, low-grade dysplasia was detected in 3 patients (12.5% of the subgroup with atrophy), with no cases of high-grade dysplasia or intramucosal carcinoma identified. Specifically, among patients with OLGA Stage III, the mean age was 63.5 years.

Among patients with gastric atrophy, bivariate analysis demonstrated a statistically significant association with male sex ($p=0.015$) and age >60 years ($p=0.023$). *H. pylori* infection showed a marginal trend toward statistical significance ($p=0.062$).

4. DISCUSSION

The present study applied the OLGA system to determine the prevalence of preneoplastic gastric lesions in a cohort of patients treated at a tertiary care hospital in Guayaquil, Ecuador.

Globally, the prevalence of chronic atrophic gastritis is estimated to be approximately 25% [18]. However, several studies conducted in Latin American countries have reported significantly higher frequencies of premalignant lesions. One example is a multicenter study coordinated by the International Agency for Research on Cancer (IARC), which included 1,222 patients from Mexico, Paraguay, and Colombia and reported a prevalence of 43.4% of precancerous lesions [19]. In the local context, our study found a prevalence of atrophic gastritis of 18.5%. This figure is lower than the 38.1% reported in a pooled analysis of five Ecuadorian studies based on histological biopsies conducted between 2013 and 2018 [20]. This discrepancy may be attributable to the fact that most of these studies were conducted in hospitals in the Andean highlands, a region with a higher incidence of GC, presumably associated with a higher prevalence of *H. pylori* infection due to socio-environmental and genetic factors [2, 21].

Likewise, marked variability was observed in the prevalence of high-risk histological lesions (OLGA stages III and IV). In our cohort, 2.3% of the participants (3 patients with Stage III disease, with no cases of Stage IV) were classified as being at high risk of progression to GC, with a higher frequency among patients older than 60 years. The absence of patients with OLGA Stage IV disease may be attributable to the limited sample size.

When compared with other studies conducted in Latin American populations, the findings have been heterogeneous. For example, a prospective study conducted at a tertiary care hospital in Lima, Peru, reported that 6.6% of 197 individuals were classified as being at high risk according to the OLGA system, with a higher prevalence among individuals older than 40 years, in a setting where the prevalence of *H. pylori* infection was 56.85% [22]. Similarly, a prospective study conducted in Pasto, Colombia, a region considered to be at high risk for GC, found that 38.6% of 192 participants had atrophic gastritis, with 6.3% classified as OLGA Stage III and 5.4% as OLGA Stage IV [23].

In other geographic settings, a study conducted in Iran involving 345 individuals documented a prevalence of atrophic gastritis of 44.9%; however, only 4.3% of participants were classified as high-risk OLGA stages (III and IV). This variability highlights the need for standardized staging systems to enable individualized clinical surveillance.

Given the natural history of GC, there is an opportunity to intervene and halt the progression of premalignant lesions, making it imperative to develop primary and secondary prevention strategies tailored to the epidemiological profile of each population.

As primary prevention focuses on modifying etiological risk factors, eradication of the main risk factor *H. pylori* infection represents a fundamental cornerstone. Currently, there is no effective vaccine to prevent transmission of the bacterium [24]; therefore, eradication remains the principal strategy for its control. Recent data from South America derived from the Latin American Registry for the Management of *H. pylori* Infection (2024), which included six countries (Argentina, Chile, Colombia, Costa Rica, Mexico, and Peru), demonstrated that dual and quadruple therapies were significantly more effective than standard triple therapy [17]. According to the Maastricht Consensus guidelines, for an eradication regimen to be considered effective in clinical practice, it should achieve an eradication rate exceeding 90% in the target population [25]. Complementary primary prevention measures include reducing tobacco use; limiting salt and alcohol intake; increasing the consumption of fruits, vegetables, and dietary fiber; improving food hygiene; and promoting physical activity (17).

Secondary prevention is based on the timely diagnosis and management of gastric precancerous lesions through upper gastrointestinal endoscopy with targeted biopsies. To optimize endoscopic surveillance programs, international guidelines recommend categorizing individual risk using the OLGA system (or its variant, OLGIM) [12]. In this regard, the European guidelines for the Management of Precancerous Conditions and Lesions in the Stomach (MAPS II) recommend regular endoscopic surveillance every 2 or 3 years in high-risk geographic areas and every 5 years in areas with moderate risk [26]. In contrast, guidelines from American societies do not support generalized population-based screening; rather, they favor an individualized strategy based on patient-specific risk factors, suggesting 3-year surveillance intervals in patients with advanced preneoplastic conditions [27].

Finally, this study acknowledges the limitations inherent to its design. The single-center nature of the study limited the sample size and precluded the collection of detailed qualitative variables or lifestyle-related data, thereby limiting our ability to perform multivariable analysis. Likewise, the diagnosis of *H. pylori* was limited to standard histological examination, which may have underestimated the true prevalence of the infection, particularly in advanced stages of atrophy or metaplasia, in which bacterial density tends to decrease markedly or shift toward more proximal areas of the gastric mucosa. Despite these limitations, the use of the OLGA system at our center proved to be a feasible and valuable tool for identifying a subgroup of patients requiring close endoscopic surveillance, laying the groundwork for future prospective, multicenter studies in the coastal region of Ecuador.

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