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Epidemiological and Histopathology Study of Gastric Lesions in Ouest Africa

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ABSTRACT

Gastric pathologies represent a global public health problem due to their frequency and severity. The objective of the study was to epidemiologically evaluate all gastric lesions diagnosed at the Pathological Anatomy Laboratory of Saint-Louis, Senegal over a period of 30 months. In addition to sociodemographic parameters, different histological types and molecular profiles were described. A total of 372 cases was identified, 96% were biopsies and 4% were partial gastrectomy surgical specimens. The sex ratio was 0.92 with 48% men (N=179) and 52% women (N=193). The mean age was 45.08 years. The lesions were distributed as follows: gastritis accounted for 86.02% (N=320) of which 70% were Hp gastritis (N=224) followed by gastric cancers with 10.76% (N=40) of which 95% (N=38) were adenocarcinoma (ADC). Male predominance was clear with a sex ratio of 2.1 (N=26 H/12 F) and the tubular subtype was the most common at 55.26% (N=21) for these ADCs. At the molecular level, 17.14% of cases were HER2+ cotation 3+. Other types of cancer were rare, including 1 case of GIST and 1 case of lymphoma (1 case). Polyps were rarely observed with a rate of 1.67% (N=6) and mostly hyperplastic and glandulocystic type. These epidemiological data described in our study can contribute to the development of strategies and preventive measures in the fight against these diseases in sub-Saharan Africa where studies are scarce.

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Introduction

Gastric diseases are a global public health problem due to their frequency and severity. The most common gastric lesions are gastritis, ulcers and cancers. Gastritis is classified into acute or chronic gastritis according to its etiologies and evolutionary potential. Chronic gastritis has become better evaluated and managed since the introduction of the Sydney system, the advent of upper gastrointestinal endoscopy and the discovery of its frequent association with *Helicobacter pylori* (Hp) infection [1]. According to the World Health Organization (WHO), about 50% of the world's population is infected with *Helicobacter pylori*. In Senegal, previous studies have shown that the infestation rate is over 80% of the general population [2].

According to the International Agency for Research on Cancer (IARC), gastric cancers account for approximately 934,000 new cases per year worldwide, or 8.6% of all new cancers. This puts it in fourth place in terms of incidence behind lung (12.4%), breast (10.6%) and colorectal (9.4%) cancers. These gastric cancers are more common in men with a sex ratio of 2 [3]. There is a great geographical disparity in its prevalence, with a predominance in developing countries (60%) of cases, hence the scientific

interest we have in this subject. The objectives of our study were to evaluate sociodemographic data, determine the frequency of diagnosed gastric pathologies, determine the prevalence of *Helicobacter pylori* gastritis, determine the frequency of gastric cancers by specifying the different histological types and immunohistochemical profiles.

Methodology

This is an epidemiological and histopathological study of all gastric lesions diagnosed through a retrospective approach over a period of 30 months. All reports with diagnoses of gastric lesions were included in the study. Inconclusive reports were excluded. The same applies to lesions of the cardia and bulb. Thus, 372 cases were selected for the study period.

The analysis of the microscopic slides was performed on several levels of sections after standard HE staining. Concerning Hp, the detection was made with the staining of Giemsa Histo. The OLGA/OLGIM score was applied to HP gastritis lesions and activity and dysplasias were assessed. Immunohistochemical examinations were performed specifically for cancer lesions. A manual technique on paraffin-coated gastric tissue blocks by enzyme-linked immunosorbent detection with heat restructuring. For gastric ADCs, an assessment of HER2 protein overexpression

was performed and a full intense frame labeling was rated 3+. All the data were used with the Epi Info 7.2.6.0 software for the calculation of frequencies, age averages, diagram development and correlation test calculation.

Results

Sociodemographically, there was no gender predominance of gastric disorders (sex ratio 0.92). The mean age of patients was 45.08 years +/- 16.87 with extremes of 10 years and 91 years. The most affected age group was [41-60] years old with 38.70%. The majority of samples were endoscopic biopsies in 96% of patients, i.e. 360 patients (N=372). The main indication for these biopsies was chronic epigastralgia with a rate of 54.4% of patients. The majority of gastric biopsies were performed in the antrum and fundus with 71.79% or 257 cases (N=358). Erosion and erythematous appearance predominated, with 18.94% and 18.27% respectively for the appearance of the gastric mucosa at EOGD. Ulcerative budding lesions accounted for 9.97%.

Histopathologically, gastritis was the most common lesion with 86.02% of cases (N=320). Gastric cancers came in second place and accounted for 10.76% or 40 cases. These included 38 cases of adenocarcinoma (ADC), 1 case of GIST and 1 case of lymphoma (Table 1). Polyps came in third place with 1.61% or 6 cases. The correlation study between endoscopic mucosal aspects and histological lesions revealed that 92.59% of ulcero-budding lesions corresponded to gastric ADCs (p. value < 0.05).

Table 1: Distribution of Gastric Lesions

Gastric lesions	Frequenciess	Percentages
Adenocarcinoma (ADC)	38	10,22 %
Lymphoma	1	0,27 %
Stromal tumor (GIST)	1	0,27 %
Gastritis	320	86,02 %
Polyps	6	1,61 %
Dystrophic Mucosa	6	1,61 %
TOTAL	372	100,00 %

Gastritis

They were distributed as follows: Hp gastritis was the most common with 70% of cases. This was followed by simple chronic gastritis and acute gastritis, with rates of 21% and 7%, respectively.

Hp gastritis predominated in the [21-40] and [41-60] age groups. Activity was assessed by the presence of neutrophils within the lesion. There was evidence of activity in 96% of chronic gastritis. Intestinal atrophy and metaplasia was assessed with the OLGA and OLGIM score. Atrophy was observed in 82 patients with Hp gastritis (N=224), or 37% (Figure 1). This atrophy was mild in 56 patients (25%), moderate in 16 patients (7%) and severe in 10 patients (5%). Intestinal metaplasia was present in 27 patients with Hp gastritis (12% of cases) (Figure 2). This metaplasia was mild in 9 patients (4%); moderate in 17 patients, or 8%. Only one (1) case of Hp gastritis with severe metaplasia was objectified. Dysplasia was found in 10 patients with gastritis. This dysplasia was high-grade in 7 patients and low-grade in 3 patients. The presence of Helicobacter pylori was found in 6 patients with dysplasia, i.e. 60% of cases (p < 0.05).

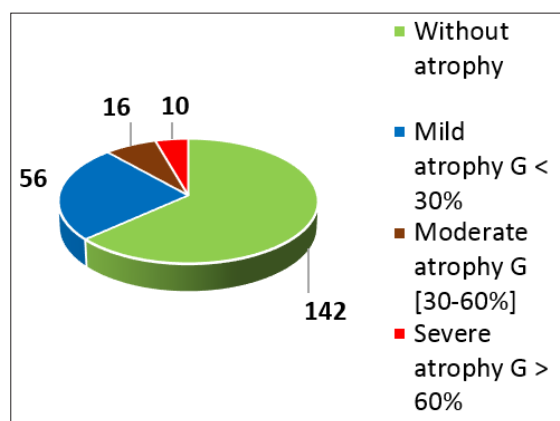


Figure 1: Distribution of Atrophy in Hp Gastritis according to the Intensity

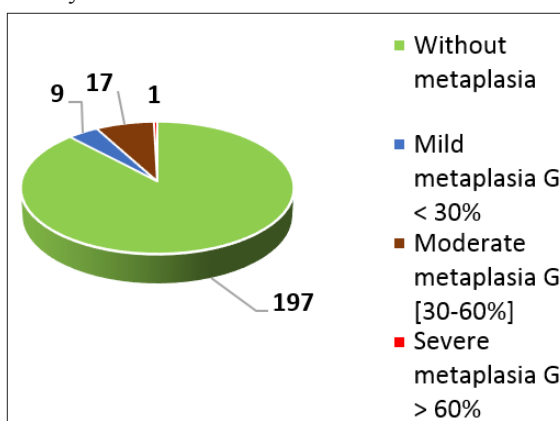


Figure 2: Distribution of Intestinal Metaplasia in Hp Gastritis according to the Intensity

Gastric Polyps

The frequency of polyps in our study was 1.61% divided into 5 cases were non-neoplastic polyps (3 hyperplastic polyps; 2 glandulocystic polyps) and 1 case was neoplastic polyps (adenoma in low-grade dysplasia).

Gastric Cancers

Gastric cancers accounted for 10.76% of all gastric lesions, i.e. (n=40 / N=372), including 38 ADCs, one (1) case of lymphoma and one (1) case of GIST.

Among cancers, ADCs were the most common with 95% or 38 cases, of which 3 cases were in situ and all 35 cases were invasive. The sex ratio was 2.1 (p = 0.0217). The most common subtype of infiltrating gastric ADC was the tubular one with 21 cases. Mucinous subtypes (6 cases), signet ring cells or independent cells (4 cases), papillary cells (4 cases) and 1 hepatoid subtype. Moderately differentiated gastric ADCs were the most objectified with 25 cases. Immunohistochemically, these ADCs with a HER2 positive status of 3+ was 17.14% (Figure 3). Gastric ADCs were more common in 20 and 15 cases, respectively between [41-60] and [61-91] years of age (p = 0.0037). The mean age of onset was 58.39 years +/-12.68.

One case of epithelioid GIST (high risk according to the Miettinen classification) and one case of EATL T-cell lymphoma were objectified in women. Lymphoma appeared at age 55 and GIST at age 69 (Figure 4).

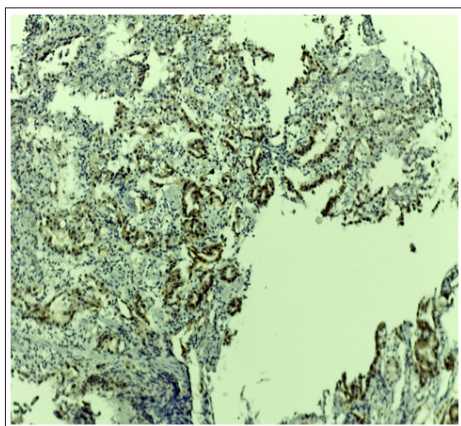


Figure 3: Microphotograph showing HER2 (3+) Staining of Gastric Tubular Adenocarcinoma

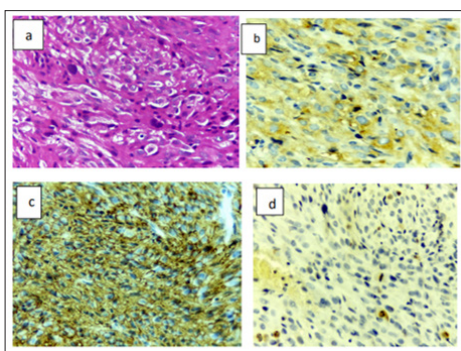


Figure 4: GIST: a) Epithelioid Tumor Cells with Marked Nuclear Atypia; b) CD117 Labeling by Cells; c) CD34 Labelling; d) High Ki67 Mitotic Index

Discussion

Our study involved 372 samples was included over 30 months. The mean age of patients in our study population was 45.08 years +/-16.87. The [21-40] and [41-60] age groups were the most affected.

Clinically, epigastralgia was the main reason for fibroscopy (54.44%). In almost all series, epigastralgia is the earliest indication of EOGD. In the sub-region, Konaté et al, on a study on chronic *Helicobacter pylori* gastritis in Mali had found a prevalence of epigastralgia at 97.88% [4,5]. In China, a study of chronic gastritis showed that epigastralgia is the most common reason for EOGD at 52.9% [6]. The fairly common association of chronic gastritis with peptic ulcer disease could explain this symptomatology.

The prevalence of Hp gastritis is 70% in our study and an almost similar prevalence was found at 72.8% in Dakar and 72.5% in Yaoundé respectively [7,8]. However, prevalence is lower in developed countries and ranges from 20% to 40% [9]. The age group between 20 and 41 years was the most affected. Other studies reported similar results in Africa [9,10]. In developing countries, it is estimated that 80% of the population is affected before the age of 20, while in the West, Hp gastritis is more common in people in their sixties [11]. Similar results are reported in the USA and Europe [12,13]. In our developing countries, overcrowding, low hygiene and economic precariousness would explain this situation. According to activity, Hp gastritis was active in 96% of cases, i.e. 214 cases out of a total of 224, with a statistically significant correlation ($p < 0.05$). In Senegal, Cissé

objectified activity in 97% of gastritis cases [14]. Our results are similar to those of Aissaoui et al in Tunisia, who found an activity of 89.7% of Hp gastritis [15]. Atrophic Hp gastritis sometimes requires endoscopic monitoring. For atrophy, our results were consistent with a study carried out in the Maghreb in Tunisia with rates of 37% and 35% respectively [15]. Hp infection is as an important factor in atrophy of the gastric mucosa in addition to intestinal metaplasia. Indeed, intestinal metaplasia was observed in 27 patients, i.e. 12% of Hp gastritis. It is the replacement of the gastric mucosa with an intestinal-type mucosa. In Burkina Faso, this intestinal metaplasia had a similar frequency of 13.5%, as well as in Tunisia with a frequency of 11% [15,16]. Chronologically, intestinal metaplasia occurs later than atrophy. In addition, it is more associated with cancer risk when it is multifocal and not localized at the level of the antrum or fundus, hence the importance of varying biopsy sites for better mapping of metaplasia [17,18]. The cascade from chronic gastritis related to Hp infection to atrophy, metaplasia and dysplasia, respectively, applies only to intestinal adenocarcinoma. Moreover, gastric cancer is the 5th most common cancer in Senegal with 5.3% of new cases/year.

In our study, gastric cancers accounted for 10.76% of gastric lesions. These data are comparable to those of a study carried out in Senegal which estimated 12.7% of gastric tumors. Our frequency is close to that of Togo with 14% [19]. It is higher than Western countries frequencies: 3.4% in France and 1.8% in the USA [20,21]. This can be explained by the decrease in the prevalence of Hp infection, in relation to improved living conditions and hygiene as well as changes in dietary habits. In addition, adenocarcinomas are the most common type of gastric cancer. Other types of cancer were rare and we did not report neuroendocrine carcinoma due to sample size and study time. It was noted that ADCs occurred at an advanced age and a statistically significant correlation was established ($p = 0.0037$) and the sex ratio of 2.1 revealed that it is a cancer that affects more men. Comparable data are found in the literature, particularly in the Mali sub-region [5]. Immunohistochemically, HER2 overexpression is a factor in poor prognosis for gastric cancer. Targeted therapy with Trastuzumab prolongs overall survival of HER2-positive stomach cancers. Our study found an overexpression of HER2 in 17.14% of ADKs. In the US, Rajagopal reported a HER2 positivity rate of 22.4% [22].

Conclusion

Gastric pathologies are common in medical practice and have a negative impact on the quality of life of populations. The lack of epidemiological data remains a real obstacle in the fight against this scourge. Our study can contribute to the development of strategies and preventive measures in the fight against these diseases.

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