

Outcome of Band Ligation in Esophageal Varices of Bangladeshi Children: A Tertiary Centre Experience

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Abstract

Background: Variceal bleeding is often a life threatening clinical situation in infants and children. Band ligation is the main endoscopic treatment for esophageal varices.

Objective: To see the outcome of band ligation of esophageal varices in extra-hepatic and hepatic cases of portal hypertension.

Methods: This prospective study was done in the Department of Pediatric Gastroenterology, Hepatology & Nutrition, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh on 40 consecutive cases of esophageal varices enrolled from April, 2014 to March 2016. Every case was treated with band ligation followed by tab. propranolol. Cases were followed up for a minimum period of one year after the band ligation.

Results: Age of the children was 2-12 years with mean age of 7.2 ± 4.3 years and male:female ratio was 1.5:1. Out of 40 children, 32 (80%) were pre-hepatic and 8 (20%) hepatic (chronic liver disease with portal hypertension) causes. Only 1 session required in 50% pre-hepatic cases and multiple (2-3) sessions required in hepatic (100%) cases. Almost same number of band (average 2-3) required in every session of both cases. Grade-II esophageal varices with red sign were more common in pre-hepatic cases & severity of grading much more (grade-III & IV) in hepatic cases. Gastric varices were more common in hepatic (50%) cases than extra-hepatic (12.5%) cases. Recurrence of bleeding occurred in all hepatic (100%) cases and half (50%) of the pre-hepatic cases. Early re-bleeding was more common in hepatic (75%) cases & late re-bleeding in both pre-hepatic (43.7%) & hepatic (100%) cases. Minimal side effect like discomfort (10%) & Nausea (10%) were present after the procedure.

Conclusion: Pre-hepatic was the most common etiology of portal hypertension in studied children. Fewer sessions were required in pre-hepatic cases than in hepatic cases. Severity of grading, re-bleeding & associated gastric varices were more common in hepatic cases. Band ligation was found to be the treatment of choice for the control of acute variceal bleeding and prevention of re-bleeding with less complications.

Keywords: Band ligation, Esophageal varices

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Introduction

Variceal bleeding is the most common cause of severe gastrointestinal bleeding in childhood and has significant mortality.¹ Endoscopic sclerotherapy (EST) is an effective treatment for bleeding esophageal varices. However, EST is associated with substantial complications including retrosternal pain, fever, sepsis, transient dysphasia and occasionally pleural effusion. Mucosal ulcerations at the site of injection are observed in 70-80% of the patients. This is the cause

of serious complications like rebleeding (up to 20%), esophageal stricture and perforation.^{2,3} Stiegmann and Goff developed endoscopic variceal ligation (EVL) as an alternative to endoscopic sclerotherapy.⁴ In adult practice, variceal ligation has been shown to be safer and more effective than sclerotherapy and is now the preferred endoscopic treatment for variceal hemorrhage in adults.⁵⁻⁷ There is paucity of data regarding use of EVL with multi band ligator in children with variceal bleed.⁸ The multiband ligator has made variceal ligation easier and more comfortable for the patient. With this technique, up to 6 varices can be ligated after a single insertion of the endoscope.⁹ Therefore, the aim of the current study was to assess the overall outcome of band ligation in esophageal varices in terms of their eradication, recurrence, re-bleeding, safety and complications.¹⁰

Materials and Methods

A prospective study was done in the department of Pediatric Gastroenterology, Hepatology & Nutrition, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh from April 2014 to March 2016. A total of 40 admitted cases of esophageal varices between 2-16 years of age was enrolled in this study after obtaining their consent. The etiology of esophageal varices were identified on the basis of clinical, biochemical and radiological features. Liver biopsy was done whenever it was feasible.⁸ Endoscopy was done after proper resuscitation by using forward viewing flexible video endoscope (Olympus GIF-V) under conscious sedation with intramuscular midazolam (0.3mg/kg/dose). Varices were graded on the scale based on Conn's criteria. When varices are visible only during inspiration (Grade-I), visible during both inspiration & expiration (Grade-II), occupy <50% of lumen (Grade-III) and ≥50% of lumen (Grade-IV).¹¹

EVL was done in grade II esophageal varices with red sign, grade III and grade IV in a case of acute variceal bleeding or recurrence of esophageal varices after banding.¹² Multi-Band Ligator (MBL-6-F, Wilson-Cook Medical, USA) was used for EVL operation.¹³ Selected severe esophageal varices were visualised and aspirated into the banding chamber of the ligator. Suction was maintained until the screen became red, and then the band was deployed by rotating the handle clockwise until the band release was felt. The bands were then launched onto the selected varices in ascending order through the esophagus.¹² The above procedures could be seen in Figure 1. EVL sessions

were repeated at interval of 1 month till either all the varices were obliterated or reduced to grade I or tiny thrombosed varices which could not be ligated.⁸ During each sessions, up to 4 band were placed beginning in the distal esophagus using a multiband ligation device (six shooter). Follow up endoscopy was done every 1 month interval or when patient develop upper gastrointestinal bleeding up to minimum one year. All children were treated with band ligation plus tab. propranolol with an oral proton pump inhibitor (PPI) (Omeprazole 1 mg/kg/day) for 2 months or more until succeeding endoscopy.¹⁴ Treatment was analyzed by grading of varices, total number of band ligation sessions & number of band required in every session, total number of obliteration, incidence of early & late re-bleeding and complications.⁸ Initial variceal obliteration was defined as the complete disappearance of esophageal varices or when the sizes of esophageal varices were too small to be ligated. Recurrence of esophageal varices was defined as a re-appearance of esophageal varices or enlargement of previous small-size varices that became accessible by EVL.¹⁰ Early re-bleeding defined by recurrent hematemesis and/or melena and/or bloody fluid drained by nasogastric tube or needed blood transfusion within 1 month of band ligation & late re-bleeding defined by same manifestations ≥1 months of band ligation.¹²

A preformed semi structured data collecting form was used as a data collection instrument. Data were collected by researcher and analyzed by Statistical Package of Social Science (SPSS) version 11.5 programme. Descriptive analysis was performed for demographic, clinical and radiographic features, and results were presented as mean ± standard deviation for quantitative variables and frequencies (percentages) for qualitative variables. Data was analyzed by Z test for proportion testing. An upper tailed p value of <0.05 was considered as significant.

Results

Initially, 49 children with esophageal varices were enrolled, 8 (16.32%) were lost from follow up of various reasons and 1 (2.0%) was dead due to variceal bleeding. The final sample size was 40. All the children were between 2-12 years of age. Subjects mean age was 7.2±4.3 years. There were 30 (60%) male & 10 (40%) female cases. Male: Female ratio was 1.5:1.

Out of 40 children, 32 (80%) developed portal hypertension due to pre-hepatic causes and 08 (20%)

due to hepatic causes. No patient was found with post-hepatic cause. The mean age at onset of the first variceal bleeding was at 5.3±4.5 years. In pre-hepatic cases it was 4.4±3.6 years & in hepatic cases it was 7.6±4.6 years. So, in pre-hepatic cases first variceal bleed occurs much earlier than hepatic cases.

Table-I
Baseline characteristics

Variables	Value	
Mean Age (years)	7.2±4.3	
Sex, n (%)		
Male	30 (60)	
Female	16 (40)	
Mean age of first variceal bleed (years)		
All cases	5.3±4.5	
Pre-hepatic	4.4±3.6	
Hepatic	7.6±4.6	
Etiology, n (%)	Pre-hepatic	Hepatic
Overall	32 (80)	08 (20)
Portal vein thrombosis	20 (62.5)	-
Splenic vein thrombosis	4 (12.5)	-
Others	8 (25)	-
Cryptogenic	-	4 (50)
Wilson's disease	-	1 (12.5)
Hepatitis B virus	-	1 (12.5)
Biliary cirrhosis	-	1 (12.5)
Autoimmune hepatitis	-	1 (12.5)
Esophageal Varices, n (%)	Pre-hepatic	Hepatic
Grade-II with red sign	16 (50)	-
Grade-III	08 (25)	04 (50)
Grade-IV	08 (25)	04 (50)
Gastric Varices, n (%)	Pre-hepatic	Hepatic
	04 (12.5)	4 (50)

Patients were followed up for a minimum period of one year after the band ligation. Initial variceal obliteration was achieved in all (100%) cases.

Only one session required in 50% cases of pre-hepatic children and multiple session required in hepatic children. Almost same number of band required in every session of both pre-hepatic & hepatic cases. Recurrence of bleeding was observed in 50% cases of pre-hepatic & all cases of hepatic children. Early re-bleeding was more common in hepatic (75%) cases & late re-bleeding was more common in both pre-hepatic (43.75%) & hepatic (100%) cases.

Ten (25%) children experienced minor complications like discomfort (10%), nausea (10%) & retrosternal pain (05%), while major complications were absent.

Table-II
Outcome of band ligation

Outcome	Value	
Number of band ligation session required, n (%)	Pre-hepatic	Hepatic
1 session	16 (50)	-
2 session	12 (37.5)	04 (50)
3 session	04 (12.5)	04 (50)
Number of band required in every session, n (average)	Pre-hepatic	Hepatic
Initial obliteration, n (%)	32 (100)	08 (100)
Recurrence of bleeding, n (%)	Pre-hepatic	Hepatic
Overall	16 (50)	08 (100)
Early re-bleeding	02 (6.2)	06 (75)
Late re-bleeding	14 (43.8)	08 (100)
Complications, n (%)	Minor events	Major events
Discomfort	04 (10)	-
Nausea	04 (10)	-
Retrosternal pain	02 (5)	-
Esophageal ulceration	-	00
Esophageal perforation	-	00
Esophageal stricture	-	00
Aspiration pneumonia	-	00
Sepsis	-	00

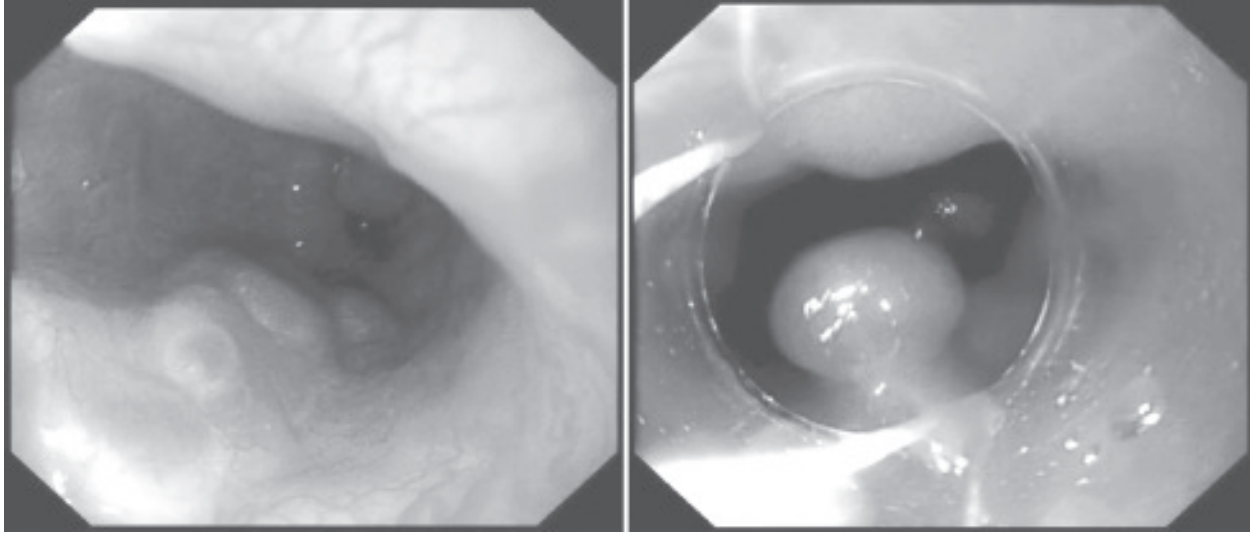


Fig.1: Endoscopic image showing large esophageal varix & ligating the varix using multiband ligator

Discussion

Esophageal varices are the most common complication of EHPVO and IHPVO. Once varices have developed, they increase in size and eventually cause variceal bleeding.¹⁵ This is an emergency with high rates of morbidity & mortality.¹²

EVL is the gold standard for the treatment of acute bleeding of esophageal varices. Furthermore, it is also effective in secondary prophylaxis and in primary prophylaxis for patients who are not suitable candidates for beta blocking agents.¹⁰ Several previous experiences suggested that this technique is safe & effective in children.¹⁶⁻²⁰

A pediatric study analyzed the endoscopic sclerotherapy & band ligation and reached the conclusion that EVL was much more effective than sclerotherapy and achieved variceal obliteration faster with fewer treatment sessions.¹⁰ In a recent randomized controlled trial comparing EST and EVL for bleeding esophageal varices in children with EHPVO, it was found that, EVL eradicated varices within fewer endoscopy sessions (3.9 ± 1 vs 6.1 ± 1.7).¹³ In the present study, only one session required in 50% cases of EHPVO and multiple sessions required in IHPVO.

Multiband ligator has been used in children in few studies only.^{13,21} Kerner et al²¹ found that by using multi band ligator, varices were obliterated in 2 sessions in 26 of 28 patients with minimal complications. In these studies multi band ligator was

found to be technically feasible and safe in children. Similar observation was also reported in the present study. We applied 2-3 bands in every session of ligation in both pre-hepatic & hepatic cases.

In adult & children, endoscopic therapy for variceal bleeding with EVL is a well established treatment that achieves 70% to 100% early haemostasis.¹² Abbasi et al¹⁰ stated that initial variceal obliteration was achieved in 79.8% cases. In the present study, initial variceal obliteration occurred in all cases (100%) with proper banding.

Meta-analyses of 15 studies that compared EVL against sclerotherapy in the prevention of variceal re-bleeding showed that EVL was associated with lower rate of re-bleeding.²² Pokhrana et al⁸ also stated the same result. Recurrence of bleeding was much more in intra-hepatic cases (91.7%) than extra-hepatic cases (8.3%).¹⁵ In our study, recurrence of bleeding occurred in 100% intra-hepatic cases and 50% pre-hepatic cases. Masalaite et al¹⁵ also showed that early re-bleeding was more in intra-hepatic cases (82.1%) & less in pre-hepatic (17.9%) cases. Similar result was observed in our study. Early re-bleeding occurred in 75% intra-hepatic cases and 6.2% pre-hepatic cases. Late re-bleeding was more in both pre-hepatic (43.8%) & hepatic (100%) children.

Major complications like esophageal perforation, bleeding, ulceration and stricture formation was significantly higher in EST group as compared to EVL group.⁸ In a study of 17 children with EHPVO reported

no short term or long term complication with EVL. Lu et al¹² also did not observe fatal complications following EVL. We reported some minimal events like discomfort (10%), nausea (10%) & retrosternal pain (5%) but major events were absent.

Conclusions

Band ligation eradicates esophageal varices with less complications and lower re-bleeding rate. Only few sessions were required in pre-hepatic cases than in hepatic cases. Recurrence of bleeding including early re-bleeding were more common in hepatic cases. Endoscopic variceal ligation using multiband ligator was found to be safe & effective for the control of acute variceal bleeding and the prevention of re-bleeding in children.

Limitations of study

There were mainly two limitations of our study. First, it was a single-centre study with a limited sample size and short period of follow-up (around one year). Data needs further evaluation on a larger scale and over a longer follow-up duration. Second, it was a single-arm study (only the outcome of band ligation) and so not comparable to other available options for oesophageal varices like oral drugs, endoscopic sclerotherapy or their combination.

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