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Distribution of Chronic Gastropathies and Associated Factors with the Presence of Anti-Gastric Parietal Cell Antibodies in a Cameroonian Population

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Authors' contributions

This work was carried out in collaboration among all authors. Author TTJW design and implementation of the study, literature search, data collection and analysis and writing of the first draft. Author BEEE participated in the design of the study, adoption of the analysis method and correction of the article. Author SD design of the study, recruitment of patients, performance of endoscopies, correction and interpretation of results. Author AD was the study coordinator, circumscribed and corrected the study. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Background and Aim: Data on autoimmunity is and remains scarce in Central Africa due to the orientation of most research programs on infectious diseases. As of now, the diagnosis of autoimmune diseases in Cameroon is very limited. Anti-gastric parietal cell antibodies (AGPCA) lead to destruction of the gastric wall resulting in atrophy. The objective of this study was to determine the prevalence of AGPCA and their association with socio-demographic factors in patients suffering from chronic gastropathies.
Methodology: This was a cross- sectional study carried out from March to October 2020, in two hospitals in the city of Douala. The type of gastropathy was determined by endoscopy and autoantibodies were tested by Indirect Immunofluorescence at Centre Pasteur Cameroon. The kit

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used was Euroimmum Lot F 211117DB, and a fluorescence microscope of the mark Leica DM 1000 was used to observe the reactions. Data was analysed using SPSS 25.0, and a P value of 0.05 was considered as being significant.

Results: 120 patients were enrolled in this study and constituted 57 (47.5%) men and 63 (52.5%) women with a male to female sex ratio of 0.9. The prevalence of AGPCA was 10.8%. The age of the patients who were tested positive to anti-gastric parietal cell antibodies ranged from 21 to 87 years with P value 0.003, and constituted 6 men and 7 women with P value 0.918 and OR 1.063(0.335 – 3.371). The most represented type of gastropathy was gastritis in 6 (46.2%) patients, P value 0.032 with occupation factor. The adjusted Odds Ratio (AOR) was 1.414 (0.798 - 2.507) and P value 0.236 for the risk factor age.

Conclusion: The overall prevalence of ACPG in our study was 10.8%. In bivariate analysis, we found associations with age, occupation and type of gastropathy. Although very often present in elderly people, the results obtained in this study are in favor of a more or less homogeneous distribution in the population.

Keywords: Anti-gastric parietal cell antibodies; gastropathies; dyspeptic symptoms.

ABBREVIATIONS

AGPCA : Anti-gastric Parietal Cell Antibodies
AOR : Ajusted Odds Ratio
OR : Odds Ratio
IgG : Immunoglobulin G
ELISA : Enzyme Linked Immune Sorbent Assay

1. INTRODUCTION

It was in 1988 that Karlsson et *al.* demonstrated that the proton pump(H+/K+ ATPase) represents the antigen of which anti-gastric parietal cell antibodies are secreted against [1]. They are found in the secretory canaliculi of gastric parietal cells as well as in gastric microsomes [2]. These autoantibodies had a sensitivity of 80-90% and a specificity of about 50%. [3]. It is important to remember that there was a physiological threshold for these autoantibodies, hence the need for titration to confirm their presence at a high level. These antibodies were not specific to autoimmune gastritis and could be found in other autoimmune diseases but at a lower level. In very advanced stages of the disease, there was some decrease in the level of these antibodies in the serum of patients. This could be explained by the destruction of the gastric mucosa by the action of these autoantibodies and its replacement by a scar-like tissue [4,5].

In routine practice in medical laboratories, two methods were used for the determination of these antibodies: ELISA and indirect immunofluorescence [6].

The immunofluorescence technique was developed in 1942 and refined in 1950 by Coons, who was able to observe specific reactions on tissues and cell preparations. In 1963 a link was identified between lupus erythematosus lesions and a deposition of IgG and C3 complex on the dermal-epithelial junction [7,8].

This was a sensitive, fast, responsive technique that could be automated for routine use [9]. The performance of immunofluorescence techniques therefore combined the sensitivity of fluorescence and the specificity of antibodies to their antigens.

The relatively long duration of dyspeptic symptoms, their repetition or reoccurrence, and the influence of socio dermographic factors led us to believe that the risk of developing atrophic gastritis from the production of AGPCA was high. We believe that age, gender and even occupation may be contributing factors to the development of AGPCA.

The objective of this study was to determine the prevalence of AGPCA and to identify different associations between socio-demographic factors and endoscopic findings.

2. MATERIALS AND METHODS

2.1 Study Design

This was a cross-sectional study including patients recruited from two hospitals in the city of Douala and the samples were analyzed at Centre Pasteur Cameroon in Yaounde from March to October 2020.

The inclusive criteria for this study was ;being a patient and having a patient file at the gastroenterology unit, having a chronic

gastropathy of at least 5 years and carrying out an endoscopy. The exclusive criteria was; patients asking for remuneration in order to participate in the study, those having another autoimmune disease such as Hashimoto thyroid and those who refused to participate in the study.

A questionnaire was used to collect the socio-demographic data of the eligible participants after the' raison d'etre' of the study had been explained and their informed consent obtained. All ethical considerations were respected.

2.2 Endoscopy and Sample Analysis

An endoscopy was carried out for each patient to determine the gastropathy.

We took a dry blood sample for autoantibody testing after the serum had been separated into an Eppendorff tube, then frozen at -20°C.

The kit used for diagnosis was Euroimmun Lot F 211117DB which enables the qualitative or semi-quantitative in vitro determination of human IgG immunoglobulin class antibodies against parietal cells. The reaction was observed using a fluorescence microscope having the following characteristics; excitation filter: 450-490 nm, colour separator: 510 nm, blocking filter: 515 nm Light source: Mercury vapour lamp, 100 W.

2.3 Statistical Analysis

Data was registered and saved into Excel 2019 and analysed using SPSS software version 25.0. The result of the descriptive analysis was presented as frequencies. The chi-square test was used to assess the independence of the presence of AGPCA and socio-demographic and clinical characteristics. The bivariate analysis provided odds ratios with a 95% confidence interval. A P value < 0.05 was considered a significant association between two variables. The mutilivariate analysis was performed by logistic regression between gastric parietal cell antibody positivity and the identified risk factors.

3. RESULTS

120 patients were recruited for this study. 47.5% were male and 52.5% were female, with a male to female sex ratio of 0.9. The age of the patients ranged from 19 to 87 years. Workers were most represented in the socio-professional category (64.2%). AGPCA were found in 13 patients, i.e. 10.8%. Table 1 shows these results.

Analysis of the data in Table 2 yielded two variables with significant P values. Age was a factor that was associated with the presence of AGPCA with P value 0.003 as well as occupation of the participants with P value 0.036.

The association between results from endoscopy and the presence of AGPCA summarised in Table 3 shows various types of gastropathy with a significant P value of 0.032.

The results of the multivariate analysis in Table 4 show that when all the risk factors are grouped together, the association between these factors and the presence of AGPCA is no longer found.

Table 1. Socio-demographic data of patients

Variable		N(%)
Sex	Male	57 (47.5)
	Female	63 (52.5)
Age (years)	[19 - 28]	15 (12.5)
	[29 - 38]	19 (15.8)
	[39 - 48]	25 (20.8)
	[49 - 58]	21 (17.5)
	[59 - 68]	29 (24.2)
	[69 - 78]	6 (5.0)
	[79 - 88]	5 (4.2)
Occupation	Students	5 (4.2)
	Workers (None Civil servants)	77 (64.2)
	Civil servants	15 (12.5)
	Pensioners	23 (19.2)

Table 2. Positivity to AGPCA according to socio-demographic data

Variables		Presence of AGPCA					
		Positive N(%)	Negative N(%)	Chi 2	OR	CI (95%)	P value
Sex	Male	6 (5.0)	51 (42.5)	0.011	1.063	0.335 – 3.371	0.918
	Female	7 (5.8)	56 (46.7)				
Age (years)	[19 - 28]	2 (1.7)	13 (10.8)	19.602	-	-	0.003
	[29 - 38]	2 (1.7)	17 (14.2)				
	[39 - 48]	-	25 (20.8)				
	[49 - 58]	1 (0.8)	20 (16.7)				
	[59 - 68]	3 (2.5)	26 (21.7)				
	[69 - 78]	2 (1.7)	4 (3.3)				
	[79 - 88]	3 (2.5)	2 (1.7)				
Occupation	Students	1 (7.7)	4 (3.7)	8.535	-	-	0.036
	Workers (None civil servants)	6 (46.2)	71 (66.4)				
	Civil servants	0 (0.0)	15 (14.0)				
	Pensioners	6 (46.2)	17 (15.9)				

Table 3. Positivity to AGPCA according to results from endoscopy

Variables		Presence of AGPCA			
		Positive N(%)	Négative N(%)	Chi 2	P value
Type of gastropathy (endoscopy)	Normal examination	-	10 (9.3)	13.797	0.032
	Gastritis of the fundus	2 (15.4)	13 (12.1)		
	Gastritis	6 (46.2)	24 (22.4)		
	Antral gastritis	1 (7.7)	23 (21.5)		
	Erosive antral gastritis	2 (15.4)	21 (19.6)		
	Atrophic gastritis	1 (7.7)	-		
	Antral ulcer	1 (7.7)	16 (15.0)		

Table 4. Risk factor and multivariate logistic regression model

	P value	AOR	CI (95%)	
Age	0.236	1.414	0.798	2.507
Men	0.918	0.928	0.223	3.865
Women	-	-	-	-
Occupation	0.505	-	-	-
Students	0.254	0.191	0.011	3.279
Workers (None Civil servants)	0.998	0.000	0.000	.
Civil servants	0.629	0.403	0.010	16.181
Pensioners	-	-	-	-
Type of gastropathy	0.670	-	-	-
Normal examination	0.999	2989.004	0.000	-
Gastritis of the fundus	0.999	48199.882	0.000	-
Gastritis	0.999	8806.121	0.000	-
Antral gastritis	0.999	1588.813	0.000	-
Erosive antral gastritis	0.999	10877.000	0.000	-
Atrophic gastritis	0.999	7986.821	0.000	-
Antral ulcer	-	-	-	-

4. DISCUSSION

After analysis, we obtained 13 positive cases out of the 120 we analysed. The prevalence of these autoantibodies in our study population is 10.8%. This prevalence is higher than that obtained by V. Calcaterra et al with 10 AGPCA positive patients out of 220 enrolled in their study, i.e. 4.5% [10]. The value we obtained also differs from those presented by Yaping Guo et al

working on a Chinese population between 2015 and 2019; they reported a prevalence of 35.8% [11]. On the other hand Yasuhiro et al searching for these autoantibodies in 28 patients obtained 22 positive cases or 78.6% [12]. AGPCAs are found in several types of gastritis with varying prevalence.

The cross-tabulation of the age variable with positivity to AGPCA shows that almost all age groups are involved. In this study, patients within the 39-48 years age range did not present positive cases. We can also see that the age groups [79 - 88] and [59 - 68] years are the modal classes with 03 patients each. In the study by Loukili et al, 02 of the patients were over 80 years just as in our study, 01 over 70 years, 01 over 65 years and 01 over 40 years [13]. This distribution of patients according to age clearly shows that this pathology can be found in all age groups. We note, however, that the proportion of patients over 70 years of age is greater. We can say that the risk of occurrence of AGPCA increases with age. The P-value of this cross-over is 0.003. This value is significant. The particularity of this study is that different age groups are affected by this autoantibody.

The relationship between AGPCA positivity and gender enables us to observe that of the 13 positive cases, 06 are male and 07 are female. We notice that there is no marked difference between the number of positive patients in both gender. On the other hand, Seynabou et al. reported in 2016 a more accentuated representation of women compared to men [14]. This result is not different from that presented by Koulidiati et *al* ; 07 women and 01 man [15]. Our results are similar to those presented by Maazoun et *al* on 31 patients at the University Hospital of Sfax in Tunisia. They presented a participation of 17 men and 14 women [16]. The P value 0.918, which is not significant and OR 1.063, implies that men and women have an equal chance of being positive to AGPCA. The comparative study shows a high prevalence among women, especially those over 60. The difference in participation between the two sexes was not very remarkable in our study. We found almost equal attendance of both sexes in the gastroenterology departments.

The distribution of occupation according to positivity to AGCPA shows two categories that are most affected; pensioners and workers with 06 patients in each category. The P value 0.036 is significant. Retired people are former workers, and stressful situations in the professional and even family environment have certainly contributed to the development of the action of these autoantibodies, this variable can be linked to the age of the patient. Retired people are above 60 years of age.

The distribution of patients positive to AGPCA according to the type of gastropathy does not show a major predominance of one type of gastropathy. However, research on the type of gastropathy according to the presence of AGPCA by Maazoun et al showed a predominance of atrophic gastritis most often associated with ulcerative lesions [16]. Of the 31 patients included in his research, 15 had atrophic gastritis. Similarly, Mejri et al found 62.5% prevalence in patients with atrophic gastritis and anti-gastric parietal cell antibodies simultaneously. We obtained a P value of 0.032 which shows a significant association between the presence of AGPCA and a particular type of gastropathy. Of the 120 patients we recruited, one (01) presented atrophic gastritis after results from endoscopy. It was also shown that anti-gastric parietal cell antibodies can be found in both atrophic and non-atrophic gastritis [17]. The action of AGPCA changes with the duration of dyspeptic symptoms. The lack of pathological analysis does not allow us to conclude on the presence of atrophic gastritis. The only case identified had advanced atrophy.

The multivariate analysis enables us to understand that risk factors were only of interest when they were presented individually, especially in bivariate analysis with significant P values.

One of the limitations of this study is that gastric biopsies were not analysed in order to provide a more accurate prevalence of gastric atrophy caused by the action of AGPCA on the digestive mucosa.

5. CONCLUSION

This study provided a prevalence of AGPCA being 10.8% in the Cameroonian population. Factors such as age, occupation and type of gastropathy showed an association with the presence of these autoantibodies when taken individually. Gastric biopsy remains ideal to identify the link between the presence of AGPCA and gastric atrophy. This study provides a summarized description of these autoantibodies for the gastropathy population.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

We declare that the data collected in this study was carried out with full observance of the rights of the patients. The project was clearly explained to the patients and the informed consent of the patients was obtained before data was collected. We declare that the Helsinki guidelines were followed in their entirety for each patient. Ethical clearances were issued to carry out this study. Minors were not included in this study. The following ethical clearances were obtained:

Ethical clearance N° 2020/0043/HGOPED/DG/ CEI from the institutional ethics committee of the Gynaeco-Obstetric and Paediatric Hospital of Douala.

Ethical clearance N° 2020/020118/CEIRSH/ESS /MBC of the School of Health Sciences of the Catholic University of Central Africa.

AVAILABILITY OF DATA AND MATERIAL (ADM)

The data used for this research is available and will be shared with any author who wishes to have it.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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