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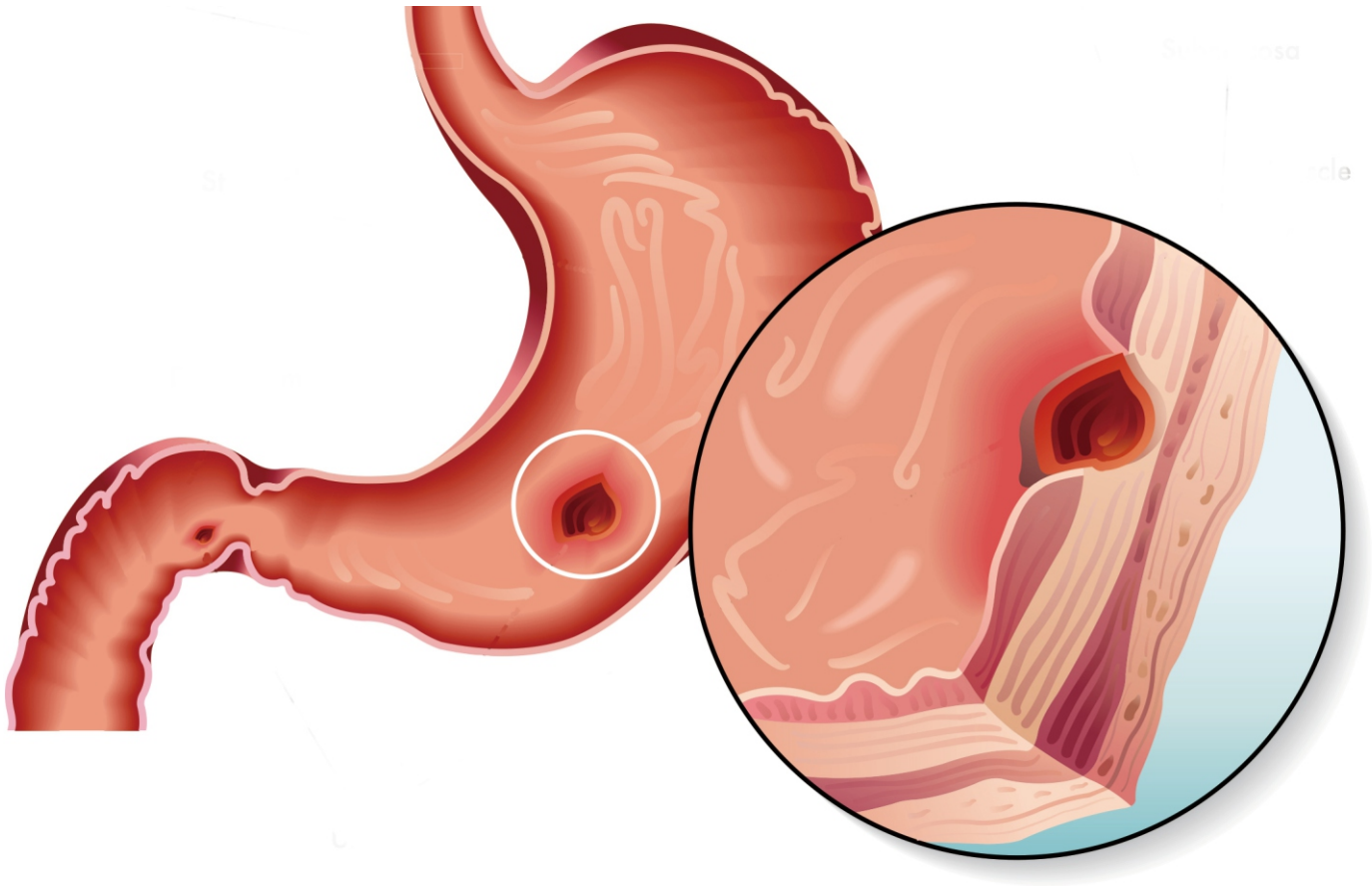

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Prevalence and Factors Associated with Intestinal Metaplasia in Chronic *Helicobacter pylori* Gastritis in a Country with High Endemicity: Ivory Coast Case

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Abstract

Context/Objective: Few studies have been carried out in a country with high endemicity for Helicobacter pylori (*H. pylori*) infection in Sub-Saharan Africa looking for the association of intestinal metaplasia (IM) with chronic gastritis. We hypothesize that IM is correlated with the intensity of *H. pylori* infection in a country with high endemicity, Ivory Coast. The objective of this study was to determine the prevalence of intestinal metaplasia in chronic *H. pylori* gastritis in Ivory Coast. **Methods:** This was a prospective, cross-sectional, multicenter study, carried out over a period of 5 months, in the reference hospital centers of Abidjan, specialized in Gastroenterology. All patients who had undergone Gastroscopy with biopsies according to the criteria of the Sydney System for the anatomopathological study, those with chronic gastritis and/or *H. pylori* intestinal metaplasia on histology and in whom all the parameters of the Sydney system classification had been well informed. The quantitative variables were expressed by their means accompanied by their standard deviations and the qualitative variables by their numbers and percentages. Chi-square and Fischer tests were used to look for associations between variables. The significance level was set at 5%. **Results:** 152 patients were retained. The mean age was 44.9 ± 12.9 years. The prevalence of intestinal metaplasia was 11.8%. In univariate analysis, no significant association was found between clinical and pathological sociodemographic factors (age, sex, ethnicity, educational level, profession) and intestinal metaplasia in chronic Helicobacter pylori gastric cases. In multivariate analysis we found that prolonged use of Proton Pump Inhibitors (PPIs) and a history of Gastroesopha-

geal Reflux Disease (GERD) were significantly associated with the absence of IM. **Conclusion:** Chronic *H. pylori* gastritis is the main risk factor for intestinal metaplasia. Prolonged use of PPIs and a history of GERD were significantly identified as factors that would protect against intestinal metaplasia.

Keywords

Helicobacter Pylori, Chronic Gastritis, Intestinal Metaplasia, Ivory Coast

1. Introduction

Chronic gastritis (CG) is considered a precancerous stage which has been the subject of several studies and classifications, the most recent of which is the coding according to the Sydney system [1]. It has a histological definition: it is a persistent inflammatory state of the gastric mucosa, diffuse or localized, associated with epithelial alterations which can progress towards atrophy and/or intestinal metaplasia [2]. In many patients, it is associated with Helicobacter pylori infection. Gastric carcinogenesis is a multi-step process with a multitude of histological lesions which can either stabilize or evolve slowly according to the sequence gastritis - atrophy - intestinal metaplasia (IM) - dysplasia - cancer [3]. IM is an intermediate step in the carcinogenesis process of intestinal-type adenocarcinoma [4]. It is defined as the replacement of gastric columnar epithelial cells by cells of intestinal morphology with the presence of goblet cells, Paneth cells and absorptive cells [5]. *Helicobacter-pylori* infection affects half of the world's population, mainly in developing countries where the infection reaches 80% of the population [6]. It is responsible for the majority of chronic gastritis ranging from minimal gastritis to severe gastritis. IM during chronic gastritis in Africans is rarely reported in the literature. Indeed, T. Darre *et al.* reported 134 cases of IM out of 247 cases of histologically proven chronic gastritis [1]. Studies including a high number of patients suffering from chronic gastritis have nevertheless been rarely reported in Ivory Coast.

On the other hand, although suggested in the world literature that the intensity of pylori infection is strongly correlated with the occurrence of IM [7], the study by Theresa H Nguyen *et al.* in the USA does not did not show a causal link between the intensity of *H. pylori* infection and the occurrence of IM [8]. Furthermore, this study included more Hispanic than African-American patients. In addition, other factors have been implicated, such as alcohol and tobacco consumption, in the occurrence of IM in chronic *H. pylori* gastritis [9]. However, no study has been done in a country with high endemicity in sub-Saharan Africa for *H. pylori* infection looking for the association of IM with chronic gastritis. We hypothesize that MI is correlated with the intensity of *H. pylori* infection in a country with high endemicity, Côte d'Ivoire [6]. The primary objective was to determine the prevalence of IM in *H. pylori* GC and specifically to determine the factors associated with IM in chronic *H. pylori* gastritis.

2. Methods

Type of study and period:

This was a prospective, cross-sectional, multicenter study, carried out over a period of 5 months (March-July 2022) in Abidjan (Ivory Coast).

Study framework:

Outpatient consultation services specialized in hepato-gastroenterology:

- Public structures: Cocody and Angré university hospitals, Abobo hospital in Ivory Coast.
- Private structures: Farah Polyclinic, II Plateaus Polyclinic.

Study population:

Our study concerned:

- Patients who had performed an Gastroscopy with associated gastric biopsies (2 fundus, 01 angulus, 2 antrum).
- Patients who had consulted in the various centers in the city during our study period.

Selection criteria:

Patients who had chronic *H. pylori* gastritis with or without intestinal metaplasia on pathological analysis of the stomach biopsy sample.

Inclusion criteria:

Had been included:

- All patients who had performed a gastroscopy with biopsies for anatomopathological study.
- Patients who had chronic gastritis and/or *H. pylori* intestinal metaplasia on histology.
- Patients in whom all the parameters of the Sydney system classification had been correctly informed and who consented to the study.

Non-inclusion criteria:

Not included:

- Patients who had CG not associated with *H. pylori* infection.

- Patients in whom the elements of the Sydney classification were incomplete on the pathological report.

- Patients who did not consent to the study.

The parameters studied:

Descriptive variables:

- Age, sex, level of education, profession, presence of comorbidities.

- History of alcoholism, smoking, notion of triple therapy, notion of taking PPI medications (proton pump inhibitors), antacids, alginates, Anti-H2.

- The notion of gastric cancer in the family.

- Indications for Gastroscopy: epigastralgia, nausea, vomiting, heartburn, GERD, dyspepsia.

Histological variables linked to gastritis:

Histological variables according to the Sydney system classification:

- Topographic, morphological and etiological information linked to gastritis.

- The location of the gastritis, its focal or diffuse nature, the location of the infiltrate within the chorion, the density of the inflammation as well as its active nature or not.
- The presence or absence of glandular atrophy, intestinal metaplasia and *H. pylori.*
- The rating of parameters evaluating the degree of severity according to a scale ranging from 1 to 3 corresponding to a mild (1/3), moderate (2/3) and severe (3/3) stage.

Data collection and analysis:

A pre-established survey sheet presenting the different variables served as a data collection support. The data was recorded in Cspro version 7.2 then exported to SPSS 26.0 for statistical analysis. The quantitative variables were expressed by their means accompanied by their standard deviations and the qualitative variables by their numbers and percentages. Chi square and Fischer tests were used to look for associations between variables. The significance threshold was set at 5%.

Ethical consideration:

Data confidentiality was respected. The managers of the structures in which the studies were carried out were informed and gave their agreement.

3. Results

During our study period, 261 patients were eligible, of whom we retained 152, 18 of whom had intestinal metaplasia, or 11.8% of our study population (**Figure 1**). The average age of our study population was 44.9 ± 12.9 with extremes of 16 and 72 years. There was a female predominance of 77.8% (n = 14) among patients with intestinal metaplasia and the majority (50%) of patients who had IM belonged to the age group of [50 - 60] with a mean age of 50.9 ± 8.1 years. Chronic *H. pylori* gastropathy was more common in the age group of [40 - 50 years].

The location of intestinal metaplasia was almost always antral (11.2%) compared to 2% at the fundal level.

There was no significant association between metaplasia and the intensity of *H. pylori* infection (**Table 1**). There was also no significant association between intestinal metaplasia and the degree of severity of chronic gastritis (**Table 2**).

We did not find a significant association between intestinal metaplasia and the sex of the patients (p value = 0.59), nor between intestinal metaplasia and the age of the patients (p value = 0.1).

Our work found a significant association between the absence of intestinal metaplasia and the use of PPIs (p value = 0.04) (**Table 3**).

Our study found a significant association between GERD and the absence of intestinal metaplasia (p value = 0.04) (**Table 4**).

Taking PPIs (p value = 0.01) and GERD (p value = 0.01) remained significantly associated with the absence of intestinal metaplasia after logistic regression (**Table 5**).

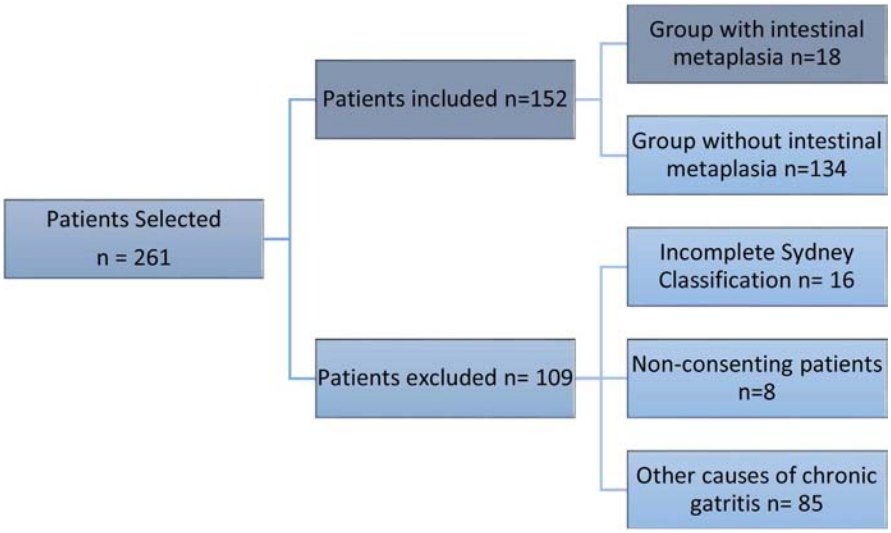

Figure 1. Flowchart.

Table 1. Association between the degree of *H. pylori* infection and the presence of intestinal metaplasia.

Degree of *H. pylori* infection	Metaplasia		p-Value
	Yes n (%)	No n (%)	
Lightweight	7 (38.9)	55 (41.0)	0.82
Average	9 (50.0)	58 (43.3)	
Severe	2 (11.1)	21 (15.7)	
Total	18 (100)	134 (100)	

Table 2. Association between intestinal metaplasia and the degree of severity of chronic *H. pylori* gastritis.

Gastric severity	Metaplasia		p-Value
	Yes n (%)	No n (%)	
Lightweight	5 (3.3)	55 (36.2)	0.08
Average	8 (5.3)	66 (43.4)	
Severe	5 (3.3)	13 (8.6)	
Total	18 (12.0)	134 (88.2)	

Table 3. Association between lifestyle and intestinal metaplasia.

Background	Metaplasia		p-Value
	Yes n (%)	No n (%)	
Alcohol	5 (3.3)	20 (13.2)	0.17
Tobacco	1 (0.7)	4 (2.6)	0.47
Traditional therapy	9 (5.9)	79 (52.0)	0.47

Continued

Coffee	2 (1.3)	22 (14.5)	0.74
Tea	7 (4.6)	32 (21.1)	0.17
Consumption of dairy products	1 (0.7)	3 (2.0)	0.40
NSAIDs	2 (1.3)	15 (9.9)	1.00
Aspirin	1 (0.7)	0 (0)	0.12
PPI	3 (2.0)	4 (2.6)	0.04*
Anti acids	4 (2.6)	17 (11.2)	0.28
Alginates	1 (0.7)	3 (2.0)	0.40

Table 4. Association between digestive signs and intestinal metaplasia.

Clinical signs	Metaplasia		p-Value
	Yes n (%)	No n (%)	
Epigastralgia	15 (9.9)	121 (79.6)	0.37
Nausea	4 (2.6)	15 (9.9)	0.24
Vomiting	3 (2.0)	9 (5.9)	0.16
Pyrosis	0 (0)	1 (0.7)	1.00
GERD	3 (2.0)	4 (2.6)	0.04*
Dyspepsia	1 (0.7)	17 (11.2)	0.70

Table 5. Factors associated with intestinal metaplasia in multivariate analysis.

Variables	Metaplasia		Adjusted p-value
	Yes n (%)	No n (%)	
PPI	3 (2.0)	4 (2.6)	0.01*
GERD	3 (2.0)	4 (2.6)	0.01*

4. Discussion

***Prevalence of Intestinal Metaplasia* (*IM*):**

This study is the first of its kind in Côte d'Ivoire. It consisted of estimating the frequency of IM in patients with chronic *H. pylori* gastritis. It took place over a period of 5 months, 261 patients were recruited and 150 were included.

In our series, the prevalence of IM was 11.8%, comparable to the data observed by Ghailane Ghizlane in Morocco [3]. Higher (54.25%) or lower (3.8%) prevalences were also found in Black Africa [1] [7]. These data demonstrate the heterogeneity of the prevalence of IM according to regions in Africa.

Antral location was more frequent than fundal location (11.2% versus 2%). This preferential distribution of IM was usual [3] [4] [7] [10] [11] [12]. Indeed, *H. pylori* infection is considered by the WHO to be the main factor involved in gastric carcinogenesis, particularly IM [6].

Factors associated with Intestinal Metaplasia:

Histological factors:

Chronic gastritis (CG) was strongly associated with *H. pylori* infection in our study. Which corroborates the results of several studies carried out in black Africa in this direction [13] [14] [15]. *H. pylori* is the main risk factor in the development of CG. On the other hand, this was part of the selection criteria for the patients in our sample. We also noted a significant association between the severity of chronic gastritis and the intensity of *H. pylori* infection, contrary to certain data reported in the literature [7] [16] [17]. Choudhary *et al.* in India did not show a correlation between the intensity of *H. pylori* infection and the severity of chronic gastritis. However, our study did not find a significant association between the degree of *H. pylori* infection and the occurrence of IM. The same was true for the search for the association between IM and the severity of chronic gastritis. Data in the literature on the correlation between the degree of *H. pylori* infection and gastric intestinal metaplasia are discordant. Thus Ghasemi *et al.* [18] noted a correlation between the degree of *H. pylori* infection and IMD, contrary to the results of Tanko *et al.* in Niger [19].

This apparent contradiction between the promoting role of *H. pylori* in the genesis of precancerous lesions, particularly IM, can be explained by several factors.

It has been proven that when a large part of the gastric mucosa was the site of the IM, the possibilities of identifying the bacteria were reduced even if the samples taken complied with the sampling protocol recommended by the Sydney system [20]. In addition, it is also known that in gastric IM, other factors could be linked to the occurrence of IM, notably the mucosal microbiota [21]. The most commonly reported factors were environmental factors, age, alcohol, tobacco, and diet [3] [4] [8] [17] [22]. Some of these factors were also studied in our study.

Epidemiological factors:

In the present study the average age of patients with IM was 50.9 ± 8.1 years with a high prevalence in patients belonging to [50 - 60] years. Theresa Nguyen *et al.* in the USA had reported a high prevalence of IM at 70 years old unlike our study where the patients were relatively younger in age.

Several data in the literature have revealed a correlation between certain socio-environmental factors and the appearance of IM. These included the advanced age of the patients, tobacco and alcohol consumption, ethnicity, race and low educational level, a family history of gastric cancer [3] [8] [9]. These data were different from those collected in our study, because we did not find an association between these different factors and the appearance of IM. This could be explained by several factors, the study contexts were not identical, the risk factors to which our patients were exposed would be different, our sample was relatively younger (average age of patients = 44.9).

Clinical factors:

Epigastralgia was a frequent reason for consultation in accordance with sever-

al data in the literature [8] [23] [24]. Indeed, epigastralgia was the main indication for gastroscopies. However, nowhere has an association between gastric clinical manifestations and IM been reported. However, our study found a significant association between the absence of IM and GERD ($p = 0.004$). The same was true for patients who declared having consumed PPIs over the long term ($p = 0.004$).

Comparison of samples:

The comparative study of sociodemographic and clinical parameters at inclusion of patients with IM and the group of patients without IM allowed us to establish that these two samples had similar exposure factors, with the exception of age of patients which was relatively higher in the group of patients with IM. Indeed, IM is a precancerous lesion which intervenes in the process of gastric carcinogenesis. It therefore appears several years after an *H. pylori* infection.

Clinically, the frequency of patients having taken long-term PPIs was lower in the group of patients with IM than in patients without IM. PPIs would certainly protect against IM. Paradoxically, it was the same for GERD. Indeed, hypochlorhydria would modify the conditions of the gastric environment, less favorable to the development of *H. pylori* which would have a promoting role in the genesis of gastric precancerous lesions, particularly IM. Our results were different from some data in the literature which reported that chronic use of PPIs masked *H. pylori* infection, increased the rate of inactive GC and increased the occurrence of IM [19].

5. Conclusion

In our study, the prevalence of intestinal metaplasia is relatively high at 11.8%. Chronic *H. pylori* gastritis is the main risk factor for intestinal metaplasia. Prolonged use of PPIs and a history of GERD were significantly identified as factors that would protect against intestinal metaplasia.

Authors Contribution

Hatrydt Guillaume Dimitri Kouamé wrote the article, made conception and design, data acquisition. Lisiane Mewetieh made data analysis and interpretation. Kouassi Olivier Claver Koffi filled and analyzed the database. Bathaix Fulgence Mamert Yao motivated the study and made the critical revision of the article.

Conflicts of Interest

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

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Indications and Findings of Upper Gastrointestinal Endoscopy in Elderly Patients in Parakou, Republic of Benin

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Abstract

Introduction: Elderly people are considered fragile and at greater risk of having malignant gastrointestinal tumors. The objective of this work was to report the reasons for performing gastrointestinal endoscopy and the lesions found during the endoscopy of this target population in Parakou. **Patients and Study Methods:** This was a descriptive and cross-sectional study with a retrospective collection of data from January 2016 to December 2017, then from January 2020 to December 2021. It took place in the Regional Teaching Hospital of Borgou-Alibori in Parakou and in the private gastrointestinal endoscopy center of Parakou (Northern Gastrointestinal Exploration Center). All patients aged at least 60 years who had undergone an upper gastrointestinal endoscopy during the study period were included. The variables studied were: the sex, age, indications for the examination, endoscopic lesions and data from the anatomo-pathological examination. **Results:** In total, out of 1540 upper gastrointestinal endoscopies performed during the study period, 249 (16.17%) involved patients aged 60 years and over. The sex ratio was 1.26. The main indication for the examination was epigastric pain (123 cases, *i.e.* 49.40%) followed by vomiting (53 cases, *i.e.* 21.29%). In terms of lesions, non-tumorous gastropathy came first in the stomach (206 cases, *i.e.* 82.73%) while esophageal lesions were dominated by esophageal candidiasis and cardial incompetence (39 cases, *i.e.* 15.66% in each of the two situations). In the duodenum, ulcer was noted in 30 patients (12.05%). In 38 patients, 12 (31.58%) were tested positive for *Helicobacter pylori* infection. Cancers of the gastrointestinal tract were confirmed in 11 patients (4.42%). **Conclusion:** Upper ga-

strointestinal endoscopy remains an excellent examination for the exploration of the upper gastrointestinal tract. In Parakou, epigastric pain represents the main indication for this examination in subjects over 60 years of age. Inflammatory or ulcerated non-tumorous gastropathy is the most commonly endoscopic lesion. Esophageal and gastric cancers are less common in this population group according to our study.

Keywords

Upper Gastrointestinal Endoscopy, Elderly Subjects, Inflammatory Gastropathy, Candidiasis, Cancer, Parakou

1. Introduction

Although diseases occur regularly, the world population continues to live longer. A subject is considered elderly when he or she is 60 years of age or older [1]. Upper gastrointestinal endoscopy (UGIE) is an examination allowing the exploration of the upper gastrointestinal tract. Its semi-invasive nature explains the reluctance of some practitioners to request this examination in elderly subjects, whereas UGIE without general anesthesia is well tolerated by 97.5% of these subjects in Mali [2] and by 88% of them in Senegal [3]. It has been proven that this examination is extremely useful in elderly subjects for diagnosis and therapeutic management [4] [5]. According to a Japanese study, very elderly subjects (over 85 years of age) benefited more from therapeutic procedures during routine gastrointestinal endoscopy than young subjects [6]. The incidence of gastrointestinal diseases, in particular cancers of the gastrointestinal tract, increases with age [6]. In addition to cancers, elderly people also tend to present benign diseases such as gastritis and gastric or duodenal ulcers [3] [6]. In a Turkish study of gastroesophageal reflux disease, elderly patients rarely had typical and severe symptoms compared to younger patients. However, significantly more severe endoscopic lesions were observed in older patients compared to younger patients [7]. In Benin, more precisely in the northern part, few data are available on gastrointestinal endoscopy in elderly subjects. We need more information about the application of upper GI system endoscopy in the elderly population. The objective of this work was to report the reasons for performing UGIE and the lesions found among elderly patients explored in Parakou in the Republic of Benin.

2. Patients and Study Methods

Type and period of study

This was a descriptive and cross-sectional study with a retrospective data collection. It covered a period of 4 years from January 2016 to December 2017 and from January 2020 to December 2021.

Study sites

The study took place in Parakou, in the gastrointestinal endoscopy unit of the

Reginal Teaching Hospital of Borgou-Alibori (CHUD-B/A) and in the Northern Gastrointestinal Exploration Center (CEDIS).

Study population

This study focused on patients admitted for the performance of UGIE whatever the indication.

- ***Inclusion criteria***: All patients aged at least 60 years who had performed UGIE during the study period were included.
- ***Exclusion criteria***: Patients in whom the UGIE was incomplete for whatever reason (an impenetrable stenosis with the adult endoscope without an identified lesion, poor tolerance of the examination) were excluded.

Variables

The variable of interest was the finding of UGIE in these elderly patients. The other variables studied were: the sex, indication for UGIE, endoscopic lesions and anatomo-pathological data when available. Data were collected on the basis of UGIE reports.

Sampling

It was non-probabilistic. We carried out an exhaustive recruitment of patients admitted for the performance of UGIE during the study period.

Performance of upper gastrointestinal endoscopy

The samples were immediately fixed in 10% formalin and then sent to the anatomic pathology laboratory with an information sheet filled out by the doctor. It should be noted that in the event of poor tolerance of UGIE, biopsies were not performed.

Performance of anatomo-pathological examination

The histological examination of all samples was carried out by two pathologists. It took place in several stages including macroscopy, circulation, inclusion, microtomy, staining, assembly and microscopy.

Data collection

Data were collected using the registers of gastrointestinal endoscopy report and anatomo-pathological examination.

Data processing and analysis

The data were recorded in Excel 2019. The qualitative variables were expressed as number and percentage and the quantitative variables as mean ± standard deviation when the distribution was normal, otherwise as median with the 1st and 3rd quartiles.

Ethical considerations

In this retrospective study, the data collected were used anonymously and confidentially.

3. Results

General data

During the study period, 1636 patients performed UGIE at the gastrointestinal endoscopy unit of CHUD-B/A and at CEDIS. Ninety-six (96) patients were ex-

cluded because the examination was incomplete without any endoscopic lesion. The study therefore focused on the remaining 1540 patients (872 at CEDIS, *i.e.* 56.62% and 668 at CHUD-B/A, *i.e.* 43.38%). See the flow chart for the selection process of the patients at the Figure 1.

Frequency of upper gastrointestinal endoscopy in elderly patients

Out of the 1540 UGIE considered, 249 were performed in elderly patients, representing a frequency of 16.17%.

Data on gender and age

There were 139 men and 110 women. The sex ratio was 1.26. Their average age was 67.15 ± 6.38 years with the extremes of 60 and 90 years. The distribution of patients according to age groups is shown in Figure 2. The age group from 60 to 64 years was the most represented (94, *i.e.* 37.75%).

Data on indications of UGIE

Epigastric pain was the main indication (123, *i.e.* 49.40%) followed by vomiting (53, *i.e.* 21.29%) and weight loss (40, *i.e.* 16.06%). Table 1 summarizes the indications for UGIE in elderly subjects in Parakou.

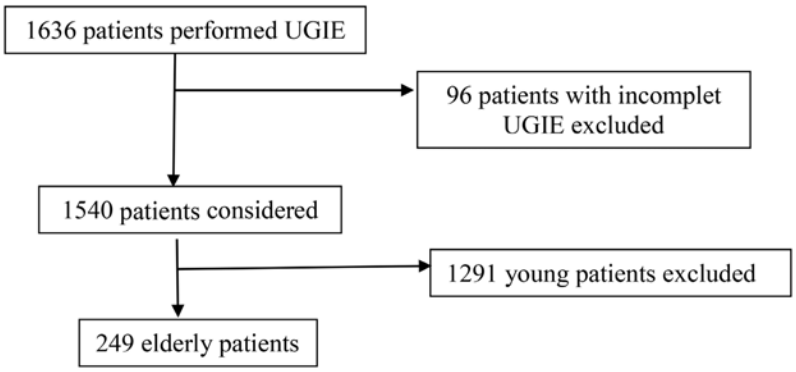

Figure 1. Flow chart for the selection process of the patients (2016-2017 and 2020-2021, Parakou).

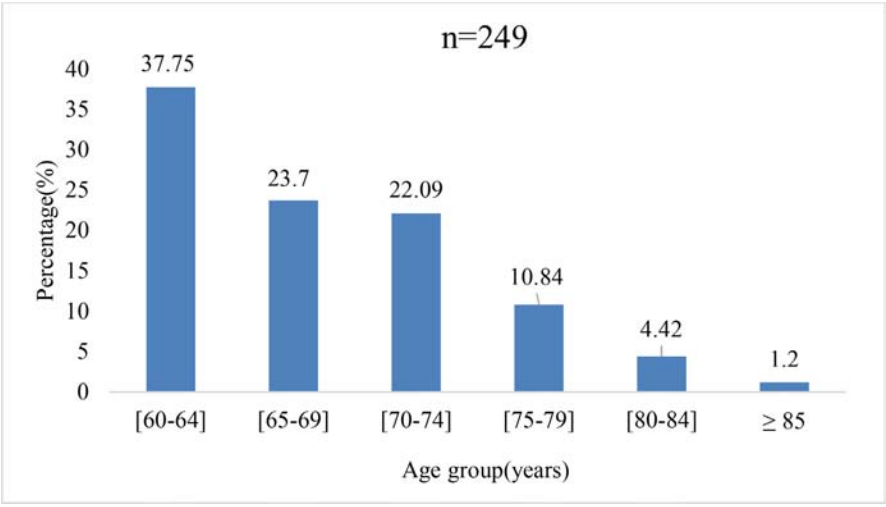

Figure 2. Distribution of patients included according to age groups (n = 249, 2016-2017 and 2020-2021, Parakou).

Table 1. Distribution of elderly patients according to indications for upper gastrointestinal endoscopy (n = 249, 2016-2017 and 2020-2021, Parakou).

	Size	Percentage (%)
Epigastric pain	123	49.40
Vomiting	53	21.29
Weight loss	40	16.06
Dyspepsia	32	12.85
Dysphagia	28	11.24
Retrosternal pain	23	09.24
Hematemesis	23	09.24
Abdominal pain*	17	06.83
Melena	17	06.83
Pyrosis	14	05.62
Odynophagia	13	05.28
Regurgitation	11	04.42
Hiccups	08	03.21
Chronic liver disease	07	02.81
Anemia	06	02.41
Hematochezia	03	01.20
Caustic ingestion	02	00.80
Diarrhea	01	00.40

*Abdominal pain other than epigastric location; A patient could have several symptoms at once.

Data on endoscopic lesions

Table 2 shows the distribution of elderly patients according to the endoscopic lesions. The endoscopic lesions found were mainly non-tumorous gastropathies (206, *i.e.* 82.73%). Lesions suspected to be malignant were noted in 40 patients (16.06%) including 31 gastric, 8 esophageal and 1 duodenal. The UGIE was macroscopically normal in 2 patients (0.80%).

Depending on the segment of the upper gastrointestinal tract considered, esophageal damage was dominated by esophageal candidiasis and cardial incompetence in the same proportions (39 cases), representing 15.66% for each of the lesions, followed by peptic esophagitis (38 cases, *i.e.* 15.26%). In the stomach, the lesions were mainly inflammatory or ulcerated non-tumorous gastropathy (206 cases, *i.e.* 82.73%) followed by gastric tumors (31 cases, *i.e.* 12.45%). Duodenal lesions were dominated by duodenal ulcer (30, *i.e.*12.05%) and bulbitis (30, *i.e.* 12.05%). Table 3 specifies the distribution of elderly patients according to the type of gastropathy on UGIE. It appears that non-tumorous gastropathies were mainly erythematous (195 cases, *i.e.* 94.66%) and ulcerated (69 cases,

Table 2. Distribution of elderly patients according to endoscopic lesions visualized (n = 249, 2016-2017 and 2020-2021, Parakou).

	Size	Percentage (%)
Esophageal injuries		
Esophageal candidiasis	39	15.66
Cardial incompetence	39	15.66
Peptic esophagitis	38	15.26
Hiatal hernia	17	06.83
Esophageal varices	10	04.02
Esophageal tumor	08	03.21
Foreign bodies	02	00.80
Extrinsic compression	01	00.40
Gastric lesions		
Non-tumorous gastropathy	206	82.73
Gastric tumor	31	12.45
Gastric ulcer	14	05.62
Gastric varices	03	01.20
Caustic injury	02	00.80
Gastric polyp	01	00.40
Duodenal lesions		
Duodenal ulcer	30	12.05
Bulbitis	30	12.05
Duodenal tumor	01	00.40

A patient could have several lesions at once.

Table 3. Distribution of elderly patients with non-tumorous gastropathy according to the type of gastropathy on UGIE (n = 206, 2016-2017 and 2020-2021, Parakou).

	Size	Percentage (%)
Erythematous gastropathy	195	94.66
Ulcerated gastropathy	69	33.49
Micronodular gastropathy	10	04.85
Portal hypertension gastropathy	05	02.43

A patient could have several types of gastropathy at once.

i.e. 33.49%). Portal hypertension gastropathy was rare (5 cases, *i.e.* 2.43%)

Data on the findings of the pathological examination

Out of the 249 elderly patients who underwent UGIE, 38 (15.26%) were able to perform the anatomo-pathological examination of the biopsies. Among them,

12 (31.58%) suffered from *Helicobacter pylori* infection. Among the 40 elderly patients with endoscopic lesions suspected to be malignant, 23 (57.50%) were able to perform anatomo-pathological examination of the biopsies. The malignant nature of the lesion was confirmed in 11 patients (47.82%), including 8 of gastric site and 3 of esophageal location. The gastric cancers were all adenocarcinomas (3 poorly differentiated, 2 moderately differentiated, 2 signet ring cell types and 1 well differentiated). As for the esophageal cancers, it was a squamous cell carcinoma in 2 patients and a well-differentiated adenocarcinoma (one patient).

Among the 12 elderly patients in whom malignant lesions were suspected on UGIE without the confirmation of the anatomo-pathological examination, it was chronic gastritis (10 patients), severe esophageal inflammation (1 patient) and non-contributory biopsy sample (1 patient). In summary, the hospital frequency of upper gastrointestinal tract cancer in elderly subjects was 4.42% (11 cases out of 249, including 8 gastric and 3 esophageal cancers).

4. Discussion

This study on UGIE in elderly subjects is one of the first in the Republic of Benin. It allowed us to know the indications for this examination as well as the endoscopic lesions visualized in this population group.

The frequency of UGIE performance among elderly subjects is 16.17% in Parakou. This frequency varies from one country to another. Dia *et al.* [3] in Senegal from 2014 to 2017, Lawson-Ananissoh *et al.* [8] in Togo from 2009 to 2013, Tolo *et al.* [2] in Mali from 2020 to 2021, Ckere-Jehl *et al.* [9] in France from 2004 to 2012, Bangoura *et al.* [10] in Ivory Coast from 2009 to 2016 reported 15.5%, 12.55%, 10.1%, 8.8% and 7.49%, respectively. This diversity in the results could be explained by the inclusion criteria which differ from one study to another (age greater than or equal to 60 years or 65 years or 75 years).

The average age of patients was 67.15 ± 6.38 years in the present study. This result is similar to those reported by Tolo *et al.* [2] in Mali (68.3 ± 6.4 years), Dia *et al.* [3] in Senegal (68 years), Lawson-Ananissoh *et al.* [8] in Togo (68.49 years).

The elderly subjects who underwent UGIE in Parakou were often male (sex ratio = 1.26), contrary to the findings made in Malian, Ivorian, Senegalese, Togolese and Turkish studies where the sex ratios were 0.9, 0.88, 0.82, 0.66 and 0.54, respectively [2] [3] [7] [8] [10].

Regarding the indications for UGIE, epigastric pain was the most common (49.40%). This result is similar to those found by Tolo *et al.* [2] in Mali (71.9%), Bangoura *et al.* [10] in Ivory Coast (38.36%), Dia *et al.* [3] in Senegal (55%) and Lawson-Ananissoh *et al.* [8] in Togo (47.29%).

In the present study, the endoscopic lesions were mainly non-tumorous and inflammatory gastropathy (82.73%). This could be explained by the frequent use of non-steroidal anti-inflammatory drugs by elderly people related to rheumatic pathologies. This predominance of non-tumorous gastropathy was noted in Mali (50%), Ivory Coast (39.81%), Senegal (44.4%) and Togo (59.73%) [2] [3] [8]

[10]. Esophageal candidiasis was common, this could be explained by the immunosuppression (advanced age, malignant tumor, comorbidity such as diabetes). Peptic esophagitis could also be induced by the cardial incompetence frequently noted in these elderly patients. Duodenal and gastric ulcers were observed in 44 elderly patients (17.67%). This high frequency of ulcers could be explained by the frequent use of non-steroidal anti-inflammatory drugs and *Helicobacter pylori* infection.

In Parakou, confirmed upper gastrointestinal cancers were found in approximately 4 out of 100 elderly patients. A lower frequency (0.93%) was reported by Bangoura *et al.* [10] in Ivory Coast. Dia *et al.* [3] in Senegal found that gastric and esophageal cancers represented 2.5% and 2.3% of gastric and esophageal cancers in elderly subjects, respectively. A higher frequency (8.39%) of upper gastrointestinal cancers was noted in Togo from 2009 to 2013 [8]. In Turkey, the frequency of upper gastrointestinal cancers was higher (6.4%) in subjects aged 75 to 79 years and even higher (18%) in those aged over 80 years [4]. This confirms the fact that the risk of gastrointestinal cancer increases with age.

The main limitations of this study are, on the one hand, the low rate of performance of the anatomo-pathological examination of biopsies either because systematic samples were not taken during UGIE or because the samples were not examined due to lack of financial resources. On the other hand, there was a weak correlation (47.82%) between the endoscopic data and those of the pathological examination for lesions macroscopically suspected to be malignant. This could be related to the quality of the biopsy samples. In a Malian study, out of 8 malignant gastric tumors suspected on EOGD, 4 (50%) were confirmed on anatomo-pathological examination [2].

Another limitation of this study is that its retrospective nature did not make it possible to specify the use of non-steroidal anti-inflammatory drugs and the presence of comorbidities in these elderly patients.

Prospective studies are necessary in this population group to evaluate the relevance of the indications for UGIE, the tolerance of the examination and the factors associated with the presence of the different endoscopic lesions.

5. Conclusion

Upper gastrointestinal endoscopy remains an excellent examination for the exploration of the upper gastrointestinal tract. In Parakou, this examination is requested in elderly people who often complain of epigastric pain. Non-tumorous and inflammatory gastropathy is the most common endoscopic lesion. Esophageal and gastric malignancies are uncommon in this population group. However, these tumorous lesions must be the dread of every doctor when faced with an elderly subject presenting digestive symptoms.

Conflicts of Interest

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

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An Infant with Dieulafoy's Lesion: A Case Report from the Philippines

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Abstract

This is a case of a 5-month-old infant who experienced repeated episodes of hematemesis and no known underlying health conditions. It was subsequently diagnosed as Dieulafoy's lesion localized in the lesser curvature of the stomach. Endoscopic diagnosis and treatment were done by angiographic embolization. Dieulafoy's lesion is considered rare even for adult cases, much more for pediatric patients and usually underdiagnosed. Hence, patients presenting with gastrointestinal bleeding should be managed in a multidisciplinary approach. Spreading awareness about this lesion by including it in the considerations, may help improve early detection and treatment.

Keywords

Dieulafoy's Lesion, Gastrointestinal Bleeding, Upper Gastrointestinal Bleeding, Hematemesis, Bleeding

1. Introduction

Dieulafoy's lesion is a relatively rare, but potentially life-threatening condition. It is a congenital arteriovenous malformation characterized by an unusually large tortuous submucosal artery. Worldwide, it only accounts for 1% - 2% as the primary source of upper gastrointestinal bleeding [1]. In the Philippines, there is insufficient data in the pediatric population. The exact pathogenesis is still unknown. It is either inherited or acquired [2]. Its true incidence in the general population is difficult to determine accurately as the symptoms are silent until presentation. Increasing the awareness of this malformation will improve early diagnosis and treatment.

2. Case Description

A 5-month-old, female infant from Davao City, Philippines was brought to the

emergency department due to hematemesis of seven days duration with at least two episodes per day. This was associated with pallor. There were no other symptoms like fever, diarrhea or bloody stools. The patient was managed as a case of anemia secondary to upper gastrointestinal bleeding probably Mallory Weis. She was confined for four days. Complete Blood Count (CBC) showed anemia with hemoglobin of 71 g/dl and hematocrit of 0.22. Bleeding parameters were within normal limits. Patient was advised for endoscopy but the parents initially refused. Transfusion of packed red blood cells was done. Patient was discharged, well. However, the recurrence of hematemesis few days post discharge prompted re-admission of the patient.

The patient was born full term to a 29-year-old G3P3 mother in a local hospital. She was delivered via normal spontaneous delivery with a Ballard score of 39 weeks. Weight is appropriate for gestational age. She was admitted at the Neonatal ICU (NICU) for 19 days. Umbilical vein catheterization was done. Routine newborn care which includes vitamin K was also done. She was managed as a case of meconium aspiration syndrome, hypoxic ischemic encephalopathy stage II. Expanded newborn screening and hearing screening tests were all normal.

The patient had previous admissions due to severe pneumonia and acute gastroenteritis. She had no allergies, non-asthmatic, and no known exposure to tuberculosis. Growth and development are at par with age. She is bottle fed with formula milk since discharge. She received the required vaccination for age. The family has no atopy and no history of bleeding.

The patient was examined awake, comfortable, and not in respiratory distress. Vital signs revealed that she was tachycardic at 162 bpm, eupneic at 30 cpm, afebrile at 37.1˚C, normotensive at 90/60mmHg with oxygen saturation of 99% at room air. Her weight, length and head circumference are all normal for age. Pertinent physical examination showed absence of rashes or purpura on the skin with pale palpebral conjunctiva. There was no palpable cervical lymphadenopathy. Heart sounds were distinct and no murmurs. She had bronchovesicular breath sounds with no crackles. Abdomen is globular with normoactive bowel sounds and no hepatosplenomegaly.

According to Nelson's Textbook of Pediatrics, bleeding that originates in the esophagus, stomach, or duodenum can cause hematemesis. It is the cardinal sign of upper gastrointestinal bleeding (UGIB) which comprises 73% of the presenting symptoms of UGIB [3] [4]. The history should include any previous GI problems (e.g., jaundice, liver disease, ulcers, GER, other GI hemorrhages), blood transfusions, coagulopathies, and iron deficiency. A neonatal history of total parenteral nutrition, omphalitis, or umbilical vein catheterization is a risk factor for portal vein thrombosis (**Figure 1**). Examination of vital signs is important to ensure that bleeding does not require emergent treatment for circulatory compromise.

Confirming the presence of blood is important to avoid unnecessary evaluation.

In patients presenting with gastrointestinal bleed, it is fundamental to distinguish an upper from a lower GI bleed. Upper gastrointestinal bleeding refers to bleeding from a site proximal to the ligament of Treitz at the level of duodeno-jejunal flexure. Symptoms of Upper GI Bleeding include hematemesis (73%), melena (21%), and coffee-ground emesis (6%). While hematochezia or passage of bright red blood in stools is usually a feature of lower GI bleeding, but some infants with UGIB can occasionally present with passage of bright red blood from the rectum because of rapid GI transit in a briskly bleeding child. The possible etiologies in Upper GI Bleeding usually vary with age but considerable overlap exists between the different age groups. The rate and extent of bleeding depend on these etiologies and the presence of associated conditions such as coagulation defects [4] (**Table 1**).

Gastrointestinal bleed is rare in neonates however it may be present in newborns with Vitamin K deficiency as well as maternal idiopathic thrombocytopenia

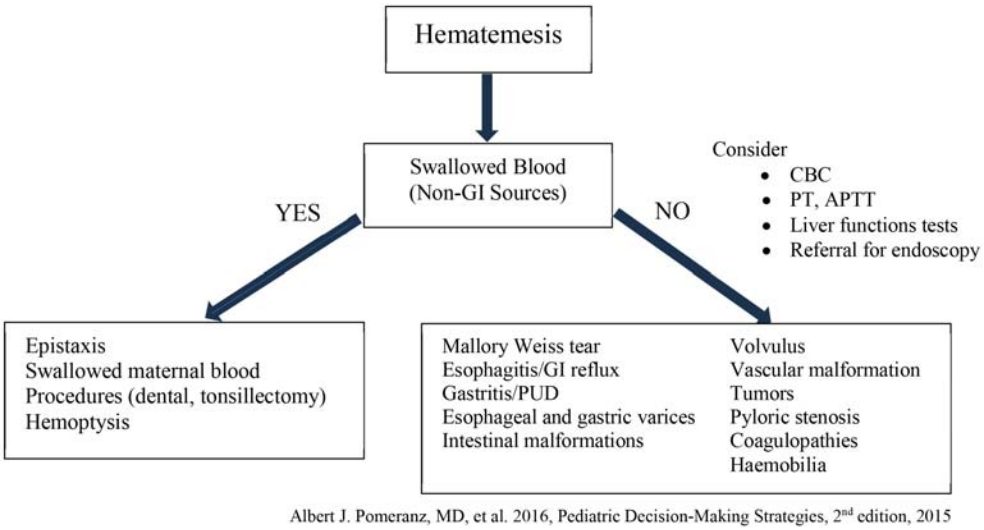


Figure 1. Diagram for approach to diagnosis for patient presenting with hematemesis

Table 1. Upper gastrointestinal bleeding (UGIB) vs Lower gastrointestinal bleeding (LGIB).

	Upper GI Bleed	Lower GI bleed
Location	**Proximal to Ligament of Treitz** (esophagus, stomach, or duodenum)	**Distal to Ligament of Treitz** (jejunum, ileum, colon, rectum)
Symptoms	Hematemesis Coffee-ground emesis Melena Hematochezia (very brisk bleeding)	Hematochezia Melena (SI, ascending colon)
Causes	Age-specific, associated conditions (PUD bleeding, varices, erosive esophagitis, and vomiting-induced hematemesis)	Crohn's disease, ulcerative colitis, hemorrhoids, anal fissures, and Meckel diverticulum
Diagnostics	Esophagogastroduodenoscopy	Colonoscopy

Nelsons Textbook of Pediatrics, 19th Ed.

and maternal NSAID use. Other causes include stress gastritis or ulcers, vascular anomalies, coagulopathy caused by infection, liver failure, or a congenital coagulation factor deficiency. For infants and toddlers, stress ulcers and gastritis are common especially in sick patients. Variceal bleeding with portal hypertension and vascular malformations may also be noted. Other causes include reflux esophagitis, esophageal or gastrointestinal foreign body, communicating duplication cysts, NSAIDS use and corrosive injury. Foreign body ingestion should be also considered especially in patients with a history of choking episodes. Causes of UGIB in older children and adolescents are like those seen in adults. Of this, varices, peptic ulcers, Dieulafoy's lesions and vascular malformations cause major bleeds [3]. For this case esophageal varices, Mallory Weis tears, Cow's milk protein allergy and coagulation problems were all considered as the cause of hematemesis.

The patient was admitted under Gastroenterology Service. She was given tranexamic acid for bleeding. Baseline laboratory tests were requested such as: Complete Blood Count, OPS/NPS, Serum electrolytes (Na, K, Ca, Cl, Mg), BUN, Creatinine, SGPT, SGOT, CRP and PCT. Imaging studies such as CXR-APL and Upper GI Endoscopy were also requested. Results showed anemia of 91 g/L (N 96 - 12 g/L), normal hematocrit of 0.30 (N 0.29 - 0.37), normal MCH, increased MCV, decreased MCHC revealing a hypochromic, macrocytic anemia, severe. Coagulation studies showed only a mild elevation of the APTT (35.3 sec, N 27 - 34 sec). The rest of the results were unremarkable.

Upper GI endoscopy findings revealed presence of a protruding vessel with multiple blood clots at the lesser curvature of the stomach, suggesting Dieulafoy's lesion, thus patient was referred to pediatric surgery and vascular and interventional radiology for evaluation and planning of the contemplated procedure (**Figure 2**).

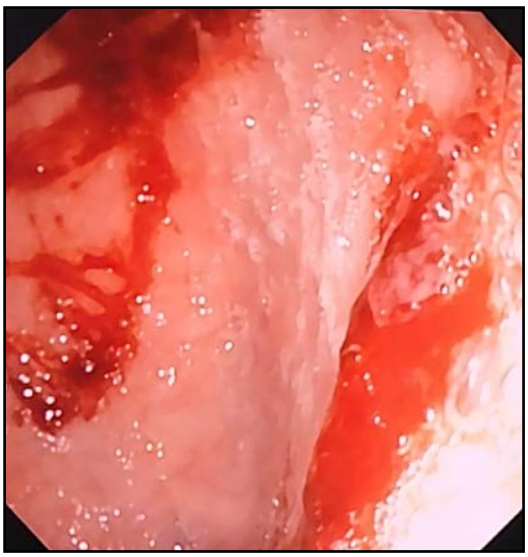


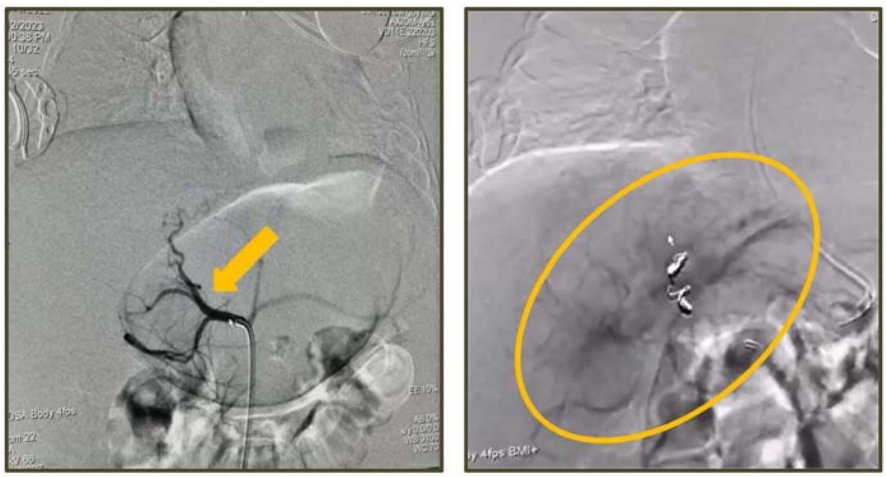
Figure 2. Endoscopic finding of Dieulafoy's lesion. Presence of a protruding vessel at the lesser curvature of the stomach surrounded by clots.

Several approaches were considered such as exploratory laparotomy, gastrostomy, oversewing of the Dieulafoy's lesion vs. wedge resection, and upper GI endoscopy with possible clipping of the lesion. The team decided to do a transarterial embolization. Angiographic embolization was done. The right common femoral artery was accessed and a vascular sheath was inserted. The celiac trunk was selected using a catheter. Upon selective angiography, a tortuous right gastric artery was noted and confirmed at the lesser curvature of the stomach. Embolization was done using 2 3 × 6 mm detachable coils. Post embolization angiography showed a successful embolization of the said artery (Figure 3). Postoperatively, the patient tolerated the procedure well with no recurrence of bleeding and other post-op complications. The patient was discharged well. With good follow-up and monitoring, patients with this malformation have a good prognosis.

3. Discussion

Dieulafoy's lesion is also known as gastric aneurysm. It is a congenital arteriovenous malformation characterized by an unusually large tortuous submucosal artery. If this artery is eroded, it could lead to pulsatile bleeding causing recurrent gastric bleed [4]. Our case had two visits to the emergency department due to episodes of hematemesis. However, it is only on the present admission that the etiology was determined.

The incidence of acute gastrointestinal bleeding ranges from 50 - 150 per 100,000 of the population each year, in all ages [1]. To account, most journals would say it only comprises 1% - 2% of acute Upper GI Bleeding in adults and is



(a) (b)

Figure 3. (a) Pre-embolization of the Dieulafoy's lesion. (b) Post-embolization of the lesion. Right common femoral artery was accessed and vascular sheath was inserted. Celiac trunk was selected using a catheter. Upon selective angiography, a tortuous right gastric artery was noted and confirmed to be seen at the lesser curvature of the stomach. Embolization was then done using 2 3 × 6 mm detachable coils. Post angioembolization shows successful embolization of the said artery.

extremely rare in children. There are no accurate statistics on the incidence of this disease in children [5]. From 1995 to 2021, only sporadic cases were reported in children worldwide. In the Philippines, there is only 1 case reported to date, however, this is an adult case presenting with melena. There is insufficient data recording its occurrence in the pediatric population [5].

According to a journal by Dulic-Lakovic, *et al*, upper GI tract is the predominant location for dieulafoy's lesion [6]. Approximately, 80% - 90% is located within 6 cm from the gastroesophageal junction within the lesser curvature of the stomach, with a direct correlation with the blood supply that directly arise from arterial chain, compared to the other part of the stomach in which blood supply is derived from submucosal plexus of a larger vessel [7] [8]. However, this could also be found elsewhere along the gastrointestinal tract—duodenum (15%), esophagus (8%), rectum (2%), colon (2%), and jejunum (1%) [5]. Dieulafoy's lesion involving the colon and rectum is extremely uncommon, diagnosis was by rigid sigmoidoscopy, with fewer than 30 cases [9]. One study reported its occurrence in the tracheobronchial branch presenting as hemoptysis [10]. The patient's endoscopic findings showed protruding vessel with multiple blood clots at the lesser curvature of the stomach which is the most common site for the lesion to arise.

The exact pathogenesis is still unknown, either it is inherited or acquired. Older age patients with the said lesion may suggest it is acquired, while pediatric literature suggests it may represent a congenital anomaly [11]. One literature proposed an underlying mechanism: unlike the normal arterial tree that usually tapers off when approaching the distal branches, the lesion maintains dilated approximately 1 - 3 mm all throughout. This caliber is ten-fold larger than the normal maximal caliber of submucosal vessels. Dieulafoy's lesion can protrude through a small mucosal defect making it susceptible to minor mechanical trauma and eventually erode into the lumen to cause acute gastrointestinal bleeding [1].

Patients usually present with painless recurrent intermittent hematemesis associated with melena, hematochezia, and hypotension. The clinical manifestations of the patient depend on the location and the diameter of the bleeding vessel involved [5]. Gastric and duodenal lesions present with massive upper gastrointestinal bleeding, small intestinal lesions present with UGIB bleeding and/or hematochezia, while colonic lesions present with fresh blood per rectum [12]. In our case, our patient presented with recurrent hematemesis eventually during the course in the wards was associated with melena.

For patients who present with acute upper gastrointestinal bleeding, initial management for these patients would include fluid resuscitation and as well as risk stratification, whether low or high risk. Patients are classified under high-risk when: Patient presents with hypotension, tachycardia, oliguria, pallor, altered sensorium, hematemesis, decreased hematocrit which are signs of large blood loss. Patients with chronic conditions or comorbidities such as any heart, liver or kidney problems which may affect/compromise the body's physiologic reserve,

immunosuppressed patients or those taking anticoagulants. With esophagogastroduodenoscopy EGD done, those who will present with active bleeding, deep ulcer, visible vessels. Patients who are considered low-risk are usually started with supportive management and given IV proton pump inhibitor while patients with higher risk may need transfusion of blood products and admission to ICU for close monitoring. Once patients are stabilized, diagnostics to identify the source of bleeding such as EGD may be commenced [5].

To diagnose Dieulafoy's Lesion, esophagogastroduodenoscopy should be done ideally during the first 12 hours from onset of bleeding. This procedure identifies most of the sources for gastrointestinal bleeding. On EGD, Dieulafoy's lesion may appear as a stream of arterial blood emanating from what seems like a normal mucosa. For those with absence of active bleeding, blood clots may obscure the mucosal defect, and for some a protruding vessel may be seen. However, not all lesions are easily identified by this diagnostic exam due to the intermittent nature of this case which is why for some patients, multiple EGD must be done to confirm the diagnosis. EGD identifies only about 71% of the cases. For our patient, a protruding blood vessel surrounded with blood clots at the lesser curvature was noted suggesting Dieulafoy's Lesion [13] [14]. Other diagnostic modalities used in previous case reports would include mesenteric angiography for patients with massive gastrointestinal bleeding and no history or previous imaging studies which would point out any source of bleeding [14].

Diagnostic modalities for gastrointestinal bleeding may also be used for therapeutic purposes. Treatment options for Dieulafoy's Lesion would include: 1) Endoscopic hemostatic therapy; 2) Angiographic embolization or 3) Surgical plans wherein the lesion would be oversewn and resected [5]. Endoscopic therapy is currently considered as the mainstay therapy for Dieulafoy's lesions as it is able to achieve permanent hemostasis in more than 90% of cases. Endoscopic therapy includes either: the use of vasoconstrictors, such as epinephrine, and sclerosing agents, such as sodium morrhuate, 50% dextrose or absolute alcohol. These agents lead to temporary hemostasis without the risk of any mucosal perforation electrocoagulation/laser photocoagulation. Heater probe, or application of hemoclips was originally opted for our patient, however unavailability of materials led to the decision of angioembolism for our case.

Angiographic embolism is an alternative procedure in managing cases of gastrointestinal bleeding. This procedure enables the physician to locate and identify the site of bleeding and subsequently stops the bleeding by embolizing the bleeding artery with the use of glue or coils. This is usually indicated for patients who 1) failed hemostasis with endoscopic techniques, 2) acute bleeding wherein lesions were beyond the reach of available endoscopes, or 3) poor surgical candidates [13]. Prior case reports opted for this technique since prior EGD had no specific source identified, while some had endoscopic clips applied on the area of involved artery and then subsequent angioembolism done. For our case, the bleeding vessel identified and embolized was the Right gastric artery. The agent

used for embolization was 2 × 3 mm coils with the right femoral artery as the access site. For patients managed with this technique, post operatively, they are monitored for possible re-bleeding episodes due to formation of collateral channels, possible arterial dissection of cannulated artery, or possible occurrence of ischemia or strictures especially when the present collateral channels in the mesenteric area is damaged or when embolic material passes the vascular bed which was not the target vessel. Severity of these complications would then determine if there is a need for anticoagulants or possible surgical management [4] [15].

Surgery was once the first line of management for Dieulafoy's lesion. Currently, this is already reserved for those patients with failure of endoscopic or angiographic interventions. In this technique, the identified vessel is oversewn or resected, given that guided preoperative localization is done. Exploratory laparotomy, gastrotomy with oversewing of Dieulafoy's lesion or possible wedge resectioning was considered for this case if prior options were not possible for our patient.

4. Conclusion

Patients presenting with gastrointestinal bleeding should be managed in a multidisciplinary approach. One must consider other systems aside from gastrointestinal causes. As a rare condition both for adults and children, appropriate diagnostic and treatment modalities should be done. Endoscopic therapy is still the first-line diagnostic and/or treatment option for Dieulafoy's lesion. Other treatment options may be used as adjunct therapy. Despite its good prognosis, treated patients still need to be closely monitored for rebleeding episodes.

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Conflicts of Interest

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

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Abbreviations

GIT	Gastrointestinal Tract
LGIB	Lower Gastrointestinal Bleed
UGIB	Upper Gastrointestinal Bleed

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Management of Endoscopic Portal Hypertension Lesions in Cirrhotic Patients in a Country with Limited Resources: About 603 Cases in the City of Douala in Cameroon

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Abstract

Introduction: Portal hypertension (HTP) is a morbi-mortality factor in cirrhotic patients. It is responsible for endoscopic lesions and has digestive hemorrhage as the main complication. The objective of the study was to study the management of endoscopic lesions of portal hypertension in a country with limited resources. **Methodology:** This was a cross-sectional and analytical study conducted in 04 hospitals in the city of Douala, Cameroon, over a period of 08 years from 1 January 2014 to 31 December 2022. Included were cirrhotic patients with viral hepatitis with endoscopic lesions of PH. The data collected were sociodemographic, clinical, paraclinical, therapeutic and evolutionary. Data analysis was done using SPSS software version 25.0. Logistic regression allowed the search for prognostic factors with a significance threshold of $p < 0.005$. **Results:** We included 603 patient records. They were mainly male patients (56.1%) with an average age of 47.6 ± 6.3 years. The Child Pugh score was ranked B in 53.7% of cases. Digestive hemorrhage was the main complication in 66.8% of cases. We had grade 2 esophageal varices in 61.5% of cases. The main treatments were prescription of propanolol (63.3%) and ligation of esophageal varices (53.3%). The average number of ligation sessions was 2.1 ± 1.8 with an interval between sessions of 28 ± 2.8 days. Prevention of rupture of esophageal varices was secondary in 66.5% of cases (n = 452). The rate of hemorrhagic recurrence was 9.3%. Hospital mortality was 15.1%. Recurrence of hemorrhage was associated with PT < 45%

(OR = 1.04; 95% CI [1.01 - 1.06]; p = 0.003) and platelet levels < 150,000/mm^3 (OR = 1.05; CI 95%: [1 - 1.09], p = 0.029). Mortality was associated with a child pugh C score (OR = 9.73; 95% CI 95% [3.9 - 23.9]; p < 0.005) and hemorrhagic recurrence (OR = 2.02; 95% CI 95% [0.9 - 4.3]; p < 0.005). **Conclusion:** The management of HTP lesions was based on the prescription of beta-blockers and the ligation of esophageal varices. Factors associated with mortality were hemorrhagic recurrence, low PT and Child Pugh C score.

Keywords

Portal Hypertension, Cirrhosis, Endoscopic Lesions, PEC, Cameroon

1. Introduction

Portal hypertension (PH) is defined as an increase in portal pressure beyond 15 mmHg, or an elevation of the port-cave pressure gradient beyond 5 mmHg [1] [2]. It is secondary to an obstacle to port-hepatic circulation [1] [3]. This obstacle occurs mainly in the liver, in the portal vein, or more rarely on the terminal part of the inferior vena cava [1]. The most common causes of portal hypertension are cirrhosis and bilharzia [4]. It causes vascular changes such as dilation of the portal vein, the formation of collateral (esophageal varices, gastric, splenic) [5]. With portal hypertension, oesopageal and gastric varices are the main endoscopic lesions [3].

The prevalence of endoscopic lesions of portal hypertension varies between 30% and 70% and one third of cirrhotic patients present at the time of diagnosis. In Ivory Coast, Outtara *et al.* in 2018, had a prevalence of 80% in cirrhotic patients [6]. In Senegal Bassène *et al.* had recovered respective prevalence of esophageal varices (VO) grade 2 and 3 of 24.3% and 75.7% [7]. In Cameroon, Tapouh *et al.* had a prevalence of 92% VO in cirrhotic patients [8]. The predictive factors of endoscopic PH lesions in cirrhotic patients are first the platelet rate 150.109/mm^3, the value of elastometry 20 kPa [9]; but also the rate of prothrombin, spleen size, albumin [8] [10].

The discovery of endoscopic lesions of PH is most often done in the context of digestive hemorrhage or as part of the monitoring of cirrhosis [11]. In Cameroon, Ankouane *et al.* in 2013, had 28.9% of high digestive hemorrhages that were related to PH lesions in the city of Yaoundé [12]; and in Gabon, Itoudi *et al.* in 2019 had a prevalence of 29.5% [13]. The management is based on the Baveno consensus conference with updated in 2021, Baveno VII [9]. This consensus codifies the diagnosis and treatment of PH lesions. The diagnosis of portal hypertension in cirrhotic patients is based on a pressure gradient > 5 mmHg and/or the presence of clinical signs of portal hypertension. It is considered clinically significant if the 10 mmHg gradient [9]. There are 3 levels of management (primary, secondary and tertiary) for digestive hemorrhage by rupture of esophageal varicose veins. The means of management are both medical (non-car- dis-

elective beta-blockers) and endoscopic (esophageal varicose vein ligation, TIPS) [3] [9].

Hemorrhage related to rupture of esophageal varicose veins is a significant morbi-mortality factor in cirrhotic patients. Early treatment and prevention of hemorrhagic risk contribute to lower mortality in these patients. The aim of the study was to assess the management of PH lesions in a resource-limited country like Cameroon based on Baveno's recommendations; and to investigate factors associated with patient prognosis.

2. Patients and Methods

Type of study

We conducted a cross-sectional and analytical study over a period of 08 years from January 1, 2014, to December 31, 2022. It had for framework 04 sanitary structures of the city of Douala of which 02 were public (General Hospital and Hospital Laquintinie) and 02 private (Center of the diseases of the digestive tract and the Polyclinic Marie O). These structures have a digestive endoscopy unit with a technical platform allowing the realization of diagnostic and therapeutic endoscopies.

Study population and sampling

The population of cirrhotic patient studies followed in the various health structures. Diagnosis of cirrhosis was by a gastroenterologist through liver biopsy, non-invasive methods (impulse elastomerics, fibrotest/Actitest, Fib 4, NALFD fibrosis score). We included patients with endoscopic lesions secondary to portal hypertension (esophageal varicose veins, esosogastric varices, gastric varices and portal hypertension gastropathy). We excluded patients whose records were incomplete or not found. Our sampling technique was non-probability based on the exhaustive recruitment of patients meeting our inclusion criteria.

Data collection

Patients were selected using consultation and hospitalization records. Included patient records were used for data collection. The latter was done using a pre-established form respecting the anonymity and confidentiality of each patient. The data collected were sociodemographic (age and sex), history and comorbidities (hypertension, diabetes, personal history), the etiology of cirrhosis, clinical signs, results of biological analyses, indications and results of esophageal endoscopy, treatment, and course (death, hemorrhagic recurrence).

We assessed the Child-pugh score for each patient [14]. We also assessed Glasgow-Blatchford and Rockall scores in patients with digestive hemorrhage [15].

Ethical considerations

We obtained a research authorization from the ethics committee and the various health structures (N° 3802 CEI-UDo/06/2023/T). The recommendations of the 2013 Helsinki Declaration were scrupulously respected through the design of a research protocol, the submission of the latter to the relevant institutional eth-

ics committee for evaluation and respect for the confidentiality of personal information concerning the persons involved in the research.

Statistical analysis

The data was collected on a data sheet and then saved under the interface of the Microsoft Excel 2010 software and the SPSS software version 25.0 was used for statistical analyses. The quantitative variables were expressed in average and standard deviation and the qualitative variables in number and percentage. Logistic regression by uni- and then multivariate analyses looked for the associated factors. The odd ratio was calculated with a 95% confidence interval and a significance threshold for a $p < 0.05$.

3. Results

We collected 807 records of cirrhotic patients and included 603 with endoscopic lesions of portal hypertension, a prevalence of 74.7%. These were mainly male patients (56.1%) with an average age of 47.6 ± 6.3 years. The etiologies of cirrhosis were mainly viral hepatitis B (20.1%) and C (17.7%); and alcohol (14.2%) (Table 1). The Child Pugh score was ranked A, B, C respectively in 1.3% and 53.7% and 45% of cases. The circumstances of discovery of the lesions were an externalized digestive hemorrhage in 66.8% of cases. Hematemesis occurred in 51.6% of cases (n = 208/403). The Glasgow-Blacthford score was greater than 1 in all patients with digestive hemorrhage and the Rockall score was greater than 8 in 22.6% (n = 91/403). The main clinical signs were ascites (96.5%), jaundice (85.4%), hepatic encephalopathy (59.9%) and collateral venous circulation (57.2%) (Table 1). Biologically, the mean hemoglobin level was 9.1 ± 2.6 g/dl, and the mean platelet level was (149.5 ± 40.8) × 10^6/mm^3 (Table 1). The average prothrombin rate was 48.9% ± 13.1% (Table 1). The average transaminase rate was 30.6 ± 7.7 IU/L for AST (aspartate aminotransferase) and 32.3 ± 11.7 IU/L for ALT (alanin aminotransferase); and the average bilirubin rate was 36.5 ± 9 mg/L (Table 1). the mean serum albumin level was 29.8 ± 10 g/l (Table 1). In endoscopy, we had grade II and III esophageal varices respectively in 61.5% and 20.2%; red signs in 35% of cases and gastric varices in 31.8% of cases (Table 2). The medical treatment was based on the prescription of propanolol (63.3%) and those of antibiotics for the prevention of ascites infection (57.9%) (Table 3). The main endoscopic treatment was esophageal varices ligation (53.7%) (Table 3). The average number of ligation sessions was 2.1 ± 1.8 with an interval between sessions of 28 ± 2.8 days (Table 3). The average number of elastics installed was 4.1 ± 1.9. The prevention of rupture of esophageal varices was secondary in 66.5% of cases and primary in 33.5% (Table 3). The rate of hemorrhagic recurrence was 9.3%. Hospital mortality was 15.1%. Recurrence of hemorrhage was associated with PT < 45% (OR = 1.04; 95% CI 95% [1.01 - 1.06]; p = 0.003) and platelet levels < 150,000/mm^3 (OR = 1.05; IC95%: [1 - 1.09], p = 0.029). Mortality was associated with a Child Pugh C score (OR = 9.73; 95% CI 95% [3.9 - 23.9]; p = 0.002) and hemorrhagic recurrence (OR = 2.02; 95% CI 95% [0.9 - 4.3]; p =

0.005), PT < 45% (OR = 1.53, [CI 95% (0.2 1- 8.8)], p = 0.001) (Table 4).

4. Discussion

Three quarters of cirrhotic patients have portal hypertension lesions. This

Table 1. Characteristics of population study.

Variables	Frequency (%)	Mean (±SD)
Mean age (years)		47.6 ± 6.3
Sex		
Male	338 (56.1)	
Female	265 (43.9)	
Etiologies of cirrhosis		
Hepatitis B	121 (20.1)	
Hepatitis C	107 (17.7)	
Alcohol	86 (14.2)	
Alcohol/hepatitis B or C	83 (13.8)	
Co-infection B/C	61 (10.1)	
Auto-immune	39 (6.4)	
Autres	44 (7.2)	
Unknown	62 (10.2)	
Child pugh score		
A	8 (1.3)	
B	324 (53.7)	
C	272 (45)	
Clinical presentations		
Hemorrhage	403 (66.8)	
Ascitis	582 (96.5)	
Jaundice	515 (85.4)	
Hepatic encephalopathy	361 (59.9)	
Collateral veinous circulation	345 (57.2)	
Biological paramters		
Hemoglobin (g/dl)		9.1 ± 2.6
Platelets (10^6/mm^3)		149.5 ± 40.8
Prothrombin time (%)		48.9 ± 13.1
ASAT (UI/l)		30.6 ± 7.7
ALAT (UI/l)		32.3 ± 11.7
Bilirubin (mg/l)		36.5 ± 9
Albumin serum level (g/l)		29.8 ± 10

Table 2. Hypertension portal endoscopic lesions.

Variables	Frequency (%)
EV grade I	109 (18.3)
EV grade II	371 (61.5)
EV grade III	122 (20.2)
Gastric varices (GOV, IGV)	192 (31.8)
Red spots	211 (35)
Portal hypertension gastropathy	91 (15.2)

Table 3. Management of hypertension portal lesions according BavenoVII recommandations.

	Frequency	Mean (±SD)
Type of prevention		
Primary	202 (33.5)	
Secondary	401 (66.5)	
Varices ligations		
Average of seances	324 (53.7)	2.1 ± 1.8
Average number of elastics		4.1 ± 1.9
Delay between seances (days)		28 ± 2.8
Scleroterapy	80 (13.3)	
Medical treatment		
Propanolol	382 (63.3)	
Carvedilol	6 (1)	
Antibiotics	349 (57.9)	
Terlipressin	171 (28.3)	

Table 4. Factors associated to hemorrhagic Recurrence and death of patients.

Prognosis factors	OR adjusted (CI 95%)	p-Value
Death		
PT < 45	1.53 (0.21 - 8.8)	0.001
Child-pugh C	9.73 (3.9 - 23.9)	0.002
Hemorrhage recurrence	2.02 (0.9 - 4.3)	0.005
GOV	0.1 (0.01 - 0.99)	0.05
Bilirubine > 15 mg/l	0.97 (0.94 - 1.01)	0.17
Hemorrhage recurrence		
PT < 45	1.04 (1.01 - 1.06)	0.003
Platelet < $150 \times 10^6/mm^3$	1.05 (1 - 1.09)	0.029
VO grad 2	0.79 (0.004 - 22.58)	0.935

proportion is much higher than that of Waqqas *et al.* in Pakistan whose study focused on patients who experiences a first episode of ascitis [16]. Most patients had decompensated cirrhosis as shown by child pugh scores, which are mostly classified B and C. This is similar to that of Sehounou *et al.* in Benin or Bouglouga *et al.* in Togo [17] [18]. Lesions of portal hypertension were discovered in a hemorrhagic context in most cases. It is most often the mode of discovery of cirrhosis because most patients in our context do not know they are carriers of cirrhosis. The clinical signs and biological results found reflect decompensation but also complications of cirrhosis. They are like those described in the African series [19] [20] [21].

The proportion of esophageal varices is comparable to that of Bagny *et al.* in Togo [22] higher than that of Ouattara *et al.* or Okon al in Ivory Coast [6] [21]. Hemorrhage was managed according to Baveno's recommendations [9], although it was not effective in all patients. All patients as part of their follow-up do not always have access to specialized centers with an adequate technical platform. Most patients admitted in a hemorrhagic context are lost to sight. Esophageal varices ligation may have been in just over half of patients. The high cost of a ligation kit is an obstacle to the realization of this medical procedure that is not within the reach of all budgets in limited ressources country. All patients were able to have an average of 02 ligation sessions, as was in Senegal by Bassène *et al.* [7]. Due to financial limitations, many patients abandon their treatment, making monitoring and controlling the eradication of varices not always effective. Medical treatment with beta-blockers is often preferred in our context because less expensive than endoscopic treatment. Prevention was generally primary and secondary. Secondary prevention was followed by the inaugural hemorrhagic episode because it was often the mode of discovery of cirrhosis and/or portal hypertension lesions. Only a third of patients had primary prevention, which corresponds to the proportion of patients seen without hemorrhagic context. No patients received tertiary prevention. The implementation of a TIPS basis for tertiary prevention [9], necessitates the presence of sanitary structures equipped. The shortcomings of the technical platform do not allow by the realization of certain treatments.

Mortality remains very high, but it is lower than that found by Itoudi *et al.* in Gabon [19], which had a prevalence of 19.6%. Hemorrhagic recurrence was observed in one in ten patients. Factors associated with mortality were Child Pugh C score, low prothrombin time and hemorrhagic recurrence. Decompensation of cirrhosis and the occurrence of digestive hemorrhage are prognostic factors often found in the literature [22]. Hemorrhagic recurrence was associated with thrombocytopenia and low prothrombin time. Low prothrombin time was also identified by Camengo and the Central African Republic as a factor in hemorrhagic recurrence [23].

The limit of the study is its retrospective nature which does not allow to have indications on the observance of medical treatment by beta-blockers, on the era-

dication of esophageal varices after varices ligation.

5. Conclusion

Three quarters of cirrhotic patients had endoscopic lesions of portal hypertension. The circumstances of discovery of the lesions were mainly digestive hemorrhage. Despite the limits of the technical platform the recommendations of Baveno are respected. This is mainly a secondary prevention put in place generally after the bleeding episode. The management was based on the prescription of beta-blockers and the ligation of esophageal varices. The outcome of patients is influenced by the severity of cirrhosis and its complications.

Authors' Contributions

All authors contributed to the development, writing, and editing of the article.

Conflicts of Interest

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

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Abbreviations

ALAT: Alanin amino-transferase
ASAT: Aspatate amino-transferase
EV: Esophageal varices
GOV: Gastro-oesophegal varices
IGV: INTRA gastric varices
PH: Portal Hypertension
PT: Prothrombin time

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Midwives's Knowledge and Practice in Preventing Mother-to-Child Transmission on Hepatitis B Virus in Brazzaville in 2023

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Abstract

Background: Maternal-fetal transmission is the most frequent mode of hepatitis B virus (HBV) contamination in Africa. Prevention of mother-to-child transmission (PMTCT) of hepatitis B is still poorly understood, and training of the health workers involved, such as midwives, is rare. **Objective:** The aim of this study was to assess the knowledge and practices of midwives prevention of HBV' mother-to-child transmission (PMTCT) in Brazzaville. **Patients and Methods:** This was a cross-sectional analytical study conducted in Brazzaville from June 1 to July 31, 2023. Midwives present at the time of the survey in the various Brazzaville health centers visited and who agreed to answer the questionnaire during a face-to-face interview with the investigator were included. Univariate analyses were performed using epi info7.2 software. Pearson's chi-square and Student's t-tests were used to compare proportions and means, which were significant at the 0.05 level. **Results:** At the end of our study, 93 midwives out of 127 agreed to take part in the study, *i.e.* a participation rate of 73.2%. Their median age was of 41.7 years, a median professional experience of 13.7 years, and they worked mainly in primary health care facilities. Global knowledge of HBV PMTCT was satisfactory in 51 (54.3%) midwives. Knowledge of the HBV vaccine was significantly related to professional experience (p = 0.0167). PMTCT practice was poor in 48 (51.6%) cases. Overall, the practice of PMTCT was statistically associated with the midwives' place of practice (p = 0.0262). **Conclusion:** Midwives had good knowledge but insufficient practice of PMTCT in Brazzaville. Training and awareness-

raising are needed to reduce mother-to-child transmission of HBV.

Keywords

Viral Hepatitis B, Midwifery, Knowledge and Practice

1. Introduction

Viral hepatitis is inflammation of the liver parenchyma caused by the presence of a virus. Of the five hepatotropic viruses involved, viruses B and C account for the greatest burden of morbidity and mortality, making it a major global public health problem. In 2017, more than 2 billion people were infected with the hepatitis B virus in their lifetime, representing around 30% of the world's population, of whom 257 million are chronic carriers [1]. Sub-Saharan Africa and Southeast Asia are regions of high HBV prevalence, with carriage ranging from 8% to 20%. In the Congo, studies estimate the prevalence of hepatitis B at around 5% - 15% [2] [3] [4]. The worldwide prevalence of hepatitis B among pregnant women is between 7.2 and 10.6%, compared with 7.8% in the Congo [5] [6]. Maternal-fetal contamination with the hepatitis B virus is the most common mode of infection in high-prevalence areas, accounting for around 38.9% of cases during pregnancy, 95% during childbirth, and 24% during breastfeeding [7] [8]. Some factors, such as a gestational HBV viral load in excess of 2000 IU/ml, absence of HBV vaccination in the newborn, and HIV co-infection, favor maternal-fetal contamination [9] [10]. Children born to HBsAg-positive mothers and contaminated at birth will develop chronic hepatitis in 90% of cases and die of cirrhosis and/or hepatocellular carcinoma in 25% of cases. Unlike HIV, prevention of mother-to-child transmission (PMTCT) of hepatitis B is still poorly understood, and training of the health workers involved, such as midwives, is rare. In fact, the implementation of a PMTCT strategy for hepatitis B is one of the WHO's guidelines for reducing the burden of hepatitis B worldwide [1]. The aim of this study was to evaluate the knowledge and practices of FHs on the prevention of mother-to-child transmission (PMTCT) of HBV in Brazzaville.

2. Patients and Methods

We conducted a cross-sectional analytical study in Brazzaville's public health centers from June 1 to July 31, 2023, a period of two months. We included primary health centers, secondary health centers or referral hospitals, and tertiary health centers such as general and university hospitals. Midwives present in the various health centers at the time of the survey and who agreed to answer the questionnaire were included. Midwives who subsequently withdrew their consent were excluded. After explaining the purpose of the study and ensuring their anonymity, the midwives were interviewed face-to-face by two trained interviewers. Data were collected using a pre-established questionnaire, designed on

the basis of a literature review and containing 39 items. The performance of the self-administered questionnaire was evaluated by two expert hepato-gastroenterologists with the aim of covering all areas of prevention of mother-to-child transmission of HBV. Midwives' socio-demographic characteristics (age, professional experience, health center of practice and sector of activity), their knowledge, and practice in terms of prevention of mother-to-child transmission were collected. The level of knowledge and practice could be unsatisfactory (less than 50% correct answers) or satisfactory (at least 50% correct answers). Data were entered into Microsoft Excel. Univariate and bivariate analyses were performed on epi info7.5. Chi-square, Fisher, and Student's t-tests were used to compare percentages and means at a significance level of 5%.

3. Results

During the study, 93 midwives took part out of the 127 approached, the participation rate was 73.2%. The median age was 41.7 years (IQR: 31.7 - 49 years). Figure 1 shows the distribution of midwives according to age. The level of education was divided into three classes: primary, secondary and higher education in 21 (22.6%), 40 (43%) and 32 (34.4%) cases. Median professional experience was 13.7 years (IQR: 5 - 18.2). Midwives with at least 10 years' professional experience accounted for 55 cases (59.1%) versus 38 (40.9%). They were interviewed in primary, secondary and tertiary health centers respectively in 47 (50.5%) cases, 29 (31.2%) cases and 17 (18.3%) cases. They practiced in different sectors of activity: prenatal consultation, delivery room and hospitalization sector in 39 (41.9%), 38 (40.9%) and 16 cases (17.2%). Midwives' general knowledge of HBV PMTCT was good in 51 (54.8%) cases and poor in 42 (45.2%) cases. Eighty-six midwives (92.5%) knew about viral hepatitis B, compared with seven midwives (7.5%). Maternal-fetal transmission of HBV was a known mode of hepatitis B infection for 36 (38.7%) participants, compared with 57 (61.3%). The strategy for preventing mother-to-child transmission of HBV was known by 33 (35.5%)

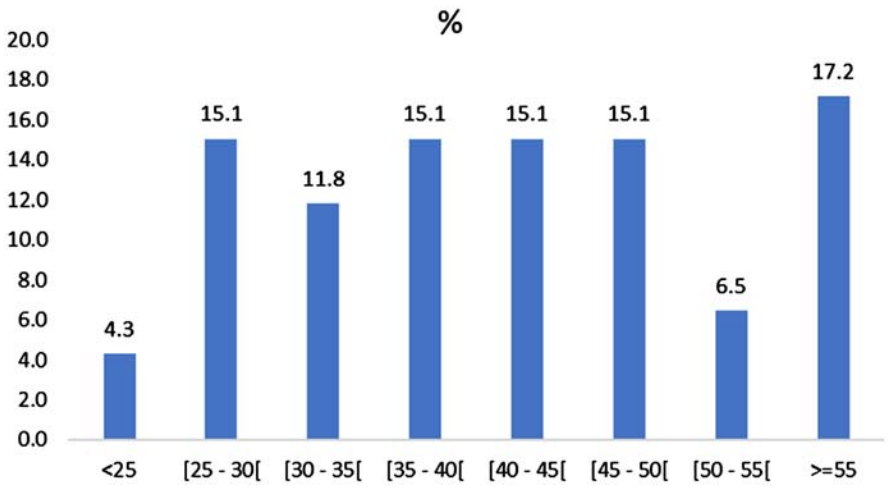

Figure 1. Distribution of midwives by age.

midwives. Concerning the tests performed during the course of viral hepatitis B, only 31 (33.3%) and 33 (35.5%) of the midwives knew the HBsAg and HBV viral load. The molecules used in the treatment of viral hepatitis B were known by 21 (22.6%) midwives. However, only 38 (40.9%) of them were aware of the recommendation to vaccinate newborns at birth. Figure 2 illustrates midwives' responses on the timeframe for vaccinating newborns. General knowledge of PMTCT was not statistically related to professional experience (p = 0.4738), place of practice (p = 0.364) or area of activity (p = 0.5867), midwides education' level (p = 0.129) as showed in the Table 1. However, in details knowledge of HBV vaccine was significantly related to professional experience (p = 0.0167). PMTCT practice was generally good in 45 (48.4%) cases and poor in 48 (51.6%). In fact, HBsAg was systematically requested in 17 cases (18.3%),

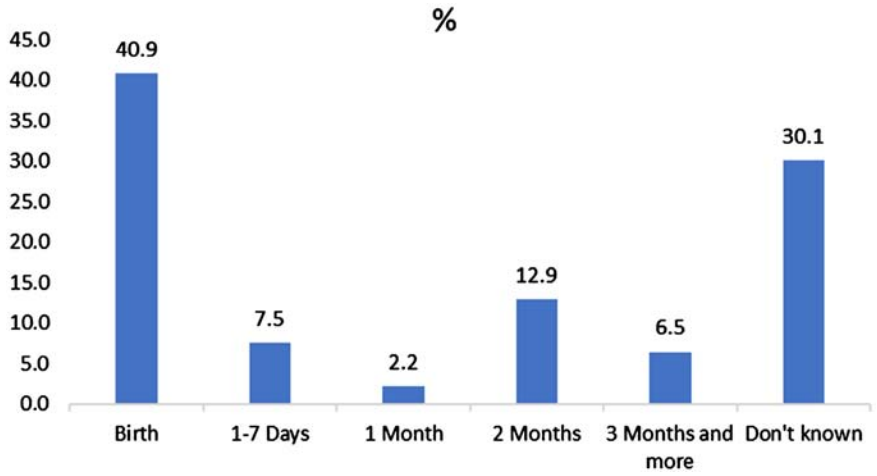

Figure 2. Knowledge of the vaccination deadline for newborns.

Table 1. Bivariate analysis of knowledge and socio-demographic factors.

Independent variable		Knowledge		*p*
		Good	Poor	
Experience ≥ 10 years	Yes	30	25	0.4738
	No	21	17	
Health center	First level	24	23	0.3640
	Second level	19	10	
	Third level	8	9	
Activity's sector	Prenatal consultation	23	16	0.5867
	Delivery	21	17	
	Hospitalization	7	9	
Education level	Primary	9	12	0.129
	Secondary	20	20	
	Higher	22	10	

intermittently in 26 cases (27.9%) and never in 50 cases (53.7%). Among the 43 FHs who performed HBV screening during pregnancy, the test was performed in the first trimester in 34 (36.6%) cases, and in the second trimester in nine (9.7%) cases. No HBV screening was performed in the third trimester of pregnancy. Only 20 (21.5%) midwives advised newborns to be vaccinated against HBV, compared with 73 (78.5%). Nineteen (20.4%) midwives systematically prohibited breast-feeding if the mother was HBsAg-positive 74 (79.6%). Overall, PMTCT practice was statistically linked to the health center where midwives practiced (p = 0.0262), but not to professional experience (0.2725), sector of activity (p = 0.2) or their education' level (p = 0.5398) as showed in the Table 2.

4. Discussion

Many studies have examined the role of midwives in preventing HBV transmission in newborns. The determinants of this prevention have been approached from different angles by the authors. Midwives' experience in terms of length of practice was a determinant of their knowledge of HBV PMTCT in South Sudan. Midwives with more than 10 years' professional experience were in the majority, accounting for 80% of the sample [11]. As for the sector of activity, Bagny *et al.* in Ivory Cost found similar results, with 44.6% of midwives working in delivery rooms [12]. This may be explained by the fact that midwives in antenatal clinics and delivery rooms have had experience in PMTCT of HIV in pregnant women since 2010, and were more available to participate in these studies. Overall knowledge of PMTCT varies from study to study [13]. The overall level of knowledge of PMTCT varied from study to study. It was good for 58% of midwives according to Mursy *et al.*, poor for Elsheik and Adebamowo at 30.9 and 30% respectively [11] [14] [15]. Factors that could explain this variation were the

Table 2. Bivariate analysis of practice and socio-demographic factors.

Independent variable		Practice		*p*
		Good	Poor	
Experience ≥ 10 years	Yes	25	30	0.2527
	No	20	18	
Health center	Primary level	18	29	0.0262
	Secondary level	14	15	
	Tertiary level	13	4	
Activity's sector	Prenatal consultation	17	22	0.2
	Delivery	17	21	
	Hospitalization	11	5	
Education level	Primary	12	9	0.5398
	Secondary	17	23	
	Higher	16	16	

low level of education and the young age of the participants for Elsheik *et al.* in South Sudan [11]. Level of education was not a factor determining overall knowledge in our study. In Ghana, training was the only factor predicting midwives' overall knowledge [16]. More specifically, awareness of HBsAg screening for hepatitis B was highest for Bagny *et al.* in Ivory Cost, and Adjei *et al.* in Ghana, at 59% and 79% respectively. On the other hand, for Bathaix *et al.*, 60.6% of midwives were unaware of the screening test, and 27% were unaware of the time required to perform the test, depending on the term of pregnancy. However, according to WHO recommendations, screening for hepatitis B during pregnancy is indicated in the third trimester, using HBsAg testing, supplemented by viral load testing in the event of HBsAg positivity [17] [18]. Some authors recommend second-trimester screening [12]. HBV screening during the third trimester of pregnancy is followed by antiviral prophylaxis for pregnant women with a high viral load, and sero-vaccination for newborns. However, in Africa, anti-HBV serotherapy is often unavailable, and early treatment could minimize the risk of contamination. Generally speaking, midwives have a poor knowledge of the HBV vaccine [12] [19]. These results reinforce the need to increase midwife training on HBV PMTCT, as suggested by Sahiner *et al.* in Turkey, where the need for training was expressed by 53.5% of midwives [19]. As for the overall practice of PMTCT, Adjei *et al.* in Ghana found 42.9% good practice while Mursy and Elsheik in South Sudan found respectively 60.6% and 76.4% of midwifes with good practice of PMTCT [11] [14] [16]. Bagny *et al.* in Ivory Cost and Adjei *et al.* in Ghana reported a statistical link between PMTCT practice and sector of activity and health facilities [12] [16]. HBsAg practice of pregnant women was carried out by 52.4% of midwives in Ghana, 79% in Canada, where the study included midwives, family doctors and obstetricians, which could explain the relatively higher frequency of HBV PMTCT. Also in Canada, only 23.9% of healthcare professionals participating in the study indicated that viral load was recommended when considering antiviral treatment, and 90.1% indicated a schedule for serological monitoring of infants [16] [20]. Vaccination practice by midwives varied. In Sahiner's study in Turkey, 69.5% of midwives practiced HBV vaccination and 60.1% practiced immunoglobulin injection. In this study, the midwives had previously received training in newborn vaccines, demonstrating the importance of midwife training as a determinant of newborn vaccination. The practice of vaccinating newborns within 12 hours of birth was 37% in Canada, 47.7% in Ivory Cost in 2015 [12] [19] [20]. Low vaccination rates among newborns are as common in resource-poor countries as they are in developed ones, which is why we need to focus on training healthcare professionals who care for pregnant women and newborns. According to Adjei *et al.* in Ghana, the factors limiting the vaccination of newborns from birth were: the mother's denial of her seropositivity, the mother's ignorance of the consequences of hepatitis B for the newborn, the costs associated with monovalent vaccines [21]. Finally, the sample size of our study may have been a limitation.

The reluctance and fear of stigmatization of midwives, despite the anonymity of the study, partly explain the size of the sample.

5. Conclusion

Midwives play an important role in HBV PMTCT, but their practice is poor in terms of screening pregnant women for HBsAg and systematically vaccinating newborns against HBV within the first 24 hours of birth. Efforts need to be made to strengthen their general knowledge and improve their practice of HBV PMTCT, notably through training.

Conflicts of Interest

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

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Biloma Post-Cholecystectomy: A Prudent "Wait-and-See" Approach

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Abstract

Bile duct injury (BDI) is a well-known complication of cholecystectomy and can lead to the formation of a variety of complications, including biloma. Once diagnosed, the appropriate treatment depends on the severity of the condition and can range from minimally invasive procedures to more invasive procedures. We report the case of a 31-year-old woman who exhibited postoperative bile leakage after a cholecystectomy and a CT scan revealed a left hepatic subcapsular biloma. The patient was managed conservatively with close monitoring. The biloma resolved on its own without any intervention. Bilomas are rare complication of cholecystectomy that can be managed conservatively with a wait and see approach, especially in asymptomatic patients. Close monitoring with imaging and laboratory parameters is crucial in the management of these patients.

Keywords

Laparoscopic Cholecystectomy, Bile Duct Injury, Biloma, Conservative Treatment

1. Introduction

Cholecystectomy is still associated with a high risk of bile duct injury which can lead to bile leakage and the formation of a variety of complications, including intra-abdominal collection, fistula, and potentially bile peritonitis [1] [2].

In some cases, the leaked bile may form an encapsulated intra-peritoneal collection known as a biloma [3]. The term "biloma" was first introduced by Gould and Patel in 1979 to describe an encapsulated collection of extrahepatic bile resulting from bile leakage into the peritoneal cavity [4] [5]. However, the term has since been expanded to include any well-circumscribed intra-abdominal bile

collection external to the biliary tree, encapsulated or not [6] [7].

As per the research conducted by Vazquez and colleagues, when bile accumulation occurs rapidly within a brief timeframe, it tends to be encapsulated and may lead to peritonitis. Conversely, when the leakage and accumulation happen gradually, it results in only mild inflammation of the biliary tract and peritoneum [6].

To diagnose a biloma, various radiological techniques such as ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), may be utilized [8].

The severity of the condition will determine the appropriate treatment, which can range from minimally invasive procedures such as ultrasound guided drainage, endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy to more invasive procedures such as hepaticojejunostomy [8] [9].

2. Case presentation

Chief Complaint: Patient is a 31-year-old woman who came into the emergency room with acute constant pain in the right hypochondrium with a slight fever.

History of Present Illness: Patient had been experiencing recurring abdominal pain for several months, but did not seek treatment, the pain recently became acute and constant, accompanied by a slight fever.

Physical Examination: Revealed a stable patient with no jaundice. Abdominal palpation showed guarding in the upper right quadrant.

Diagnostic Work-up: Lab work revealed an elevated white blood cell count of 16.10 × 1000/µl (4.8 - 10.8), with a C-Reactive Protein level at 200. An ultrasound was performed, which showed a thick-walled gallbladder (11 mm) distended at 9 cm. The ultrasound was consistent with acute cholecystitis.

Treatment and Management: The patient was started on a course of antibiotics administered intravenously.

Follow-up: After 48 hours of treatment, the patient exhibited significant clinical improvement. We considered either a laparoscopic cholecystectomy on day three or continuing with oral treatment followed by a deferred laparoscopic cholecystectomy. However, on day three, the patient's condition deteriorated, prompting a decision to proceed with surgical management. Consequently, the patient was admitted to the operating room for a cholecystectomy via laparotomy.

Despite the inflammatory complications, the cholecystectomy was completed with a subhepatic drain and multitubular blade left in place. On the fourth day after the operation, bile leakage was observed from the blade drainage, which persisted for two more days. Since the patient was recovering well, she was discharged with the subhepatic drain for continued outpatient monitoring.

During the next week, 15 ml of bile discharged daily, however the patient remained stable. On day 10, bile leakage stopped, on the other hand C-RP level increased. Due to MRI unavailability, a CT scan was performed.

CT showed a left hepatic subcapsular collection containing liquid content with

thin walls, not enhanced after contrast. Measuring 117 × 54 × 92 mm. Imaging suggests a biloma of hepatic segment IV (Figure 1).

We had to decide between an ultrasound-guided percutaneous drainage, which required a specialized radiologist and proper equipment, or to keep monitoring the patient who was recovering well. Since we lacked the necessary tools, we chose to remove the drain, stop antibiotics, and plan weekly check-ups and a CT scan scheduled after a month. We proceeded with a physical examination every 4 days, with lab work performed every week. Since the follow-up was satisfactory, we continued the same rhythm of surveillance, up until the scheduled CT by the end of the month.

Outcome: Evolution was satisfactory. Patient fully recovered with no clinically evident complication and her blood work remained within normal range. Six weeks after the diagnosis of the biloma, a CT was performed, and the results were favorable (Figure 2). The subcapsular collection had completely disappeared.

3. Discussion

While laparoscopic cholecystectomy (LC) is the preferred treatment for symptomatic gallbladder disease, open cholecystectomy (OC) is often performed as a last resort when LC is unsuccessful. However, due to a lack of necessary laparoscopic equipment in government hospitals, OC remains a common procedure in certain parts of the world, such as Morocco [10] [11].

Biliary leakage is a serious complication that can occur after cholecystectomy, with rates ranging from 0.2% to 2.2% [12]. This complication is often associated

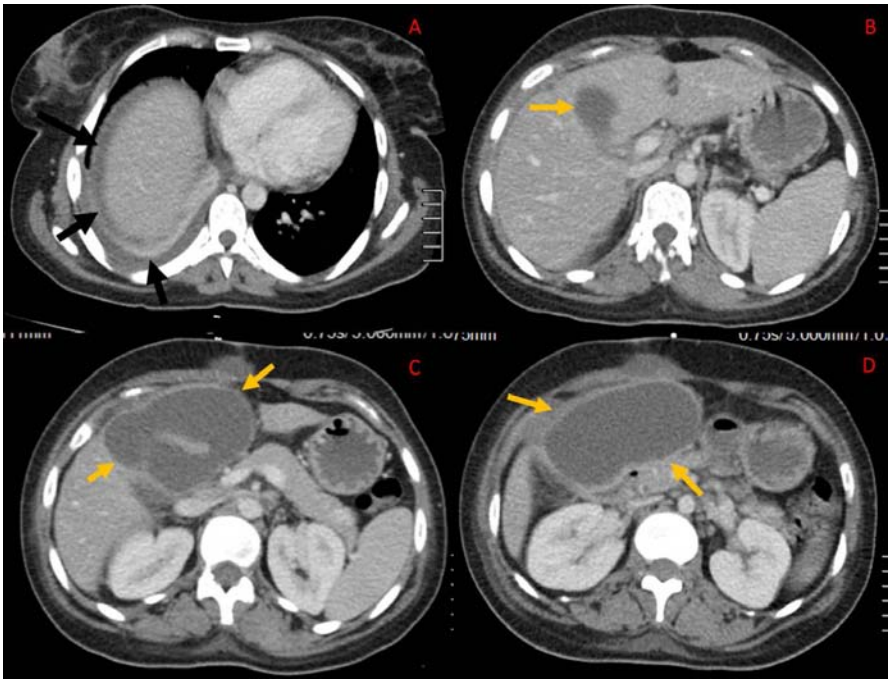

Figure 1. (A) Black arrows point to free fluid around the liver. (B)-(D) Subscapular collection of liquid content, not enhanced after contrast. Yellow arrows correspond to the biloma.

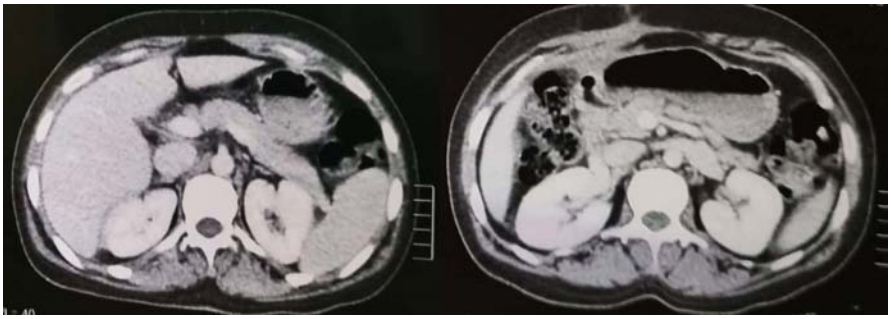

Figure 2. Abdominal CT: Total disappearance of the subcapsular collection along with the free fluid around the liver.

with Bile duct Injury, and is included in many widely used classifications [13]. The exact incidence of biliary leakage during OC is unknown, most large series have reported rates of 0.5% or less [2] [6] [14].

Biloma formation is commonly caused by biliary injuries, which can result in bile leakage and subsequent infections. Bilomas can also cause mass effect on the surrounding tissues [2] [7]. Prompt diagnosis and appropriate management are crucial to prevent significant morbidity and mortality.

Inadvertent injury to the common bile duct or excessive use of cauterization or laser can lead to biliary fistulas, along with other factors such as inexperienced surgeons or unsuccessful clipping of the cystic duct. [9] [15].

Biliary fistulas can often go undetected during surgery regardless of the lesion's nature, with patients experiencing symptoms like abdominal pain, peritonitis, or sepsis postoperatively [15]. In this case, bile in drainage was the only indication.

Ultrasound is effective in identifying bilomas, but the preferred method for diagnosing this complication is through the utilization of Computed Tomography [6]. Early imaging of the biliary tree is crucial to ascertain the location and extent of bile leaks [8].

Mini-invasive procedures, like endoscopic sphincterotomy and stenting, are preferred for minor injuries, while surgical reconstruction is best for major injuries. The initial step in management can be percutaneous drainage of bilomas, with further treatment dependent on the patient's progress [4] [7] [8] [9] [10].

The main objective of endoscopic therapy is to diminish the transpapillary pressure gradient. This leads to an enhancement in transpapillary flow and a reduction in extravasation from the bile duct leakage. Alongside decompressing the biliary system, the implantation of a stent serves to seal the defect, functioning as a bridge at the site of extravasation. Endoscopic therapy encompasses procedures such as biliary sphincterotomy in isolation, the insertion of a biliary stent, or the use of nasobiliary drainage, either individually or in combination [15].

Since we lacked the resources for the above-mentioned procedures, we took a different approach in our primary care setting. While surveillance is seldom mentioned due to the risk of biloma infection, we opted for close outpatient monitoring as an alternative approach, which produced excellent results for our patient who presented no clinical symptoms and declined transfer. Our aim is to

offer a new approach for low-income settings and guide further recommendations for this challenging complication.

4. Conclusion

The management of a biloma following cholecystectomy requires a careful assessment of the patient's condition and the severity of the complication. Various imaging techniques, such as ultrasound and CT, are essential for accurate diagnosis, while treatment options range from minimally invasive procedures to more invasive surgical interventions. In this case, a wait-and-see approach can also be effective in managing the condition see approach with the patient being monitored closely for signs of improvement or deterioration. Overall, this case highlights the importance of careful monitoring and individualized treatment approaches in the management of postoperative complications.

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Declarations

Ethical Approval

Not applicable.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Authors' Contributions

MBI wrote the manuscript, and operated as primary surgeon. YD prepared the figures and was the radiologist on the case. All authors reviewed the manuscript.

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Availability of Data and Materials

The authors confirm that the data supporting the findings of this study are available within the article.

Conflicts of Interest

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

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Hepatitis B Virus in Cirrhosis and Primary Livers Cancers

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Abstract

Introduction: Hepatitis B virus (HBV) infection is a public health problem in sub-Saharan Africa, due to its frequency and progression to complications such as cirrhosis and/or hepatocellular carcinoma (HCC). **Objective:** To help improve the management of cirrhosis and hepatocellular carcinoma. **Patients and Methods:** This was a 34-month cross-sectional study conducted in the Hepato-Gastroenterology Department of the CHU de l'Amitié Sino-centrafricaine in Bangui. It included patients of both sexes aged 18 years or older with a diagnosis of HBV-related cirrhosis and/or HCC. **Results:** During the study period, 1344 patients were admitted to hospital, 681 of them for chronic liver disease (51%). Among patients admitted for chronic liver disease, in particular cirrhosis and/or HCC, HBV was implicated in 288 cases (42.30%), of whom 170 (24.96%) met our inclusion criteria. These included 123 men (72.35%) and 47 women (27.65%). The sex ratio was 2.61. The mean age of our patients was 40 years (±11 years) with extremes of 18 and 76 years. Cirrhosis was observed in 101 cases (59.41%), HCC on cirrhosis in 59 cases (34.70%) and HCC in 10 cases (5.89%). Cirrhosis was classified as Child-Pugh B in 62 cases and C in 20 cases. HCC on cirrhosis was classified according to BCLC stage C in 7 cases and stage D in 52 cases. **Conclusion:** HBV is the leading cause of cirrhosis and HCC in the Central African Republic. Chronic liver disease is diagnosed at the advanced stage of the disease. Hence the importance of early detection, prevention through vaccination at birth, and management of infected patients.

Keywords

Hepatitis B Virus, Cirrhosis, Hepatocellular Carcinoma, Bangui

1. Introduction

Infection with the hepatitis B virus is a major public health problem, due to its frequency, complications and socio-economic consequences [1] [2] [3].

According to the World Health Organisation, 2 billion people have been infected with HBV in their lifetime, and 240 to 350 million are chronic carriers [4] [5] [6]. In Africa, the overall level of endemicity is high, with a north-south gradient. The Maghreb region, with a prevalence ranging from 2% to 8%, is described as an area of medium endemicity. The prevalence of HBsAg carriage is 4% - 7% in Tunisia, 1.66% in Morocco, 2% - 8% in Algeria and 1.3% - 5.8% in Libya [7]. The prevalence of chronic HBV infection in sub-Saharan Africa is between 8% and 20%, making it a highly endemic region [8] [9]. It is estimated at between 14.9% and 16.14% in Mali [10] [11] [12], 11% in Senegal [13] and 13.5% in Chad [14]. In the Central African Republic, the prevalence of hepatitis B varies from 10.6% to 19.8% depending on the study population [15] [16] [17] [18] [19]. Chronic hepatitis B infection carries a high risk of progression to cirrhosis and hepatocellular carcinoma (HCC). In 2010, chronic HBV infection was responsible for 786,000 deaths, 312,000 of which were attributable to cirrhosis and 341,000 to HCC. Hepatitis B is the 15^{ième} leading cause of all-cause mortality [20]. HBsAg is more frequently found in HCC in Asia, sub-Saharan Africa and Latin America. HCV is found in Europe, North America, Japan, Pakistan, Mongolia and Egypt [21]. In France, 5% of cirrhosis and 9.8% of HCC are attributable to chronic hepatitis B [22]. In Tunisia, 48% to 60% of cirrhosis and 70% of HCC are related to HBV [23]. In Mali, 71% of cirrhotic patients and 66.2% of patients with HCC are HBsAg positive [10] [11] [12]. In Senegal, HBV was the cause of cirrhosis in 82.2% of cases and of HCC in 67% of cases [13]. However, in Chad, HBV seroprevalence was 67.3% in patients with cirrhosis and 56.3% in patients with HCC [14]. In studies in Bangui, HBV was the cause of cirrhosis in 62.5% [24] and of HCC in 67.4% [25]. The aim of this study is to assess the seroprevalence of HBsAg in cirrhosis and HCC in order to help improve patient management.

2. Method Patients

We conducted a 34-month cross-sectional analytical study between 1 January 2020 and 31 October 2022. Data collection was retrospective from 1 January 2020 to 31 March 2022 and prospective from 1er April 2022 to 31 October 2022. The study population consisted of patients hospitalised in the Hepato-Gastroenterology (HGE) department of the Centre Hospitalier Universitaire de l'Amitié Sino-Centrafricaine (CHUASC) in Bangui during the study period.

We included in the study patients of both sexes aged at least 18 years, diagnosed with cirrhosis and/or primary liver cancer (PLC) and tested for HBV infection. The diagnosis of cirrhosis was based on clinical and biological signs of hepatocellular insufficiency (HCI), clinical, ultrasound and endoscopic signs of portal hypertension (PH) and, when the liver was hypertrophic, on its characte-

ristics (firm or hard consistency, regular surface, painless, with a thin or sharp lower edge). The diagnosis of FPC was made clinically if the liver was large, hard, woody, stony, with an irregular surface, tender or painful with a foamy lower margin and/or on the basis of biology if the alpha-fetoprotein level was ≥ 400 ng/ml, abdominal ultrasound if there were masses or nodules and abdominal tomodensitometry if there were hypervascularised hepatic lesions on arterial examination and late portal lavage. Infection with the hepatitis B virus was incriminated if the following serological markers were detected: positive HBS antigen, positive HBV viral load. If HBsAg was positive, the patient was tested for co-infection with HDV.

We did not include in the study patients who met the inclusion criteria and who refused to take part in the study.

Our sample was of convenience, taking into account all patients who met the inclusion criteria during the study period.

Data were collected using an individual direct-administration survey form. Data were collected from patients, medical records and hospital registers. The variables studied were sociodemographic, clinical, biological, morphological and prognostic characteristics.

The data were analysed using Epi info 7 software. We used the pearson chi² test with a significance level of 5% for the comparison.

3. Results

Epidemiological aspects: During the study period, 1344 patients were hospitalised, 681 of them for chronic liver disease (51%). The following table presents the aetiologies of chronic liver disease hospitalised during the study period (Table 1).

Among patients admitted for chronic liver disease, in particular cirrhosis and/or HCC, HBV was implicated in 288 cases (42.30%), of which 170 (24.96%) met our inclusion criteria. These included 123 men (72.35%) and 47 women (27.65%). The sex ratio was 2.61.

The average age of our patients was 40 (±11 years) with extremes of 18 and 76 years.

Table 1. Breakdown of cases of cirrhosis, HCC arising from cirrhosis and hepatocellular carcinoma by aetiology (N = 681).

Causes	Chronic liver disease			
	Cirrhosis Number (%)	HCC on cirrhosis Number (%)	CHC workforce	TOTAL workforce
Undetermined	181 (26.58)	61 (8.96)	20 (2.93)	262 (38.47)
Alcohol	42 (6.17)	31 (4.55)	14 (2.05)	87 (12.77)
Anti-HCV	28 (4.11)	3 (0.44)	13 (1.91)	44 (6.46)
HBsAg	186 (27.31)	68 (9.98)	34 (5.01)	288 (42.30
Total	437 (64.17)	163 (23.93)	81 (11.90)	681 (100)

The table below shows the breakdown by age group and gender (Table 2).

The occupation of patients with cirrhosis and/or FPC is shown in the table below (Table 3).

The patients had a good socio-economic level in 51 cases (30%) and a low socio-economic level in 119 cases (70%).

The marital status of patients is shown in the figure below (Figure 1).

Table 2. Breakdown of patients by age group and sex (N = 170).

Age range	Gender		
	Male number (%)	Female number (%)	TOTAL number (%)
18 - 27	13 (7.64)	9 (5.29)	22 (12.94)
28 - 37	35 (20.59)	8 (4.71)	43 (25.30)
38 - 47	50 (29.41)	20 (11.76)	70 (41.18)
48 - 57	15 (8.82)	5 (2.95)	20 (11.76)
58 - 67	10 (5.89)	4 (2.35)	14 (8.23)
68 - 76	0	1 (0.59)	1 (0.59)
Total	123 (72.35)	47 (27.65)	170 (100)

Table 3. Occupation (N = 170).

Profession	Workforce	%
Pupil or student	11	6.47
No profession	20	11.76
Professionals and traders	22	12.94
Farmer and stockbreeder	26	15.30
Public or private sector employee	29	17.06
Activities in the informal sector	62	36.47
Total	170	100

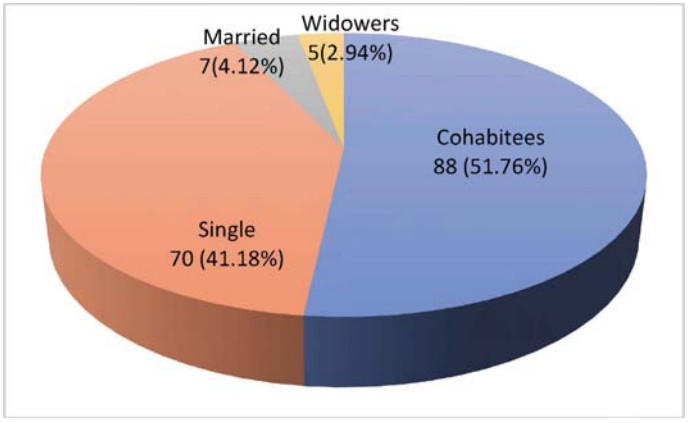

Figure 1. Marital status (N = 170).

The patient histories are presented in the table below (Table 4).

Alcohol consumption was admitted by 125 patients (73.53%). The average quantity of alcohol consumed was 60 g/d, with extremes of 20 and 160 g/l. The average duration of alcohol consumption was 10 years, with extremes of 1 and 40 years. Fourteen patients (8.82%) smoked. The average number of pack-years was 4 (extremes: 1 and 20).

None of our patients had been vaccinated against HBV.

Clinical aspects

In 145 cases (85.29%) of our patients, chronic HBV carriage was known during the course of their current disease, and in 25 cases (14.71%) it was known after an acute viral hepatitis B infection. The figure below shows the liver diseases associated with HBV (Figure 2).

The following table shows the gender distribution and average age of the patients included (Table 5).

Table 4. Patient history (N = 170).

History	Workforce	%
Drug addiction IV	1	0.59
Excision	7	14.89
Dental care	22	12.94
Tattoo	25	14.71
Multiple sexual partners	26	15.29
Scarification	28	16.47
Surgery	38	22.35
Pedicure care	40	23.53
Manicure care	40	23.53
Blood transfusion	49	28.82
Occasional sexual partner	58	34.12
Jaundice	61	35.88
Circumcision	123	72.35

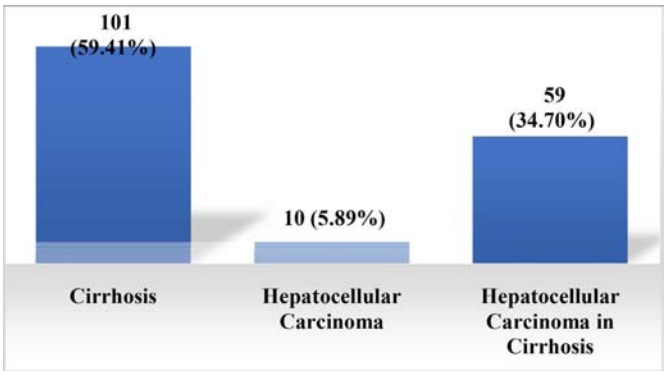

Figure 2. Diagnosis of chronic liver disease (N = 170).

68 patients (67.32%) with cirrhosis were aged between 28 and 47 years. Of the 101 patients with viral B cirrhosis, 22 (21.78%) had anti-HDV antibodies out of the 25 patients who had undergone HDV serology. Nine patients (64%) had HBV/HIV co-infection out of the 14 patients who had undergone HIV screening. HCV screening was performed in 12 patients, 6 (50%) of whom had anti-HCV antibodies.

Of the 59 patients (%) with HCC in viral B cirrhosis, 38 (64.4%) were between 28 and 47 years of age. Coinfection with the Delta virus was observed in 11 cases (18.65%). HBV/HIV co-infection was found in 5 patients (8.47%). HCV screening was performed in 8 patients, 3 of whom (37.5%) were co-infected with HBV/HCV. Of the 10 patients, 7 had HBV-related HCC aged between 28 and 47 years. One patient tested positive for HBV/HDV co-infection. HIV serology was positive in all three patients. HCV serology was positive in the 2 patients who had undergone the test.

Cirrhosis was the most common liver disease in 160 cases, followed by hepatocellular carcinoma in 59 cases (36.87%). The other modes of decompensation were ascites in 140 cases (87.50%), jaundice in 130 cases (81.25%), hepatic encephalopathy in 47 cases (29.38%), digestive haemorrhage in 42 cases (26.25%), infection of ascites fluid in 30 cases (21.43%), and hepatorenal syndrome in 9 cases (5.63%). Hepatic encephalopathy was stage 1 in 8 cases (17.02%), stage 2 in 17 cases (36.17%), stage 3 in 15 cases (31.91%) and stage 4 in 7 cases (14.9%).

The WHO performance status is shown in the figure below (Figure 3).

Biological aspects

Biologically, full HBV serology was performed in only 105 patients (61.76%).

Table 5. Breakdown by sex and average age of the various chronic liver diseases.

Variables	Men (%)	Women (%)	Sex ratio	Average age
Cirrhosis	68 (67.33%)	33 (32.67%)	2.06	40 ± 10
HCC on cirrhosis	49 (83.05)	10 (16.95)	4.9	45 ± 11
CHC	6 (60)	4 (40)	1.5	48 ± 12

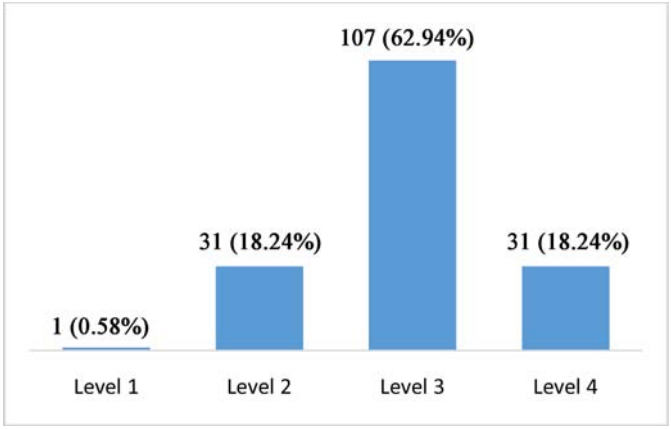

Figure 3. WHO performance status.

This enabled identification of patients carrying wild-type virus in 22 cases (20.95%) and those carrying pre-C mutants in 83 cases (79.05%). In 65 cases (38.24%), HBV infection was confirmed only by HBsAg positivity. HDV serology was carried out in only 40 patients (23.53%). It was positive in 34 cases (85%). 159 patients (93.53%) were tested for co-infection with HCV. HCV serology was positive in 11 patients (6.91%). HCV viral load was detectable in all patients. The mean viral load was 1,123,500 IU/ml. HIV serology was positive in 11 cases (6.91%). Alpha-fetoprotein was measured in 67 patients (39.41%). The mean alpha-fetoprotein value was 978 IU/ml, ranging from 1 to 840,000 IU/ml. The alpha-fetoprotein value was less than 400 IU/ml in 22 patients (32.83%) and greater than or equal to 400 IU/ml in 45 patients (67.17%).

Prognostic aspects

The severity of IHC in patients with cirrhosis and HCC on cirrhosis according to Child-Pugh is presented in the table below (Table 6).

The BCLC classification made it possible to specify the stage of severity of hepatocellular carcinoma occurring in cirrhosis in our 59 patients. They were stage C in 7 cases (11.86%) and stage D in 52 cases (88.14%).

The Okuda Classification was used to assess the severity of the 10 cases of primary liver cancer without cirrhosis. The patients were stage 2 in 4 cases (40%) and stage 3 in 6 cases.

4. Discussion

Limits of the study

The diagnosis of cirrhosis and HCC was made on clinical, biological and morphological grounds without recourse to liver biopsy. It is now accepted that when epidemiological, clinical, biological, radiological and endoscopic evidence concurs, the diagnosis of cirrhosis can be made without necessarily resorting to a liver biopsy for histological analysis, or by using other non-invasive means [26]. Blood tests for fibrosis now limit the need for PBH. CT scans can now be used to make a positive diagnosis of HCC without histological analysis of HBC specimens. The significant elevation of alpha-fetoprotein in our HCC patients was also an argument in favour of the diagnosis. We were unable to include 118 patients with hepatitis B-related chronic liver disease because of the absence of certain morphological and biological tests to support a positive diagnosis of cirrhosis and/or HCC. However, our study provided information that should be

Table 6. Child-Pugh classification (n = 160).

	Cirrhosis	HCC on cirrhosis	Total
Class A	7 (4.37%)	0	7 (4.37%)
Class B	62 (38.75%)	26 (16.25%)	88 (55.00%)
Class C	32 (20.00%)	33 (20.63%)	65 (40.63%)
Total	101(63. 12%)	59 (36.88%)	160 (100%)

compared with data in the literature.

Frequency: Chronic liver disease was the most frequent condition hospitalised in the HGE department of the CHUASC in Bangui (51.00%). The frequency of HBV during cirrhosis and/or HCC in our study is lower than that reported by authors in Ndjamena (65.5%) [14] and Pointe Noire in Congo (63%) [27]. Previous studies in Bangui reported a prevalence of 62.5% [24] for cirrhosis and 67.4% [25] for HCC. Other authors have observed a prevalence of 54.50% during cirrhosis [28] and 41% in patients with HCC [29].

Sociodemographic characteristics: The mean age of patients with cirrhosis in our study was 40 years, similar to that reported by authors in Ndjamena (41 years) [14]. However, previous studies of cirrhosis in Bangui reported an average age of 44 [24] and 45 [28]. This shows that the average age of patients with cirrhosis is falling, with younger and younger people increasingly being affected. This reduction in the average age could be encouraged by other factors, such as alcohol consumption and smoking, which favour the progression of liver disease. In Cotonou [30] and Kinshasa [31], the authors found an average age of 49 and 51 years respectively. In contrast, patients with HCC in our study had an average age of 48 years. This is lower than the 50 years reported in Bangui [25]. The mean age of our patients is similar to those observed in Dakar, Senegal [32] and Abidjan, Ivory Coast [33], which were 47.4 and 48.15 years respectively. Authors in Morocco found a mean age of 59 years [34]. HCC occurs later in the Maghreb than in sub-Saharan Africa. The age *groups* most represented in the study were 28 - 37 and 38 - 47. Authors in Ndjamena [14], Dakar [32], Côte d'Ivoire [33] and Bangui. [25] had made the same observation. The young age of patients at the time of diagnosis could be linked to vertical transmission of HBV. The male predominance of chronic viral hepatitis B (72.35%) in our study corroborates the data in the literature [14] [24] [28] [29] [30] [31] [32]. The patients in our series came from all social strata. However, 70% of our patients had a low socioeconomic level. This observation had already been made in Bangui [28] [35], as well as by other authors in Brazzaville [36] and Cotonou [30]. The low socio-economic level observed is linked to a low human development index, a characteristic of low-income countries where social inequalities are immense [37].

Daily alcohol consumption was found in 73.53% of cases. Alcohol could be one of the factors favouring the onset of complications, in particular cirrhosis and/or HCC. It has also been reported by other authors [24] [25] [28] [31] [38] [39]. Cirrhosis and/or HCC were discovered at the symptomatic stage in 163 cases (95.88%). This finding had already been made in previous studies in Bangui [24] [25] [28] [34] [35] and also by authors in Kinshasa [31], Cotonou [30], Côte d'Ivoire. [33] and Burkina Faso [36]. The delay in consulting a doctor is probably linked to the use of traditional medicine, self-medication, poverty, religious convictions and occult beliefs, as reported in the study on the therapeutic itinerary of patients with cirrhosis [37]. Cirrhosis represented 94.11% of cases

and HCC 5.89% of cases in our series. However, the authors in Ndjamena had reported 84% HBV-related cirrhosis and 16% HBV-related HCC [14]. In Pointe Noire, Congo, the authors observed 48.1% HBV-related cirrhosis and 51.8% HBV-related HCC [27]. All this shows that in our settings, cirrhosis and/or HCC are diagnosed late. This may be related to the absence of an HBV screening policy and the lack of vaccination against HBV at birth in these countries. Cirrhosis was diagnosed at the decompensation stage in 160 cases (94.11%). The most frequent modes of decompensation were ascites (87.50%), jaundice (81.25%), hepatocellular carcinoma (36.87%) and hepatic encephalopathy (29.38%). They were reported with varying frequency in other studies in Bangui [24] [28] [34] [35] [37], Bamako [11], Pointe Noire in Congo [27], Cotonou [30] and Kinshasa [31]. The majority of our patients (62.94%) had WHO performance status 3, indicating advanced disease. The presence of the PreC mutant observed in our study in 79.05% of cases was revealed in 70.7% of cases in a previous study in Bangui [35]. HBV/HDV co-infection was found in 85% of cases in our study. This frequency is higher than that reported by other authors in Bangui, who reported frequencies of 7.5% [28], 53.6% [29] and 22.5% [35]. The HBV/HDV co-infection could explain the progression of the disease. The significant elevation of alpha-fetoprotein was greater than 400 IU/ml in our patients, supporting the diagnosis of HCC reflecting the alpha-fetoprotein-secreting form, as previously reported by authors in the department [25]. In our context, alpha-fetoprotein can be used in conjunction with abdominal ultrasound to monitor cirrhosis.

In our study, cirrhosis was classified as Child-Pugh B and C in 55.00% and 40.63% respectively. This finding was made in Bangui [24] [34] [35] and by other African authors in Cotonou [30], Kinshasa [31], Libreville [38], and Ouakaa-Kchaou in Tunisia [39]. According to the BCLC classification, our patients with HCC in cirrhosis were between stage C (11.87%) and stage D (88.14%), as already reported by the authors in Bangui [25]. The same was true of studies in Dakar [32], Côte d'Ivoire [33] and Ouagadougou [36]. All these mean that HCC is diagnosed late in our regions, where curative treatment is not available.

5. Conclusion

HBV is a frequent cause of cirrhosis and HCC in the Central African Republic. The disease often occurs in young adult males. Diagnosis is made at an advanced stage, so curative treatment is not possible. It is important to raise awareness of the need for HBV screening, to introduce vaccination at birth as part of the Expanded Programme on Immunisation, and to provide care for people infected with HBV in order to reduce the severity of the disease.

Conflicts of Interest

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

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We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the OJGas.

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