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Endoscopic Ligation of Esophageal Varices: The Experience of Aristide Le Dantec Hospital Digestive Endoscopy Center in Dakar

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ABSTRACT

Introduction: *Endoscopic variceal ligation (EVL) has been performed for nearly two decades in the Aristide Le Dantec Hospital digestive endoscopy center in Dakar.*

The aim of our study was to determine the epidemiological, diagnostical, therapeutical and evolving aspects of patients treated by ligation, and to identify factors that may influence evolution under treatment, in particular the regrowth of esophageal varices.

Patients and Methods: *We conducted a retrospective, descriptive and analytical study covering the period from July 2005 to December 2021. We included all patients who had undergone at least one ligation session during this period.*

Results: *Two hundred and forty-two patients were included. The prevalence was 1.1%. The sex ratio was 1.46. The average age was 35 years. Patients presented at least one sign of portal hypertension in 57% of cases. Gastrointestinal endoscopy revealed grade III varices in 64% of cases and grade II varices in 36%. Portal hypertension was of cirrhotic origin in 68.6% of cases. Cirrhosis was of viral hepatitis B origin in 45.2% of cases. Endoscopic ligation was performed in secondary prevention in 91.7% of cases and primary prevention in 8.3%. In primary prevention, eradication was achieved in 20% of patients after an average of 2 [1-3] sessions. In secondary prevention, eradication was achieved in 36.5% of cases after an average of 4 [1-9] sessions. Tolerance was good. All patients had started propranolol after the first ligation session. Endoscopic control was performed in 63 patients (74.1%). Esophageal varices regrowth was observed in 30 patients (49.2%). In multivariate analysis, gender, variceal size, and Child-Pugh score appeared to be predictive factors for regrowth.*

Conclusion: *In the Aristide le Dantec Hospital digestive endoscopy center, EVL is performed for primary and secondary prevention. It is well tolerated. However, esophageal variceal regrowth is frequent.*

Keywords

Portal hypertension, Endoscopic ligation, Esophageal varices.

Introduction

Portal hypertension (PH) most often develops in a cirrhotic liver, whatever the etiology. The prevalence of esophageal varices (EV) in patients with cirrhosis is around 60%. Gastrointestinal bleeding due to variceal rupture occurs in around a third of patients [1]. In Senegal, a study found a prevalence of 32% [2]. The mortality rate of these hemorrhages is naturally of 30 to 40% for the first episode, and the risk of recurrence of 70% [1]. It is therefore essential to manage them rapidly, but above all to prevent them.

Esophageal variceal ligation (EVL) is an endoscopic technique for

curative and preventive treatment of bleeding caused by ruptured esophageal varices. It is the gold standard for hemostasis and secondary prevention [3,4].

EVL was introduced in 2005 at the Aristide Le Dantec Hospital Digestive Endoscopy Center. The technique was developed with the support of the University Libre de Bruxelles (ULB) as part of an inter-university project with the Cheikh Anta Diop University in Dakar (UCAD).

One of the aims of this project was to develop therapeutic endoscopy in Senegal. After more than a decade in practice, we feel it's time to reassess this technique, and in particular its impact on patient management. A preliminary study showed that treatment was effective and well tolerated [5]. Our objectives were to determine the epidemiological, clinical, paraclinical, therapeutical and evolving aspects of patients treated with EVL, and to identify factors that might influence the evolution of treatment, particularly in terms of EV regrowth.

Patients and Method

We conducted a retrospective descriptive and analytical study from January 1, 2005 to December 31, 2021 at the Aristide Le Dantec Hospital digestive endoscopy center. Our study population consisted of all patients referred to the digestive endoscopy center for upper GI endoscopy. We included all patients who had undergone at least one session of esophageal variceal ligation. We excluded all patients whose records could not be found. Sessions were performed under sedation with diazepam or midazolam in patients who had been fasting for at least 6 hours. They were rarely performed under general anesthesia. A questionnaire was used to collect epidemiological, clinical, paraclinical, etiological, therapeutical and evolutionary data. Frequencies and proportions were used to describe nominal variables, while means and standard deviations were used to describe numerical variables.

Data analysis was performed using SPSS (Statistical package for Social Sciences) version 18. Analytical studies were carried out using cross-tabulations. To compare frequencies, we used Pearson's Chi-square test or Fisher's two-tailed exact test, depending on their applicability. Means were compared using the Student's test, with a significance level of $p < 0.05$.

Results

A total of 249 patients were enrolled. The prevalence was 1.1%. We excluded 7 patients whose records could not be located. Our analyses covered 242 patients. The average age was 35 years [extremes = 16 - 73 years] and 86.4% of patients were under 50. Women accounted for 59% of cases. The sex ratio was 1.46. Patients' medical histories and underlying conditions are shown in Table 1.

Upper gastrointestinal bleeding was reported in 208 patients (85.9%), of whom 204 presented with hematemesis (84.3%) and 75 with melena (30.9%). Hematemesis was associated with melena in 71 patients.

Table 1: Patient medical history/Underlying condition.

Medical history/Underlying condition	Number	Percentage (%)
Hematemesis	85	35,1
Cirrhosis	49	19,8
Melena	9	3,7
Jaundice	8	3,3
Phytotherapy	5	2
Alcohol consumption	4	1,6
Freshwater bathing	4	1,6

Hematuria 2 0,8

Table 2 shows the distribution of patients according to functional signs.

Table 2: Distribution of patients by functional signs.

Functional signs	Number of patients	Percentage (%)
Hematemesis	204	84,1
Melena	75	31
Vertigo	48	19,8
Shortness of breath	21	8,6
Jaundice	12	5,4
Pale stools	7	2,9
Dark urine	7	2,9
Rectal bleeding	5	2,1
Pruritis	4	1,6
Hematuria	1	0,4

Physical examination revealed splenomegaly in 57.7% of cases and ascites in 27.2%. The results of the physical examination are shown in Table 3.

Table 3: Distribution of patients by physical signs.

Physical signs	Number of patients	Percentage (%)
Splenomegaly	138	57
Ascites	61	25,2
Hepatomegaly	28	11,6
Hepatic encephalopathy	7	2,9
Collateral venous circulation	7	2,9

Ascites fluid was investigated in 45 patients. Ascites was low in protein in 91.1% of cases and high in protein in 8.9%. Spontaneous bacterial peritonitis was present in 3 patients. Anemia was present in 89.9% of cases. It was microcytic hypochromic in 56.3% of cases and normocytic normochromic in 43.7%. Thrombocytopenia was present in 79.5% of patients. The prothrombin level was below 50% in 30.6% of cases. Hypoalbuminemia was present in 25.9% of cases, cytolysis in 41.3% and cholestasis in 50%. Abdominal ultrasound was performed in 201 patients. The results are shown in Table 4.

Upper gastrointestinal endoscopy (EGD) showed EV in all patients. They were grade III in 64% of cases and grade II in 36%. Red wale signs were present in 97.5% of cases. Cirrhosis was the cause of PH in 166 patients (68.6% of cases) and bilharziose in 3.3% of cases. No etiology was found in 28.9% of patients. Cirrhosis was viral hepatitis B induced in 54% of cases and viral hepatitis C induced in 2.3%. There was an hepatitis B-D co-infection in 2

cases. Classification according to the Child-Pugh score was carried out in 148 patients. Figure 1 shows the distribution of cirrhotic patients according to Child-Pugh classification.

Table 4: Abdominal ultrasound results.

Anomalies	Number	Percentage (%)
Hepatic atrophy	32	15,9
Hepatomegaly	29	14,4
Hepatic dysmorphia	90	43,6
Irregular hepatic outline	29	14,4
Splenomegaly	168	83,6
Portal vein dilatation	94	46,8
Portal vein thrombosis	9	4,5
Splenic vein dilatation	39	19,4
Portosytemic collaterals	8	4
Ascites	65	32,3

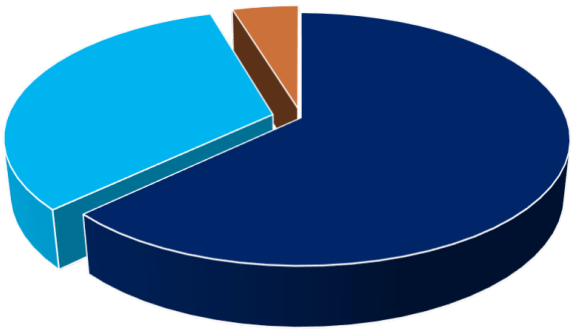

Figure 1: Distribution of cirrhotic patients by Child-Pugh Classification.

EVL was performed as secondary prevention of EV rupture in 222 patients (91.7%) and as primary prevention in 8.3%. Acute bleeding was noted in 43 patients. Hemostasis was achieved after placement of an average of 2 elastics bands [1-4 elastic bands]. No recurrence of bleeding was reported after treatment.

In primary prevention, the average age of patients was 37 and the sex ratio was 4. Four patients (20%) achieved EV eradication. Sixteen were lost to follow-up before eradication. The average number of sessions to achieve eradication was 2 [1-3 sessions]. The average number of elastics per session was 3 [2-6 elastic bands]. The average interval between sessions was 6 weeks [4-12 weeks].

In secondary prevention, the average age of patients was 36. The sex ratio was 1,36. Eradication was achieved in 81 patients (36.5%). We noted 138 patients lost to follow-up and 3 in the process of eradication. The average number of sessions to achieve eradication was 4 [1-9 sessions]. The average number of elastics per session was 5 [1-10 elastic bands]. The average interval between sessions was 6 weeks [2-12 weeks]. Retrosternal pain was found in all patients after ligation sessions. After the first ligation session, long-term treatment with propranolol was prescribed. Daily dosage varied between 20 and 160 mg. Painkillers were prescribed for all patients after the ligation sessions. The dosage was based on pain intensity. Tenofovir was prescribed for 20.9% of patients with hepatitis B induced cirrhosis at a daily dosage of 300mg. Praziquantel was prescribed for all patients with bilharzia. Recurrent bleeding prior to EV eradication was noted in 9 patients (3.71%), and 5 patients died from this recurrence. No recurrent bleeding was noted after eradication. Sixty-three patients (74.1%) had endoscopic controls after eradication. EV regrowth was noted in 30 patients (49.2%), with an average delay of 6 months [3 - 24 months]. In multivariate analysis, gender, variceal size, and Child-Pugh score appeared to be predictive factors for regrowth (Table 5).

Table 5: EV regrowth risk factors.

	Regrowth		P value
	NO	YES	
Tenofovir intake			
No	158	24	0, 363
Yes	61	6	
Child-Pugh Classification			
A	76	17	0,047
B	47	2	
C	8	0	
Esophageal Variceal Grade			
Grade 1	0	0	0,032
Grade 2	71	9	
Grade 3	134	21	
Gender			
Female	81	21	0,001
Male	131	9	

Discussion

We collected 249 patients over 15 years, representing a prevalence of 1.1%. Table 6 shows the number of patients collected by authors according to study duration.

Table 6: Number of patients collected by authors.

Authors	Number of patients	Study duration (years)
Our study	249	15
Benajah D A et al. [6]	182	6
Gabriel S et al. [7]	338	8
Harewood G C et al. [8]	216	8
Butt N et al. [9]	107	1

The average age of patients was 35 years. This varies in literature. Table 7 shows the average age of patients according to several authors.

Table 7: Average age by different authors.

Authors (Country)	Average age
Our study	35
Bassène M L et al. [5]	34
Mbengue M et al. [2]	38,7
Diarra M et al. [10]	40,8
Alvi H et al. [3]	47,4
Butt N et al. [9]	49
Gabriel S et al. [7]	51,68
Benajah D A et al. [6]	51,7

The young age of patients in Sub-Saharan Africa is probably linked to the viral hepatitis B etiology of cirrhosis, which is the main cause of PH. Indeed, hepatitis B virus (HBV) infects subjects very early in childhood, explaining the onset of cirrhotic disease around the 3rd and 4th decade of life.

In northern countries, hepatitis C virus (HCV) and alcohol are the main causes of cirrhosis. EV were grade III in 64% of patients and grade II in 36%. A predominance of grade III EV, with rates ranging from 53% to 70%, was also reported in other studies [10,12,13].

In our practice, considering the socio-economic level of our populations, EVL is often performed as secondary prevention of EV rupture. At this stage, EV are often of large size and show red wale signs. Esophageal variceal ligation is an effective endoscopic treatment for the primary and secondary prevention of EV rupture. It has been performed in our endoscopy center for over a decade. Initially reserved for secondary prevention, it has now been extended to primary prevention, particularly when EV are of large size and show red wale signs. In our study, EVL was performed for primary prevention in 20 patients (8.3%) and for secondary prevention in 222 patients (91.7%). The main limiting factor was the cost of ligation kits such as those from Cook (120,000 CFA francs). The availability of a sterilizable, refillable device (Euroligator) at the start of the project was an attractive alternative, enabling us to reduce the cost. Unfortunately, this device is no longer on the market. However, generic versions of the kit are now available and more affordable (60,000 to 65,000 CFA francs). The long interval between sessions and the low eradication rate, noted in our study compared with literature [10,13-18], are also linked to the socio-economic difficulties limiting access to ligation kits. In addition, EVL is an invasive treatment most often performed under simple benzodiazepine sedation. The resulting discomfort and pain could also be factors in poor compliance.

Propranolol was prescribed for all patients in both primary and secondary prevention. The 7th Baveno Conference [4] recommends using beta-blockers or ligation for primary prevention of EV rupture and reserving the combination of the two therapeutic modalities for secondary prevention. However, the high risk of losing sight of the patient before EV eradication has often motivated the prescription of a beta-blocker in combination with EVL in primary prevention.

EV regrowth was noted in 30 patients (49.2%). The rate of EV regrowth varies between 10 and 36% depending on the author [13,17,19-21]. Recurrent bleeding after eradication was not noted in any patient, whereas in the literature, it was reported in 3 to 30% of cases [13,17,20]. EV regrowth and recurrent bleeding may be secondary to poor compliance with long-term betablocker therapy, advanced underlying liver disease and lack of etiological treatment. In our study, gender, variceal size, and Child-Pugh classification appear to be risk factors for EV regrowth; however, this analysis needs to be repeated on a representative sample for more relevant conclusions.

Conclusion

In the Aristide le Dantec Hospital digestive endoscopy, EVL is performed for primary and secondary prevention. It is well tolerated. However, EV regrowth is frequent. This may be linked to the patient's gender, hepatocellular function, and the size of the EV. Improved access to treatment could allow us to effectively measure its impact on patient management.

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