CHRONIC *HELICOBACTER PYLORI* GASTRITIS: OLGA AND OLGIM SCORES IN THREE HOSPITAL CENTERS IN ABIDJAN (IVORY COAST)

Henriette Ya Kissi Anzouan Kacou[1,2], Stanislas Adjéka Doffou[1,2], Abdoulatif Yaogo[1,2], Arsel Bleriot Tsobzé[1,2], Degnon Ange Christelle[1,2], Alain Koffi Attia[1,2]

[1] Felix Houphouët-Boigny University Hospital.

[2] Angre University Hospital.

Corresponding author: Henriette Ya Kissi Anzouan Kacou

Felix Houphouët-Boigny University Hospital, Abidjan, Côte d'Ivoire.

Tel : +225 0545350000

E-mail: kissihy@yahoo.fr.

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Abstract

Background and aim: The Operative Link on Gastritis Assessment (OLGA) and Operative Link on Gastritis Intestinal Metaplasia Assessment (OLGIM) scores are used, in addition to the Sydney system, for chronic gastritis caused by Helicobacter pylori (H. pylori). They enable the grading of histological lesions of glandular atrophy and intestinal metaplasia, which are associated with low and high risk of neoplastic degeneration, respectively. We evaluated chronic Helicobacter pylori gastritis according to OLGA and OLGIM scores, and investigated the factors related to the occurrence of severe histological lesions.

Patients and methods: We conducted an analytical cross-sectional study from January 1, 2023, to June 30, 2023. Included were adult patients of both sexes who presented with chronic *Helicobacter pylori* gastritis, diagnosed by histological analysis of gastric biopsies. The re-evaluation of atrophy and intestinal metaplasia of the Sydney System parameters made it

possible to define OLGA and OLGIM stages, respectively. The significance threshold retained was set at $p < 0.05$.

Results: Our study included 346 patients with a mean age of 44.4 ± 14.2 years and a sex ratio of 0.71. Lesions of glandular atrophy and intestinal metaplasia were present in the antrum in 32.4% and 12.7% of cases, respectively. Stage III disease represented 2.0% of the cases according to the OLGA score and 0.6% of the cases according to the OLGIM score. None of the patients had a stage IV disease.

Conclusion: Severe histological lesions (OLGA-OLGIM III and IV) are rare, despite the high prevalence of *Helicobacter pylori* infection.

Keywords: *Helicobacter pylori, chronic gastritis, glandular atrophy, intestinal metaplasia, dysplasia, OLGA score, OLGIM score, gastric cancer, Sydney System, Ivory Coast.*

INTRODUCTION

Helicobacter pylori (*H. pylori) infection is a significant public health issue affecting nearly 50% of the global* population [1]. In France, its prevalence is 33.9% in adults [2]. There is a higher prevalence in developing countries, particularly in Côte d'Ivoire, where it is 66.47% in chronic gastritis [3]. Chronic *Hp* gastritis is defined histologically as a persistent inflammatory state of the gastric mucosa, diffuse or localized, induced by the presence of *Hp* and associated with epithelial alterations that can progress towards atrophy and/or intestinal metaplasia [4]. In clinical practice, it raises particular interest due to the risk of carcinomatous degeneration, as outlined in the Correa cascade [5]. This is described according to the Sydney system, which is the most commonly used in current practice. It comprises five fundamental elements: a lymphoplasmacytic infiltrate common to all chronic gastritis, the presence of polymorphonuclear neutrophils, glandular atrophy, intestinal metaplasia, and dysplasia [6]. The Sydney system enables a precise grading of precancerous lesions. It has the disadvantage of not being able to establish an immediate link between the gastritis phenotype and risk of malignancy [7]. As a result, two new classifications of chronic gastritis, defined as “Operative Link on Gastritis Assessment” (OLGA) and “Operative Link on Gastritic Intestinal Metaplasia Assessment » (OLGIM), have been proposed, making it possible to establish an overall scalability score, based on the degree of atrophy and intestinal metaplasia [7-8]. Patients with

advanced atrophic or metaplastic lesions (OLGA stages III-IV and OLGIM III-IV, respectively) are at risk of developing high-grade dysplastic lesions or gastric cancer. They should be subjected to endoscopic evaluation and monitoring, regardless of whether bacterial eradication is achieved [9,10]. In addition to the presence of *Hp*, several other factors contribute to the development of severe histological lesions in these patients. In Asia, factors such as advanced age and smoking have been incriminated [11]. In Europe, factors such as diet (consumption of salty and smoked foods), alcohol consumption, and smoking have been linked to an increased risk of gastric cancer [12]. To our knowledge, very few studies carried out in Côte d'Ivoire have evaluated patients at high risk of gastric cancer, according to the OLGA and OLGIM scores and the factors associated with the occurrence of severe histological lesions. Therefore, we propose conducting this study, the aim of which is to describe chronic Helicobacter pylori (Hp) gastritis according to the OLGA and OLGIM scores and to investigate the factors associated with the occurrence of severe histological lesions, to improve the screening of gastric cancer in our practice.

PATIENTS AND METHODS

Study framework

Our study was conducted in the Hepato-Gastroenterology Department of the University Hospital of Cocody on an outpatient basis and in the Hepato-Gastroenterology Unit of the Danga Medical Clinic. The laboratories for histopathological study were: the Laboratory of Pathology of the Medical Sciences Training and Research Unit in Abidjan-Cocody, the Laboratory of Pathology at the Danga Medical Clinic, and the Plateau Central Pathology Laboratory.

Type and period of study

This was a cross-sectional analytical study conducted over six months, from January 1, 2023, to June 30, 2023.

Selection criteria

Inclusion criteria

Adult patients of both sexes presenting with chronic *Hp* gastritis, diagnosed by histological analysis of gastric biopsies and having given their informed consent, were included in our study.

Exclusion criteria

- Patients receiving treatment with PPIs within 2 weeks or an antibiotic within 4 weeks preceding gastroscopic examination;

- Patients who underwent upper digestive endoscopy, regardless of the reason, without gastric biopsies.

Procedure

We recruited adult patients who underwent upper digestive endoscopy, regardless of the reason, with gastric biopsies as part of the search for *Hp* infection: two antral, one angular, and two fundic biopsies. These biopsies were sent to three Pathological Laboratories to search for chronic Helicobacter pylori (H. pylori) gastritis.

Sampling

We employed non-probability, consecutive, and exhaustive sampling methods.

Sample size

According to a study conducted by Diakité et al. in three hospital centers in Bouaké, Ivory Coast, in 2022, the prevalence of chronic Helicobacter pylori (Hp) gastritis is 66.47% [3]. To calculate the sample size, we used the Cochrane formula:

N = z 2 ×p (1-p) /m 2 with:

P =prevalence

M = margin of error, which is 0.05 (for a precision set at 5%)

Z = 1.96 for a confidence level of 95%

N = sample size

Numerical application: n = (1.96 2 × 0.6647 ×0.3353) / (0.05 2) = 342.47 or 342 patients.

Studied variables

- Sociodemographic variables included: age, sex, educational level, socio-economic level, and marital status.

- Clinical variables: Indications for esophagogastroduodenoscopy (EGD), use of gastrotoxic medications (NSAIDs), tobacco, and alcohol consumption.

- Paraclinical variables: EGD and pathological results according to the Sydney system.

Collection technique and tool

Data collection was performed through interviews and the collection of results from paraclinical examinations. Patients with chronic Helicobacter pylori (H. pylori) gastritis were referred via telephone. After obtaining informed consent, a pre-established survey form presenting the different variables was used for data collection.

Search for chronic *Hp* gastritis.

Sample collection and transport

Samples were collected from the Digestive Endoscopy Unit at different collection locations. The devices used were Olympus GIF H170 and Storz-brand video endoscopes. Antral (2), angular (1), and fundal (2) biopsies were performed using single-use or reusable endoscopic forceps after disinfection, according to the procedure of the French Society of Digestive Endoscopy (SFED) [13]. The biopsies were placed in 10% formalin bottles and sent to the Pathology Laboratory. The biopsy collection sites were specified on the pathological request forms available in the digestive endoscopy units.

Sample preparation

After fixation with 10% formalin and paraffin embedding of the gastric biopsies, thin sections were prepared and stained for reading between slides and coverslips. A standard stain with hematoxylin, eosin, and saffron (HES) was used for the diagnosis of gastritis. In contrast, a special modified Giemsa staining was used for the diagnosis of H. pylori infection.

Histological analysis

The Sydney system was used to evaluate the inflammation, activity, atrophy, and intestinal metaplasia. The parameters were rated as follows: 0 (absent), 1 (mild), 2 (moderate), and 3 (severe). *HP density was rated as mild, moderate,* or severe. Next, we applied the OLGA and OLGIM scores.

The OLGA classification is based on semi-quantitative evaluation of the intensity of atrophic lesions of the fundal and antral mucosa, with a staging ranging from 0 to IV. Stages 0, I, and II represent stages with a low progressive risk. Stages III and IV are defined as stages with a high progressive risk [7].

The OLGIM classification categorizes patients into five classes (ranging from 0 to IV) based on the grade and site of intestinal metaplasia, thereby defining the overall score of intestinal metaplasia. Stages 0, I, and II represent stages with a low progressive risk. Stages III and IV are defined as stages with a high progressive risk [8].

Data analysis

The data were recorded using CSPRO VERSION 7.7 software and then exported into SPSS software (version 26.0) for statistical analysis. Qualitative variables were expressed by their numbers and frequencies and compared using the chi-square or Fisher test if one of the boxes had a theoretical number of less than five. Quantitative variables were expressed as their means, accompanied by their standard deviations when the distribution of the variables followed a normal distribution, and as their medians, accompanied by their interquartile ranges when the distribution was not normal. Chi-square or Fisher's exact tests were used to search for factors associated with severe histological lesions in the bivariate analysis. Then, the related factors in the bivariate analysis were entered into a logistic regression model to identify the factors independently associated with severe histological lesions. Statistical significance was set at $p < 0.05$. The graphs were created using Microsoft Excel 2013 software, and the tables were created using Microsoft Word 2013.

Ethical considerations

The study adhered to the ethical guidelines outlined in the 1975 Declaration of Helsinki. All patients agreed to participate in the study after obtaining informed consent. Confidentiality of the data collected during the survey was respected. The results of this work will not be used for commercial purposes, but only for scientific research.

RESULTS

Descriptive data

Patient's sociodemographic characteristics

Our study included a total of 346 patients whose mean age (standard deviation) was 44.4 (±14.2) years, with a sex ratio of 0.71. The sociodemographic characteristics of the patients are summarized in Table 1.

Table 1. ***Sociodemographic Characteristics***

Variable	Number (N=346)
Mean age ± standard deviation	44.4 ± 14.2
Gender (Male) n (%)	144 (416)
Marital status n (%)	
Married	201 (58.1)
Bachelor	113 (32.7)
Others	32 (9.2)
Gainful activity (Yes) n%)	197 (56.9)
Educational level n (%)	
Primary	54 (15.6)
Secondary	118 (34.1)
Superior	115 (33.2)
Unschooled	59 (17.1)

Clinical and endoscopic characteristics

The main reasons for performing upper gastrointestinal endoscopy were epigastric pain (86.4%), dyspepsia (8.1%), and digestive bleeding (2.3%). More than one cause of EGD was identified in the same patient. The clinical characteristics of the patients are summarized in Table 2.

Table 2. Endoscopic findings.

Variable	Number (N=346)	Percentages (%)
Epigastric pain	299	86,4
Dyspepsia	28	8,1

Gastrointestinal bleeding	8	2,3
Anemia	7	2,0
Halitosis	4	1,2
Hiccup	3	0,9
Precordial pain	1	0,3
Vomiting	4	1,2

The examination results were expected in 14.2% of the patients. The endoscopic lesions were antral (72.8%) and fundic gastropathies (34.4%). Gastric and duodenal ulcers were found in 1.4% and 0.9% of the cases, respectively. More than one lesion could be found in the same patient. Among patients with gastropathy, the most common erythematous appearance (78.8%) of the gastric mucosa was observed.

Histological characteristics of chronic Hp gastritis

In our patients, the histological lesions and their severity were predominant in the antrum. Glandular atrophy lesions were present in the antrum in 32.4% of cases and in the fundus in 6.4% of cases. Intestinal metaplasia was present in 12.7% of cases in the antrum and 2.3% of cases in the fundus. *HP* was found in the antrum and fundus in 96.8% and in 82.4% of cases, respectively.

Classification of patients according to OLGA and OLGIM scores

Severe histological lesions (OLGA stages III – IV and OLGIM stages III and IV) were uncommon. Stage III disease represented 2.0% of the cases according to the OLGA score and 0.6% of the cases according to the OLGIM score. None of the patients had a stage IV disease. Figures 1 and 2 show the distribution of patients according to OLGA and OLGIM scores.

Analytical data

To estimate the link between the density of Hp and the occurrence of severe histological lesions, we divided our chronic gastritis cases into two groups: the first with low density at Hp (mild to moderate density) and the second with high density (severe density). *HP* density was

not associated with the occurrence of severe histological lesions, as determined by the OLGA score. We did not find a significant association between age and the occurrence of severe histological lesions, as determined by OLGA and OLGIM scores. Male sex was significantly associated with the occurrence of severe histological lesions, as determined by the OLGA score (OR = 8.7; p = 0.022). There was no association between sex and the occurrence of severe histological lesions, as determined by the OLGIM score. We did not find any significant association between alcohol intake and the occurrence of severe histological lesions according to the OLGA score (p=0.107). Smoking was significantly associated with severe histological lesions according to the OLGA score (OR=16.2; p=0.004). There was no significant association between Non-steroidal anti-inflammatory drugs (NSAIDs) use and the occurrence of severe histological lesions according to the OLGA score (p=0.072).

DISCUSSION

OLGA and OLGIM scores represent two histoprognostic classification models that provide clinicians with precise and relevant information, enabling the selection of forms of chronic gastritis that require rigorous monitoring. Severe forms, defined by OLGA and OLGIM scores of stages III–IV, are at risk of developing high-grade dysplastic lesions or gastric cancer [14]. In our study, these stages of chronic gastritis with a high progressive risk were very uncommon, accounting for 2% of patients according to the OLGA score and 0.6% of patients according to the OLGIM score. This low number could be explained by the relatively young age of the patients (44 ± 14.2 years). These results are lower than those reported in Tunisia, where a high progressive risk of gastritis was found at a frequency of 6% for the OLGA classification and 7% for the OLGIM classification [15]. Likewise, in Turkey, the respective frequencies of high-risk chronic gastritis (III and IV) were 4.3% and 4% for OLGA and OLGIM scores, respectively [16]. In an Italian series, the high-risk stages were 6.4%, with a clear predominance of stage III and a very low rate of stage IV (<1%) [17]. Our results differ from those of Nam JH et al., who reported a 25.7% higher rate of chronic gastritis with a high progressive risk in a Korean population with a mean age of 48.2 ± 10.8 years, according to the OLGA score [11]. In our study, the stages of chronic gastritis with low progressive risk (OLGA and OLGIM 0-I-II) were the most frequent. The OLGA scores were 67.9%, 22%, and 8.1%, respectively. The OLGIM

score was 86.7%, 8.4%, and 4.3%, respectively. These results are similar to those reported by Salazar et al., who reported a frequency of 96% for OLGA-OLGIM stages 0-I-II [18]. Histological lesions induced by *Helicobacter pylori (Hp)* were mainly found in the antrum. The glandular atrophy and intestinal metaplasia recurred. *HP* was present in the antrum and fundus in 96.8% and 82.4% of cases, respectively. These results are similar to those reported by Doffou et al. for the Côte d'Ivoire [19]. Regarding *Hp* density, we did not find a significant association between high *Hp* density and the occurrence of severe histological lesions (OR = 0.8; p = 1.000). Indeed, chronic gastritis with a high progressive risk, as determined by the OLGA score, is characterized by marked atrophy of the gastric mucosa, resulting in hypochlorhydria, which disrupts the gastric environment, rendering it inadequate for bacterial multiplication and limiting bacterial density [15]. Similarly, a high bacterial density, accompanied by severe lesions according to the OLGIM score, was not observed in any of our patients. This finding could also be explained by changes in the ecosystem becoming inappropriate for bacterial multiplication in high-risk forms of OLGIM, which are characterized by extensive intestinal metaplasia [15]. These results differ from those reported by Ghasemi et al., who found a statistically significant relationship between the intensity of *Helicobacter pylori (Hp)* colonization and the occurrence of gastric atrophy and gastric intestinal metaplasia [20]. A study conducted by Nam et al. in the Korean population found that stages of high progressive risk, as defined by OLGA and OLGIM, were not present in patients under 30 years of age. However, in individuals over 30 years of age, the frequency of high-risk OLGA and OLGIM stages increases to 7.9% and 3.2%, respectively [11]. In our study, 71.4% of patients presenting with severe lesions, as determined by the OLGA score, were over 30 years of age. None of the patients with severe lesions according to the OLGIM score were aged < 30 years. In Cameroon, Ankouane et al. found a predominance of severe atrophic lesions in patients aged 41–60 years [21]. In our study, no significant association was found between age and the occurrence of severe histological lesions in univariate analysis. These data are contrary to those reported in the literature and those reported by Nam JH et al., who found a significant association between age 40 years and the occurrence of severe histological lesions [11]. This could be explained by the weakness of our sample in the severe lesions group. However, our small number of patients with severe histological lesions, as determined by the OLGIM score, did

not allow for the identification of factors associated with the occurrence of severe intestinal metaplasia. According to the recommendations of learned societies, chronic gastritis with a high progressive risk (OLGA and OLGIM III-IV) requires endoscopic monitoring every three years, regardless of whether bacterial eradication has been achieved [22]. In our study, these severe histological forms represented respectively 2% of cases according to the OLGA score and 0.6% according to the OLGIM score. Follow-up endoscopy was not performed in 78% of these patients every 3 years. This result concerns us and should invite us to increase screening for gastric cancer in our practice, through the use of the OLGA and OLGIM histoprognostic scores, and to offer a control endoscopy every 3 years in patients with severe histological forms.

Despite the large sample size and multicenter nature of our study, it nevertheless presents some limitations: a small number of patients presented with severe histological lesions, and the slides were read by different pathologists. Interobserver variability was not assessed in this study.

Conclusion

Severe histological lesions (OLGA and OLGIM III-IV) of chronic *Helicobacter pylori (H. pylori) gastritis are rare in our context, despite the high prevalence of H. pylori* infection. A high *HP* density was not associated with the occurrence of severe histological lesions.

Footnotes.

Ahmed Fathy (Professor of internal medicine, gastroenterology, and hepatology unit), Hayam Rashed (Professor of pathology), and Amany Mohamed (Professor of family medicine and biostatistician) were peer reviewers.
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Ethics approval
Informed consents were obtained from all individuals involved in this work.
Data and materials availability: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.
Competing interests: The authors declare that they have no competing interests.
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This work was conducted following the STROBE guidelines.

Authors' contributions:

All authors made substantial contributions to the study's conception, design, data acquisition, analysis, or interpretation; drafting or revising the article; and final approval of the version to be submitted.

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