



Efficacy of Endoscopic Band Ligation in the Treatment of Acute Esophageal Varicose Bleeding

Akut Özofagus Varis Kanama Tedavisinde Endoskopik Band Ligasyonunun Etkinliği

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Abstract

Aim: To determine the efficacy of endoscopic band ligation (EBL) on rebleeding and mortality in the treatment of esophageal varices bleeding.

Material and Method: Fifty cirrhosis patients who applied to the emergency department with acute esophageal variceal bleeding between 2018 and 2020 and were treated with EBL within the first 12 hours were evaluated retrospectively.

Results: Twenty-seven (54%) patients were male and 23 (46%) were female. The mean hospital stay of the patients was 6.4±5.6 days, and the mean blood transfusion requirement was 3.6±2.7 units. Re-bleeding was observed within 30 days in 5 (10%) patients and within 1 year in 7 (14%) patients. Ten (20%) patients died within 30 days, and 11 (22%) patients died within 1 year. The need for blood transfusion was higher in patients with grade 3 varicose veins (4.9±3.1) than in patients with grade 2 varicose veins (2.5±1.5) (p=0.001). Mortality rate within 30 days and 1 year was significantly higher in patients with grade 3 varicose veins (p=0.001). Although the rate of bleeding within 30 days and 1 year was higher in patients with grade 3 varicose veins than in patients with grade 2 varices, the difference was not significant (p=0.087).

Conclusion: EBL is an endoscopic treatment method to be preferred in patients with acute esophageal variceal hemorrhage due to its low risk of re-bleeding and low mortality rate.

Keywords: Cirrhosis, endoscopic band ligation (EBL), esophageal varices bleeding

Öz

Amaç: Özofagus varis kanama tedavisinde endoskopik band ligasyonunun (EBL) yeniden kanama ve mortalite üzerine etkinliğini belirlemek.

Gereç ve Yöntem: 2018-2020 yılları arasında acil servise akut özofagus varis kanaması ile başvuran ve ilk 12 saat içerisinde EBL tedavisi uygulanan 50 siroz hastası retrospektif olarak değerlendirildi.

Bulgular: Hastaların 27'si (%54) erkek, 23'ü (%46) kadındı. Hastaların ortalama hastanede yatış süresi 6,4±5,6 gün, ortalama kan transfüzyon ihtiyacı 3,6±2,7 ünite idi. Beş (%10) hastada 30 gün içinde, 7 (%14) hastada 1 yıl içinde tekrar kanama görüldü. On (%20) hasta 30 gün içinde, 11 (%22) hasta 1 yıl içinde öldü. Grade 3 varisli hastalarda (4,9±3,1) grade 2 varisli hastalara (2,5±1,5) göre kan transfüzyon ihtiyacı daha fazla idi (p=0,001). 30 gün ve 1 yıl içinde ölüm oranı grade 3 varisli hastalarda anlamlı olarak daha yüksekti (p=0,001). Otuz gün ve 1 yıl içinde kanama görülme oranı grade 3 varisli hastalarda grade 2 varisli hastalara göre daha yüksek olmakla birlikte fark anlamlı değildi (p=0,087).

Sonuç: Akut özofagus varis kanama hastalarında EBL, tekrar kanama riskinin ve mortalite oranının az olması nedeniyle tercih edilecek bir endoskopik tedavi yöntemidir.

Anahtar Kelimeler: Siroz, endoskopik bant ligasyonu (EBL), özofagus varis kanaması



INTRODUCTION

Gastroesophageal variceal bleeding is the most important complication of portal hypertension and the leading cause of death in cirrhotic cases.^[1] Increased intrahepatic vascular resistance to portal flow leads to the development of splanchnic vasodilation that results in portal hypertension and an increase in hyperdynamic circulation and portal blood flow. When portal pressure rises above a threshold, gastroesophageal collaterals that develop at the site of communication between the portal and the systemic circulation enlarge with exacerbation of portal hypertension and eventually rupture.^[2]

In patients with liver cirrhosis and suspected variceal bleeding, providing immediate hemodynamic stabilization, careful transfusion until the target hemoglobin is not higher than 7-8 g/dL to prevent volume-dependent increase in portal pressure, use of vasoactive drugs to reduce flow into the portal system, and use of antibiotics to eliminate inflammatory stimuli is necessary and endoscopy should be performed under careful airway protection as soon as possible.^[3]

Endoscopic sclerotherapy (EST) and endoscopic band ligation (EBL) are two treatment options for esophageal varices.^[4] Vasoactive drugs such as vasopressin, terlipressin, somatostatin and octreotide are effective in hemostasis by reducing portal pressure in patients with acute variceal bleeding.^[5]

With the implementation of effective treatment options such as endoscopic and pharmacological treatments and transjugular intrahepatic portosystemic shunt, the death rate from esophageal variceal bleeding has decreased from 42% to 6-12% in the last two decades.^[4] Therefore, prompt and appropriate treatment is important in patients with acute variceal bleeding.

The aim of our study is to determine the effectiveness of EBL on rebleeding and mortality in the treatment of esophageal varices bleeding in cirrhotic patients.

MATERIAL AND METHOD

The study included 69 cirrhosis patients who applied to the emergency department with acute esophageal variceal bleeding between 2018 and 2020 and were treated with EBL within the first 12 hours. Demographic, clinical, laboratory and endoscopic findings of the patients were obtained retrospectively by file scanning. 19 patients with incomplete information were excluded from the study. The duration of hospitalization, rebleeding rates, blood transfusion needs and mortality rates of the remaining 50 patients were analyzed. The patients' esophageal varices were classified as follows: Grade 1 (small) varices, minimally elevated veins above the surface; grade 2 (moderate) varices, convoluted veins covering <1/3 of the esophageal lumen; grade 3 (large) varices, veins in contact with each other covering >1/3

of the esophageal lumen.^[6] Somatostatin treatment (250 µg IV bolus followed by 250 µg/hour continuous infusion) was started in all patients with acute esophageal variceal bleeding, and endoscopic band ligation was performed in the endoscopy unit.

The study was approved by University of Health Sciences, Gaziosmanpaşa Education and Research Hospital Ethics Committee (Date: 27.01.2021, Decision No: 219). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Statistical Analysis

The conformity of the numerical variables to the normal distribution was tested with the Shapiro Wilk test. The Mann Whitney U test was used to compare the non-normally distributed variables in the two groups. The relationships between categorical variables were tested with the Chi-square test, and the relationships between non-normally distributed numerical variables were tested with Spearman's rank correlation coefficient. SPSS 22.0 Windows version package program was used in the analysis. $P < 0.05$ was considered significant.

RESULTS

In our study, 27 (54%) patients were male and 23 (46%) were female. The mean age was 62.1 ± 13.6 . The demographic characteristics of the patients and their initial findings at the time of admission are shown in **Table 1**. According to the classification of esophageal varices, 26 (52%) patients had grade 2 varicose veins and 24 (48%) patients had grade 3 varicose veins (**Table 2**). Re-bleeding was observed within 30 days in 5 (10%) patients, within 1 year in 7 (14%) patients, and re-bleeding was not observed within 1 year in 38 (76%) patients. The mean hospital stay of the patients was 6.4 ± 5.6 days, and the mean blood transfusion requirement was 3.6 ± 2.7 units. Ten (20%) patients died within 30 days, and 11 (22%) patients died within 1 year. There was no significant difference between men and women in terms of rebleeding rates ($p = 0.800$), length of hospital stay ($p = 0.462$), need for blood transfusion ($p = 0.384$) and death rates ($p = 0.093$). Although the rate of bleeding within 30 days and 1 year was higher in patients with grade 3 esophageal varices compared to patients with grade 2 varicose veins, the difference between them was not statistically significant ($p = 0.087$) (**Table 3**). However, the mortality rate within 30 days and 1 year in patients with grade 3 varices was significantly higher than in grade 2 patients ($p = 0.001$). At the same time, the need for blood transfusion was found to be higher in patients with grade 3 varicose veins (4.9 ± 3.1) than in patients with grade 2 varicose veins (2.5 ± 1.5) ($p = 0.001$). There was no significant relationship between rebleeding times and death rates ($p = 0.149$). According to Spearman correlation analysis, there was a weak negative correlation between systolic blood pressure and the need for blood transfusion of patients ($r = -0.340$, $p = 0.016$) and a weak positive correlation between systolic blood pressure and length of hospital stay ($r = 0.346$, $p = 0.014$) found.

Table 1. Initial data of the patients at the time of admission (n=50)

Gender (male/female) n (%)	27 (54)/23 (46)
Age	62.12±13.6
Pulse	95.44±16.43
Systolic blood pressure	88.46±16.73
BUN	65.33±37.04
Creatinine	1.43±1.07
Hemoglobin	8.82±2.46
Glucose	143.5±65.49
AST	64.56±60.55
ALT	41.4±29.5
Sodium	138.46±9.17

Mean±SD; BUN: blood urea nitrogen; AST: Aspartate aminotransferase; ALT: Alanine aminotransferase

Table 2. Clinical features and follow-up findings of the patients

Length of stay (days) (Mean±SD)	6.4± 5.67
Blood transfusion (unit) (Mean±SD)	3.68±2.71
Esophageal varices grade	n (%)
Grade 1	0 (0)
Grade 2	26 (52)
Grade 3	24 (48)
Rebleeding n (%)	
Yes	12 (24)
No	38 (76)
Rebleeding time n (%)	
Bleeding within 30 days	5 (10)
Bleeding within 1 year	7 (14)
No bleeding within 1 year	38 (76)
Death n (%)	
Death within 30 days	10 (20)
Death in 1 year	11 (22)
No death in 1 year	18 (36)

Table 3. Follow-up findings according to the varicose vein sizes of the patients

	Esophageal varicose size		p
	Grade 2	Grade 3	
Length of stay /day (Mean±SD)	5.85±5.08	7.0±6.31	0.551
Blood transfusion/unit (Mean±SD)	2.54±1.56	4.92±3.15	0.001*
Death, n (%)			
Death within 30 days	1 (3.8)	9 (37.5)	
Death within 1 year	3 (11.5)	8 (33.3)	0.001*
No death in 1 year	22 (84.6)	7 (29.2)	
Rebleeding, n (%)			
Bleeding within 30 days	1 (3.8)	4 (16.7)	
Bleeding within 1 year	2 (7.7)	5 (20.8)	0.087
No bleeding within 1 year	23 (88.5)	15 (62.5)	

* Significant at p<0.05 level, Chi-square test, Mann Whitney U test

DISCUSSION

According to our study results, the rate of rebleeding within 30 days after EBL treatment was 10% and the rate of rebleeding within 1 year was 14% in patients with acute esophageal varices bleeding. In addition, death occurred within 30 days in 10 (20%) patients and within 1 year in 11 (22%) patients. As varicose size increases in patients treated with EBL, annual bleeding and mortality rates increase.

Studies have shown that esophageal varices are present in 30% to 40% of patients with compensated cirrhosis and 85% of patients with decompensated cirrhosis.^[7] After the diagnosis of varicose veins, the overall incidence of variceal bleeding per year is 10-15%.^[4] The most important predictive factors are the size of varicose veins and the severity of liver dysfunction.^[8] Varicose size is the most useful predictor of variceal bleeding.^[9] The risk of bleeding is 1-2% in patients without varicose veins in their first endoscopies, and 5% in those with small varicose veins. In those with medium and large veins, this rate rises to 15%.^[4] In our study, the annual rate of bleeding and death in patients with grade 3 (large) varicose veins after EBL treatment in acute variceal bleeding was higher than in patients with grade 2 (moderate) varices.

The two main treatment modalities available for esophageal varices are EST and EBL.^[4] In a recent meta-analysis comparing these two methods, it was reported that rebleeding rates were lower and varicose eradication rate was higher in the EBL group compared to the EST group.^[10] Compared to EST, EBL requires fewer treatment sessions to achieve varicose obliteration and is associated with fewer complications.^[11] In another meta-analysis, the rate of rebleeding was found to be significantly lower in the EBL group than in the EST group, and the main cause of rebleeding was reported to be varicose or treatment-related ulcers. At the same time, in this meta-analysis, no significant difference was found between the EBL group and the EST group in terms of mortality.^[10] EBL has replaced EST as first-line therapy in the management of esophageal varices bleeding, as it has better survival, less risk of rebleeding, and fewer side effects.^[11,12]

In a recent study, in the 3-year follow-up of cirrhotic patients with acute variceal hemorrhage treated with EBL, recurrence of bleeding was reported in 28% of patients and death in 39%. Independent factors associated with rebleeding were found to be lack of EBL follow-up, BMI > 30 kg/m², Child C class, and large-grade varicose veins. Independent factors associated with mortality were reported as age >65 years, rebleeding, hepatocellular carcinoma, and lack of EBL follow-up. In this study, the reason for the high rebleeding and death rate was considered to be related to the lack of follow-up endoscopy.^[13] EBL may cause rebleeding from the ulcer after banding.^[14] Recurrent bleeding after emergency endoscopic ligation of acute esophageal varices bleeding in cirrhotic patients is a common complication that increases the mortality rate significantly.^[13] Guidelines recommend repeated endoscopy after control of acute variceal bleeding attack until varices are eradicated.^[15] In patients with acute varicose hemorrhage, the rate of rebleeding within 6 weeks after the first attack has been reported as 30-40%, and the rate of rebleeding within the first year has been reported as 60%.^[16,17] In our study, the rate of rebleeding within 30 days was 10%, and the rate of rebleeding within 1 year was 14%. The reason why our rebleeding rates are lower than the results of other studies may be related to the repeated endoscopic controls we applied to our patients after a bleeding episode.

Most guidelines recommend performing endoscopy within 12 hours of admission with acute variceal bleeding, when the patient is hemodynamically stable.^[18-20] In our study, endoscopy was performed in all patients after hemodynamic stabilization was achieved within 12 hours of the emergency admission. None of the patients died during endoscopic treatment. However, some studies have shown that the timing of endoscopy is not associated with mortality or rebleeding rate in patients with acute variceal bleeding.^[21,22] Cheung et al. did not show a significant relationship between the time to endoscopy and mortality or rebleeding in patients with hemodynamically stable acute variceal bleeding.^[23] In a meta-analysis, the timing of endoscopy did not affect the rate of mortality or rebleeding in patients with acute variceal bleeding.^[24] In patients with stable hemodynamics, no significant comorbid disease, or good liver function, endoscopic intervention may be delayed until adequate medical therapy (eg, intravenous vasopressin, fluid resuscitation) is administered.^[22,23] In the acute phase, 3 to 5 days of treatment with intravenous splanchnic vasoconstrictors such as terlipressin, somatostatin or somatostatin analogues may help control bleeding by reducing portal pressure.^[25] In a recent meta-analysis, the use of vasoactive drugs in patients with acute variceal bleeding was associated with a significant reduction in 7-day mortality and a significant increase in hemostasis.^[26] Therefore, it is recommended to start these drugs as soon as possible before endoscopy in patients with suspected acute variceal bleeding and continue for 3-5 days.^[18,20] Another meta-analysis showed that the combination of endoscopic therapy (ETS or EBL) and vasoactive drugs improved initial hemostasis and reduced early rebleeding within 5 days compared to endoscopic therapy alone.^[27] In our study, EBL was combined with vasoactive drugs in patients with acute esophageal variceal bleeding.

Limitations

The limitation of our study is such that the sample size is relatively small. In addition, since the data were obtained retrospectively, some of the data of the patients could not be obtained. Therefore, Child classification of the patients could not be made and MELD values could not be calculated.

CONCLUSION

In conclusion, EBL is an endoscopic treatment method to be preferred in patients with acute esophageal variceal bleeding because of the low risk of re-bleeding and the low mortality rate. At the same time, EBL should be combined with vasoactive drugs.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by University of Health Sciences, Gaziosmanpaşa Education and Research Hospital Ethics Committee (Date: 27.01.2021, Decision No: 219).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

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