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Seasonal Variation of Esophageal Variceal Bleeding in Brazzaville

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Abstract

Introduction: Seasonal variation of upper gastrointestinal bleeding has been reported in many studies. Concerning the seasons' influence on the incidence of esophageal variceal bleeding, there is no data from the Republic of Congo. **Aims:** Our aim was to assess seasonal variations in hospitalizations related to variceal bleeding in our setting and determine whether a particular month or period of the year is at high risk of variceal bleeding. **Methods:** We conducted a retrospective cross-sectional study using Data of all the patients hospitalized in the gastroenterology unit of the Brazzaville university hospital from January 2014 to December 2023 with a diagnosis of acute variceal upper gastrointestinal bleeding. Demographic data, seasonal, and monthly variation were analyzed. **Results:** A total of 177 patients hospitalized with esophageal variceal bleeding were included. The highest number of hospitalizations was reported in June (25 patients), and the lowest was reported in November (7 patients). The majority of variceal bleeding patients (40.7%) were recorded between May 16 and September 15, corresponding to the long dry season. **Conclusions:** There is a seasonal variation in hospitalizations for esophageal variceal bleeding in Brazzaville. The highest number of hospitalizations was seen in the long dry season, which is the colder period of the year.

Keywords

Seasonal Variation, Esophageal Variceal Bleeding, CHUB, Brazzaville

1. Introduction

Esophageal variceal bleeding is one of the serious complications of cirrhosis and can quickly lead to death.

The overall mortality rate is approximately 15% to 25% at six weeks. In patients with other decompensations in addition to variceal bleeding, the mortality rate is higher, estimated at over 80% in five years [1] [2].

Its occurrence depends on several factors, including the severity of liver disease (Child-Pugh score B or C), the size of the varices, the presence of red signs (red wale marks on varices), and the etiology of cirrhosis [3]-[6].

Effective management of variceal bleeding involves measures to stop the bleeding, but also the prevention of bleeding episodes through optimal control of risk factors.

Several studies published on the impact of the seasons on the incidence of upper gastrointestinal bleeding, especially in gastroduodenal ulcer disease, have reported seasonal variation in these bleeding episodes [7]-[10]. Therefore, there is one or more climatic risk factors.

Knowledge and consideration of these risk factors could contribute to better management of this event.

However, to date, there are no data on the existence or otherwise of seasonal variation in esophageal variceal bleeding in the Republic of Congo.

Hence, the interest of our study, the aim of which was to determine whether or not the seasons have an influence on the incidence of esophageal variceal bleeding in Brazzaville.

2. Method

The study was conducted in the gastroenterology department of the Brazzaville University Hospital Center (CHUB), which is the only hospital department dedicated exclusively to gastroenterology in the city of Brazzaville. This department has an endoscopy unit dedicated to the care of patients who are hospitalized there and those from other hospital departments at the CHUB. All examinations are performed either by a gastroenterologist or by a gastroenterology resident under the supervision of a gastroenterologist.

This was a retrospective cross-sectional study based on data from the medical records of patients hospitalized in the gastroenterology department between January 1, 2014, and December 31, 2023, a period of 10 years.

The study included patients of all ages with cirrhosis who were hospitalized for gastrointestinal bleeding due to esophageal varices rupture. Cirrhosis was diagnosed based on clinical, laboratory, endoscopic, and imaging findings, including evidence of portal hypertension (clinical, ultrasonographic, and/or endoscopic), signs of hepatic insufficiency, and clinical or morphological characteristics of the liver consistent with cirrhosis.

Only the first episode of bleeding and the first hospitalization for gastrointestinal bleeding were taken into account. The records of patients who had not under-

gone esophagogastroduodenal endoscopy were excluded.

Data were collected on a pre-established survey form. This included age, sex, month, the season corresponding to the month of hospitalization, year of hospitalization, and etiology of cirrhosis.

There are four seasons in the Republic of Congo: the long dry season (May 16 to September 15), the long rainy season (September 16 to December 31), the short dry season (January and February), and the short rainy season (March 1 to May 15).

3. Statistics Analysis

Continuous variables were summarized as means with standard deviations, whereas categorical variables were expressed as frequencies and percentages. For each of the 12 months across the 10-year study period, we calculated the total number and proportion of hospitalizations. The number and relative frequency of admissions were also determined for each of the four seasons.

Comparisons of categorical variables were performed using the chi-square test. A bivariate analysis was conducted to explore the association between season and the occurrence of esophageal variceal bleeding, with odds ratios and 95% confidence intervals estimated. Statistical significance was defined as a p-value < 0.05.

Data entry and analyses were performed using Microsoft Excel and R statistical software.

4. Results

Patients Characteristics

A total of 177 patients were hospitalized in our center between 2014 and 2023 for esophageal variceal bleeding (Table 1). There were 107 men (60.5%) and 70 women (39.5%). The average age was 52.3 years ± 16.8 years, with extremes of 18 and 91 years. The 50 to 69 age group was the most represented, accounting for 36.7% of all patients. Hepatitis B viral infection was the cause of liver cirrhosis for 24.8% of patients, followed by hepatitis C viral infection (8.5% of cases) (Table 2).

Table 1. Demographics.

Characteristics	Number	Frequencies (%)
Total Patients Number	177	100
Gender		
Male	107	60.5
Female	70	39.5
Age (Years)		
Mean ± SD	52.3 ± 16.8	

Continued

Age Groups		
0 - 29	15	8.5
30 - 39	31	17.5
40 - 49	34	19.2
50 - 69	65	36.7
≥70	32	18.1

Table 2. Liver cirrhosis etiologies.

Etiologies	Number	%
HBV	44	24.8
HCV	15	8.5
Alcool	8	4.5
HBV+ HCV	3	1.7
Metabolic	3	1.7
Undetermined	104	58.7

HBV: Hepatitis B virus; HCV: Hepatitis C virus.

Hospitalization Volume

The majority of patients were admitted during the long dry season (40.7%), *i.e.*, from May 16 to September 15, followed by the short rainy season (22.6%), which runs from March 1 to May 15 (Table 3). The highest number of hospitalizations was observed in June (25 patients; 14.1%), followed by February (20 patients; 11.3%) and July (20 patients; 11.3%). November had the lowest number of hospitalizations (7 patients; 3.9%) (Table 4).

Table 3. Distribution of patients as per the four seasons.

Seasons	Numbers	Frequencies	OR*	95% CI≠	p
Long dry season	72	40.7	Ref	Ref	Ref
Long rainy season	34	19.2	0.6	0.4 - 0.8	0.006
Short dry season	31	17.5	0.8	0.5 - 1.2	0.21
Short rainy season	40	22.6	0.7	0.4 - 0.9	0.04

*: Odds ratio; ≠: Confidence interval; Chi^2: 9.3; p = 0.03.

Table 4. Monthly hospitalizations for esophageal variceal hemorrhage.

Months	Numbers	Frequencies (%)
January	11	6.2
February	20	11.3
March	18	10.2
April	10	5.6

Continued

May	19	10.7
June	25	14.1
July	20	11.3
August	08	4.5
September	16	9.1
October	10	5.6
November	07	3.9
December	13	7.4
Total	177	100

5. Discussion

Several authors have reported a higher frequency of esophageal variceal bleeding during certain seasons of the year, although others disagree [11]-[14].

In a study conducted in public hospitals in France involving 17,026 patients admitted over a three-year period, Boulay found that hospitalizations for esophageal variceal rupture were higher in winter and spring. December and February had the highest admission rates, while August had the lowest.

In China, the same observation was made in Yen's study. Over a two-year period, between January 1, 1991, and December 31, 1992, the peak in hospitalizations for esophageal variceal bleeding was observed in February, a winter month [15]. Another more recent study supported Yen's findings, demonstrating that low temperatures increased the risk of bleeding from ruptured esophageal varices, regardless of age, gender, decompensation of cirrhosis, or even the etiology of chronic liver disease [16]. Peng observed between 2014 and 2019 a peak incidence of bleeding from ruptured esophagogastric varices during the winter months (January-February) and a second, lower peak from October to November [17].

Winter was also associated with a peak in hospitalizations for esophageal variceal bleeding in Siddique's study in the US [18]. December had the highest percentage of cases (8.8%), followed by March (8.7%). His study looked at data from 348,958 patients from 4411 hospitals across the US between 2005 and 2014. June had the lowest incidence rate (7.8%).

In a study conducted in India, although seasonal variation in esophageal variceal bleeding was observed, the highest incidence of bleeding episodes was not reported during the winter [19]. Spring and summer were the seasons with the highest number of admissions for esophageal variceal bleeding, accounting for 32% and 30% of cases recorded during the study period, respectively. May had the highest percentage of cases, followed by July. The authors attributed this result to several reasons, including difficulty accessing hospitals due to the closure of many roads during winter and the movement of populations to provinces with warmer temperatures. This fact shows that many factors can distort the determination of a relationship between seasonal variations and the occurrence of esophageal vari-

ceal bleeding.

Several hypotheses have been put forward to explain the high incidence of bleeding from ruptured esophageal varices in winter. One of these is that low temperatures, by causing peripheral vasoconstriction, promote the shift of systemic blood flow to the visceral circulation, which would cause an increase in portal blood flow and therefore portal pressure [20].

Another explanation is that sudden exposure to cold inhibits pituitary secretion of vasopressin, which would result in increased splanchnic blood flow and therefore increased portal pressure [21].

Increased alcohol consumption during the cold seasons has also been reported. In patients with cirrhosis, this could increase the severity of cirrhosis and promote complications such as variceal bleeding [22]. Increased use of NSAIDs during certain seasons of the year is another possible explanation. This was reported by Sezgin in Türkiye [23]. In his study, the percentage of patients admitted for upper gastrointestinal bleeding who were taking NSAIDs peaked in March, which was also the month with the highest frequency of hospitalizations for upper gastrointestinal bleeding. In addition, NSAID use is recognized as a risk factor for bleeding in patients with esophageal varices [24]. Other climatic factors that have not yet been clearly identified may also influence the risk of bleeding from esophageal varices.

In our study, June had the highest frequency of hospitalizations for bleeding due to ruptured esophageal varices. The highest number of bleeding cases was observed during the long dry season, *i.e.*, from the second half of May to the first half of September. Given that this season is the one in which the lowest temperatures of the year have been reported in the literature, the explanations given to justify the predominance of hemorrhage cases during winter could also apply here [25] [26].

Further studies on the links between risk factors for variceal bleeding and seasonal variations in Brazzaville are needed.

This study has several limitations. First, our overall sample size was insufficient to support reliable month-to-month comparisons of the daily number of hospitalizations for esophageal variceal bleeding; several months had a mean daily admission rate of less than one, precluding robust statistical comparison. Second, we were unable to assess whether cirrhosis etiology influenced the seasonal incidence of gastrointestinal bleeding, because the underlying cause of cirrhosis was undetermined in 58.7% of patients. This high rate of missing etiological data largely reflects limited access to diagnostic testing: all hospitalization costs are borne by patients, and low-income individuals frequently cannot afford a comprehensive etiological workup.

6. Conclusion

We observed a marked seasonal variation in hospital admissions for esophageal variceal bleeding in Brazzaville, with a higher incidence during the long dry sea-

son, which corresponds to the coldest period of the year. A plausible explanation for this trend is the increase in portal blood flow secondary to cold-induced peripheral vasoconstriction. However, further studies are needed to identify other factors contributing to this seasonal increase in cold-related variceal bleeding. A better understanding of the influence of seasonal fluctuations on the incidence of esophageal variceal bleeding could lead to the development of more effective preventive and therapeutic strategies. This knowledge could facilitate the optimal allocation of healthcare resources during high-risk periods and encourage clinicians to intensify monitoring of at-risk patients, thereby ensuring stricter control of modifiable factors predisposing to variceal rupture.

Conflicts of Interest

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

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