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Evaluation of OLGA and OLGIM Systems in Madagascar, a Country with Low Economic Resources

Manoahasina Ranaliarinosy Rabarison[1], Lalaina Nomenjanahary[1], Nantenaina Soa Randrianjafisamindrakotroka[2]

[1]Department of Pathology, Joseph Ravoahangy Andrianavalona University Hospital, Antananarivo, Madagascar
[2]Chairman at the Department of Pathology, Medical School of Antananarivo, Antananarivo, Madagascar
Email: manoarabari@gmail.com

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Abstract

Chronic gastritis is a persistent inflammation of the gastric mucosa. The Sydney System is the most widely used classification of this disease but it does not allow a ranking of patients according to the evolutionary potential of the disease, unlike the classifications: "Operative Link On Gastritis Assessment" (OLGA) and "Operative Link on Gastritis Intestinal Metaplasia Assessment" (OLGIM). Our goals are to apply and evaluate the three classifications: the Sydney System, OLGA and OLGIM and to draw possible correlations. This is a retrospective, descriptive, single-center study performed on all cases of chronic gastritis, diagnosed at the laboratory of Pathological Anatomy Unit of Joseph Ravoahangy Andrianavalona University Hospital from January 1, 2013 to December 31, 2017. A review and application of the three main classification systems was performed on each case. We included 298 cases. The mean age was 50.85 years. The sex ratio was 1.48. The high-risk stages according to the "Operative Link On Gastritis Assessment" (OLGA) system and the "Operative Link on Gastritis Intestinal Metaplasia Assessment" (OLGIM) system were 0.67% and 2.68%, respectively. We observed a correlation between the two systems with discordance of 5%. The use of the two new systems allows the assessment of the progressive potential of gastritis in patients at risk of developing gastric cancer. For optimal effectiveness of both classifications, biopsies should be performed according to the Sydney System recommendations.

Keywords

Gastritis, Sydney System, OLGA, OLGIM

1. Introduction

Chronic gastritis is a persistent inflammation of the gastric mucosa characterized by elementary lesions whose extension and distribution depend on its etiology and the host immune response [1]. It presents a risk of carcinogenesis but the importance of this risk is different from one patient to another. Hence, it is necessary to use an efficient classification system for the proper management of patients with chronic gastritis. The Sydney system is the most commonly used to classify chronic gastritis [2]. It allows a clear grading of precancerous lesions but has the disadvantage of not being able to select the forms of chronic gastritis with a high risk of gastric cancer [3]. Thus, two new classifications of chronic gastritis have been proposed: "Operative Link on Gastritis Assessment" (OLGA) based on the severity of atrophic gastritis and "Operative Link on Gastritis Intestinal Metaplasia Assessment" (OLGIM) [4] based on the assessment of the extent and intensity of intestinal metaplasia. They provide an overall score of progress according to the degree of atrophy and intestinal metaplasia [4].

In Madagascar, only the Sydney system is commonly used to evaluate chronic gastritis but the other two classifications have not yet been applied in routine practice. Thus, we set out to evaluate the OLGA and OLGIM classifications, to determine the correlations between the two new systems and their correlations with epidemiologic and pathologic data.

2. Materials and Method

We performed a retrospective, descriptive, single-center study of chronic gastritis diagnosed at the laboratory of Pathological Anatomy Unit of Joseph Ravoahangy Andrianavalona University Hospital over a five-year period. Non-biopsy gastric specimens and lesions other than chronic gastritis were not included. We included chronic gastritis diagnosed on gastric biopsies during endoscopic sampling. And we excluded all chronic gastritis complicated by perforation and poor-quality biopsy specimens.

We studied the following parameters: age, sex, clinical information, lesion topography, and pathological parameters including Sydney system to define chronic gastritis, atrophy to determine OLGA, and intestinal metaplasia to determine OLGIM. All specimens were fixed in 10% buffered formalin, processed according to the conventional histological slide preparation technique, and stained with hematoxylin-eosin (HE). We did not use any special stain to highlight intestinal metaplasia, which is identifiable with hematoxylin-eosin. Furthermore, the laboratory does not have Giemsa or Periodic Acid of Schiff (PAS). For each case, we first applied the Sydney system and then applied the OLGA and OLGIM systems to differentiate high-risk from low-risk chronic gastritis. The latter two assess the presence, extent and intensity of atrophy and intestinal metaplasia respectively. The scores are obtained by combining the intensity of atrophic lesions of the fundic and antral mucosa for the OLGA system (**Table 1**) and the intensity of intestinal metaplasia for the OLGIM system (**Table 2**). For

Table 1. OLGA system, Rugge *et al.* [3].

		FUNDUS			
	Atrophy score	No atrophy	Mild atrophy	Moderate atrophy	Severe atrophy
ANTRUM	No atrophy	Stage 0	Stage I	Stage II	Stage II
	Mild atrophy	Stage I	Stage I	Stage II	Stage III
	Moderate atrophy	Stage II	Stage II	Stage III	Stage IV
	Severe atrophy	Stage III	Stage III	Stage IV	Stage IV

a. Mild atrophy: <30% atrophic glands; b. Moderate atrophy: 30% - 60% atrophic glands; c. Severe atrophy: >60% atrophic glands.

Table 2. OLGIM system, Capelle *et al.* [4].

		FUNDUS			
	IM score	No IM	Mild IM	Moderate IM	Severe IM
ANTRUM	No IM	Stage 0	Stage I	Stage II	Stage II
	Mild IM	Stage I	Stage I	Stage II	Stage III
	Moderate IM	Stage II	Stage II	Stage III	Stage IV
	Severe IM	Stage III	Stage III	Stage IV	Stage IV

a. IM: Intestinal Metaplasia; b. Mild intestinal metaplasia: <30% metaplastic glands; c. Moderate intestinal metaplasia: 30% - 60% metaplastic glands; d. Severe intestinal metaplasia: >60% metaplastic glands.

both systems, the staging ranges from 0 to IV. Stages 0, I, and II represent stages with a low risk of progression. Stages III and IV define stages with a high risk of progression. The analysis was done with Epi info 7.2.2.6 software and Microsoft Excel 2020 software. To investigate the relationship between two variables, we used the Chi-square test with Fisher's test. Differences were considered significant when "p" was less than 0.05. A descriptive analysis was performed, no other specific statistical tests were performed.

3. Results

We retained 298 cases of chronic gastritis with a male predominance of patients representing 59.73% (n = 178). The sex ratio was 1.48. The mean age was 50.8 ± 15.3 years. Abdominal pain was the most common presenting sign in 46.64% (n = 139) of cases. Among the 298 specimens, 22.15% (n = 66) involved both the antrum and the corpus. However, in 69.46% (n = 207) of cases, the samples from the antrum only and in 8.39% (n = 25) of cases, from the corpus. The number of samples was less than five biopsy fragments in 90.94% (n = 271) of cases. Applying the OLGA and OLGIM systems on all specimens (conforming or not to the Sydney system recommendations), the high-risk evolutionary stages represented 0.67% (n = 2) and 2.68% (n = 8) each according to OLGA and OLGIM (**Table**

3). We observed a highly positive correlation between the two new classifications OLGA and OLGIM ($p = 0.00$) with a slight discordance of 2.68% ($n = 8$) (Table 4). In this discrepancy, high risk stages according to OLGIM are low risk according to OLGA. This could be explained by the fact that the parameters studied in these two systems are different but belong to the same process. No correlations ($p > 0.05$) was observed between the two new systems and epidemiological parameters (age, gender) nor between these two systems and the number of samples.

4. Discussion

The gender differs from literature's data. Some studies such as those conducted by Jemilou AC *et al*. [5] and Feyisa ZT *et al*. [6] showed a female predominance of patients with chronic gastritis. These authors observed that females accounted for 54.7% and 67.6% of cases in their series, respectively. Other studies conducted by Monteiro R *et al*. [7] and Wen Z *et al*. [8] showed that men were in the majority and represented respectively 62.60% and 58.2% of their study populations. Our results are similar to those of the latter with a male predominance of 59.73%. This male predominance in our series could be related to the action of estrogen. In fact, this hormone can lead to an increased expression of trefoil factors which, under physiological conditions, preserve the integrity of the digestive system mucosa [9]. These factors are involved in the protection of the mucous membranes during bacterial, viral or drug attacks as well as in certain inflammatory or ulcerative pathologies [9]. Thus, the low concentration of estrogen in men could explain the male predominance of chronic gastritis in our

Table 3. Correlation between OLGA, OLGIM and epidemiological parameters.

	Stage 0		Stage I		Stage II		Stage III	
	OLGA	OLGIM	OLGA	OLGIM	OLGA	OLGIM	OLGA	OLGIM
Number of cases	183	191	93	78	20	21	2	8
Average age (years)	51.07	51.04	50.36	49.69	50.95	51.90	51.50	54.50

Table 4. Correlations between OLGA and OLGIM.

	OLGIM Stage 0	OLGIM Stage I	OLGIM Stage II	OLGIM Stage III	TOTAL
OLGA Stage 0	133	39	11	0	183
OLGA Stage I	49	31	6	7	93
OLGA Stage II	9	8	2	1	20
OLGA Stage III	0	0	2	0	2
TOTAL	191	78	21	8	298

series.

Regarding age, we observed in our series that the mean age of our study population was 50.85 years with a peak in subjects aged 50 to 59 years representing 25.84% of patients. Hassawi BA *et al*. showed that the mean age in their series was 43.7 years [10] and Slama SB *et al*. observed in theirs a mean age was 42.73 years [11]. In accordance with the literature, we noted that chronic gastritis is frequently observed in middle-aged subjects with a slightly higher mean age in our series compared to those of other authors. This could be explained by the fact that persistence of the causative agent would be required to give a chronic inflammation. Furthermore, gastritis can remain asymptomatic for several years. Thus, the older the patients, the more likely they are to develop chronic gastritis with more specific signs. The clinical manifestations would then be more marked over the years, which would lead patients to consult a doctor at a later age.

The symptoms of chronic gastritis are varied and multiple. In our series and in the literature, abdominal pain was the most common sign that led patients to consult a doctor. Broide E *et al*. [12] and Jmaa R *et al*. [13] observed that abdominal pain constituted respectively 55.7% and 67% of the signs of gastritis in their studies. The fact that pain is one of the four main signs of inflammation could explain this predominance of abdominal pain in chronic gastritis where inflammation is the basic lesion.

Concerning the two systems (OLGA and OLGIM), they focus on atrophy and intestinal metaplasia lesions (**Figure 1**) which constitute a pre-neoplastic lesion, favoring the development of intestinal type gastric adenocarcinoma [3] [14] [15]. In our study, high-risk stages according to OLGA represent 0.67% (n = 2) of specimens and those according to OLGIM 2.68% (n = 8). Relating to OLGA,

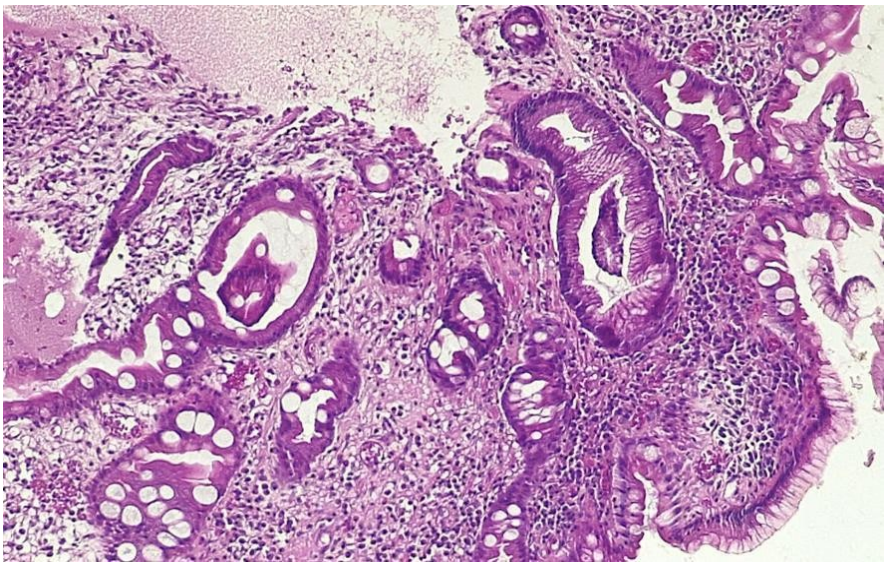

Figure 1. Stomach, chronic gastritis with atrophy and intestinal metaplasia, MO, HE, ×400. Source: Pathological anatomy unit of Joseph Ravoahangy Andrianavalona University Hospital.

high risk stages represented 6.4% of cases in an Italian series, 25.8% in a Korean series [16] and 6% in a Tunisian series [11]. Having regard to OLGIM, the studies of Selgrad M *et al*. [9], Isajevs S *et al*. [17] and Slama SB *et al*. [11] showed that high-risk stages accounted for 5.1%, 8.58% and 7% of their cases. Thus, the patients with metaplastic and non-metaplastic atrophic gastritis have not the same risk to develop gastric cancer. Assessment of the degree and extent of intestinal metaplasia and atrophy helps identify patients require special medical attention. High-risk gastritis (according to OLGA and/or OLGIM) are therefore precursors of gastric cancer. This would explain the low proportion of high-risk gastritis because gastric cancer develops in only a minority (<1%) of infected individuals and requires several factors including dietary factors, such as high salt, red meat and smoked food consumption, and high alcohol consumption [18]. We were unable to study these factors because of insufficient clinical information from prescribing physicians.

No correlation was observed between OLGA and age ($p = 0.98$) or between OLGIM and age ($p = 0.75$) in our study. Capelle LG *et al*. [4], Slama SB *et al*. [11] and Isajevs S *et al*. [17] noted a significant association between OLGA and age ($p < 0.05$). Nam JH *et al*. [16] found a correlation between OLGIM and age but Slama SB *et al*. [11] did not. In our series, this lack of correlation could be explained by the fact that the mean ages of patients with high and low risk stages according to OLGA are very close representing 51.50 and 50.79 years respectively. Similarly, for the OLGIM classification, in our study, the mean age for high risk and low risk stages represent 58 and 53.13 years respectively. It would seem in our work that the grade according to both classifications would not increase with age.

Also, no correlation was observed between OLGA and gender nor OLGIM and gender. Gender has no influence on high-risk gastritis in our series and in the literature [2] [3] [4] [19]. We did not find hormonal or lifestyle-specific explanations for this lack of correlation between men and women.

The correlation between the number of samples and the two systems (OLGA and OLGIM) in the literature wasn't seen in our data. This could be explained by the fact that the samples taken by the clinicians were targeted on specific lesions of the gastric mucosa in order to limit the number of biopsies on which the price of the anatomopathological examination depends. Indeed, in a developing country like ours, the majority of patients cannot afford an anatomopathological examination, especially if it concerns several biopsy pieces. Thus, we applied both systems to all gastric specimens with chronic inflammation and we identified high-risk stages but we could have made a better assessment of the cancer risk with complete samples. So if the specimens had been compliant with at least 5 biopsy specimens (two corpus, two antrum, one angularis) representing the entire gastric mucosa, we could have refined the evaluation of gastritis according to OLGA and OLGIM.

We observed a correlation between OLGA and OLGIM. Our results are identical to those in the literature [11] [16] [17]. Slama SB *et al*. [11] observed a posi-

tive and highly significant correlation ($p < 0.05$) with 5% discordance. In our study, all gastritis with high risk according to OLGA are high risk according to OLGIM, those with low risk according to OLGA are low risk according to OLGIM and vice versa except for some cases (n = 8) where we observed a discordance of 2.68% (n = 8). In this discrepancy, high risk stages according to OLGIM are low risk according to OLGA. This could be explained by the fact that the parameters studied in these two systems are different but belong to the same process. According to Correa P [1], the appearance of atrophy precedes intestinal metaplasia. Therefore, when a gastritis is at high risk according to OLGA and/or OLGIM, a rigorous surveillance is necessary because the patient is always at risk of developing gastric cancer. Moreover, according to some authors, the OLGIM system confers a better reproducibility than the OLGA system [4] [20] but it is less sensitive than the OLGA system [21]. Therefore, it is advisable to use both two classifications in order not to under-grade patients and to adopt an adequate surveillance.

Our study has some limitations: it is monocentric study and does not reflect the reality in Madagascar. Some samples are note representative of the gastric mucosa.

Chronic gastritis is a common condition, especially in developing countries. They require adequate management, mainly on sampling, classification and follow-up for patients and scientific research. Thus, it is important to set up Pathological Anatomy and Cytology laboratories in all the major cities of the island so that the data collected reflect the reality in Madagascar. It is necessary that clinicians take samples according to the recommendations of the Sydney System, *i.e.* five biopsy samples from the antrum, the gastric body and the angulus, and send to the laboratory of Pathological Anatomy Unit a complete prescription form with relevant clinical information (history, number of samples, etc.). Specific specimen cards should also be established for gastric biopsies. It is recommended that all pathologists practicing in Madagascar apply the Sydney System as well as the two OLGA and OLGIM systems to determine the cause, the topography of lesions and the evolutionary potential of a gastritis. This is true even if the specimens do not respect the Sydney System recommendations. They should also report on the risk of gastritis progression. It is crucial to provide each laboratory of Pathological Anatomy and Cytology with the necessary materials such as special stains like Giemsa or PAS and immunohistochemistry (anti-Helicobacter pylori antibodies) for a better appreciation of the different parameters studied in the three classification systems of gastritis. Patients at high risk of progression should be followed up according to OLGA and OLGIM. According to the recommendations of the Management of Precancerous conditions and lesions in the Stomach or MAPS [22], endoscopic surveillance every three years of high-risk gastritis according to OLGA and/or OLGIM is necessary. Etiological treatment of all low risk gastritis according to OLGA and/or OLGIM is also recommended.

5. Conclusion

OLGA and OLGIM systems allow ranking of patients according to whether or not they require special care. Their use in combination with the Sydney System is required in countries with low economic resources for optimal management of patients with chronic gastritis. However, the application of these three classifications requires targeted gastric sampling in accordance with the recommendations of the Sydney System for a better yield of anatomical-pathological results. Furthermore, prospective and multicenter epidemiological studies should be performed to evaluate the evolution of gastritis, particularly among those at high risk of developing cancer.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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