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Endoscopic Sclerotherapy: Benefits and Outcome in Pediatric Esophageal Varices

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Abstract:

Background: Endoscopic variceal sclerotherapy (EVS) is still not well defined in children with portal hypertension due to liver disease. We tried to investigate benefits and factors affecting outcome of this procedure.

Methods: We conducted retrospective random study on 49 children, aged 2 to 17 years, 30 male and 19 females, presented to our unit with esophageal bleeding. Children were injected with 1% ethanolamine maleate and followed up for 3 years period, the procedure done under light sedation (propofol). Children were on medication since they had been diagnosed (regular propranolol 2 mg/ Kg). Using suitable statistical analysis, we studied etiology, presentation, duration of the disease, number of sclerotherapy sittings and propranolol dosage in relation to good outcome of the procedure.

Results: The most common etiology was Congenital hepatic fibrosis (CHF) (no=11), Autoimmune hepatitis (AIH) (no=9), Wilson's disease (WD) (no= 8) followed by Budd-Chiari Syndrome (BCS) (no= 7) and other miscellaneous (no=14). At the end of follow up period, the good outcome (varices grade I, II) was in 19 out of 49 (38.78 %), 17/19 children experienced 2-10 sitting to get grade I and II, 13/19 (68.42%) had just one year for injection, 18/19 child had received propranolol and 10/19 (52.63%) were of child-B classification category. 25 out of 49 had hypertensive gastropathy (51.02%), 4 children had fundal gastric varices and 2 children had gastric extensions. No complications observed in all children after sclerotherapy at treatment time or follow up period.

Conclusions: Endoscopic sclerotherapy in children is safe and effective for esophageal varices due to liver disease. Outcome was affected significantly by etiology, child classification, years of diagnosis before treatment, and number of sittings. All those factors and long term outcome had to be studied on large cohort and extended research.

Key words: Portal hypertension, esophageal varices, endoscopic variceal sclerotherapy, EVS, children.

Introduction

Variceal bleeding is often a life-threatening clinical situation in infants and children.1 The experience of the "endoscopic community" in pediatric patients is limited, but during recent years, increased skills of the endoscopists and technological improvements led to standardization of pediatric endoscopy and development of specialized paediatric endoscopy unit.2 Optimal treatment of esophageal variceal bleeding is still controversial. Endoscopic variceal sclero-therapy (EVS) and surgical procedures are preferred modalities and have been shown to be effective in more than 90% of patients with active variceal bleeding but it is associated with various complications.3 EVS is an effective treatment for bleeding esophageal varices, however, EVS is associated with substantial complications including retrosternal pain, fever, sepsis, transient dysphagia and occasionally pleural effusion. Mucosal ulcerations at the site of injection are observed in 70-80% of the patients, and this is the cause of serious complications like rebleeding (up to 20%), esophageal stricture and perforation. 4,5 EVS is still not well defined in children with portal hypertension due to liver disease and here we tried to study some factors affecting benefits and outcome of this procedure.

Patients and Methods:

All children (n=49) who presented with variceal bleeding due to liver disease, were included in this study for 3 years. The diagnosis of liver disease and cirrhosis was made and based on clinical, biochemical and radiological features; stages of cirrhosis based on Child-Turcotte-Pugh (CTP).[6] Liver biopsy was done for all cases. In cases with acute variceal bleed, endoscopy was done after proper resuscitation. Varices were graded, according to Baveno V. guidelines.[7] Varices were of grade III or IV in all patients at the start of endoscopic treatment. Two children were actively bleeding before the endoscopic procedure, which was successfully controlled by EVS. EVS was done by using forward viewing flexible video endoscope under conscious sedation (propofol), children underwent endoscopic injection with 1% ethanolamine maleate for 3 years period. All children continued to receive the therapy by repeated intra and extravariceal endoscopic injections, and not exceeding 8cm for each patient at intervals of weeks to months between sessions. They all received regular propranolol medication since they had been diagnosed (2 mg/Kg). Follow up endoscopy was done at 3-4 weeks and there after every 3-6 months or when patient developed upper gastrointestinal rebleeding.

We studied etiology of liver disease, duration of the disease, number of sclerotherapy sittings and propranolol dosage, all in relation to good outcome (grade I, II) by suitable statistical analysis. ***Statistical analysis:*** Continuous data are expressed as mean ± SD, unless specified otherwise. Descriptive statistics (number and percentages) were used to describe discrete data. The Statistical Package for Social Sciences (version 17.0; SPSS, Inc., Chicago, IL, United States) was used, and $P < 0.05$ was regarded as significant

Results:

49 children, had totally 141 injections, and were followed up regularly by upper GI endoscopy. The most common etiology was CHF (no=11), AIH (no=9), WD (no= 8) followed by BCS (no= 7) and other miscellaneous (no=14). At the end of this follow up period, 25 out of 49 experienced hypertensive gastropathy (51.02%), 4 children had fundal gastric varices and 2 had gastric extensions. The good outcome (grade I, II) was in 19 out of 49 (38.78 %), 18/19 child had received 2mg/kg propranolol, 10 out 19 (52.63%) were in child B classification category, 17 children received 2-10 sitting to reach grade I and II. and the duration of injection sittings of 13/19 (68.42%) was just one year. 10/19(52.63%) children were above 10 years old age at the end of sclerotherapy and 11/19 (57.89%) of children diagnosed for 5 years before treating. Variceal eradication was achieved in all children in mean 2.8 sessions (range 2-4). Complete disappearance of varices was achieved in 10 patients while 3 patients had grade I varices. No complications observed in all patients related to sclerotherapy at time of treatment and no other major complications were noted during follow up (mean= 6.7, range=2-11 months). Good outcome correlated significantly to etiology, child classification, years of diagnosis before treatment, period since first sitting and number of sittings.

	Age/Yr	Sex	Etiology	C/P	Child's class.	Years of Dx	First sitting (months)	No. of sittings	Number of Outcome Grade (I-IV)
	2 - 17 (10.74 ± 4.17)	M = 30 F = 19	CHF =11 AIH = 9 WD = 8 BCS = 7	H = 34 M = 3 H, M = 12	A =18 B =15 C =16	2- 13 (5.28 ± 2.33)	2 - 40 (13.96 ± 18.83)	2 - 24 (6.30 ± 4.58)	I = 1 II = 4 I, II = 14 III = 3 II, III = 18 III, IV = 9

Table. 1: Demographic data and outcome

*Significant = < 0.05
Dx = Diagnosis
CHF= Congenital hepatic fibrosis
AIH = Autoimmune hepatitis
BCS= Bud Chiari disease

WD = Wilson's Disease
H = hematemesis
M = Melena

Table.2: Demographic data in relation to good outcome

	Etiology	Years of Dx. (Yr) M±SD	First sitting (Mo) M±SD	No. of sittings M±SD	Outcome grade
Results	AIH = 5 WD = 4 BCS = 3 Unknown =3	3 -5 (4.74± 2.16)	4 -29 (17.53± 27.03)	2-24 (6.00 ± 4.31)	I = 1 II = 4 I, II = 14
P value	0.022*	0.036 *	0.027 *	0.077 *	-

*Significant = < 0.05
Dx = Diagnosis
AIH = autoimmune hepatitis
BCS = Bud Chiari disease
WD = Wilson's Disease

Discussion:

Bleeding of esophageal varices is the main cause of morbidity and mortality in children with portal hypertension due to liver disease.[2] In the study group, variceal eradication was achieved in all patients in mean 2.8 sessions (range = 2-4). Complete disappearance of varices was achieved in 10 patients while 3 patients had grade I varices. In concordance with the present results, endoscopic injection sclerotherapy has been described with favorable results as both primary [8-10] and secondary prophylaxis of variceal hemorrhage in children and adolescents with cirrhosis.[11-12] Other study reported that endoscopy in children remains a very safe procedure, although a more detailed understanding of risk factors and ideal training and practice organization is lacking.[7] In the pediatric population, EVS and esophageal variceal banding (EVL) are considered the methods of choice in the treatment of esophageal variceal hemorrhage and prevention of rebleeding.[13] Sclerotherapy being favorable and reserved for small children in whom it is not anatomically possible to use the equipment for EVL.[14] One study on biliary atresia, the patients with grade 2 or 3 varices received sclerotherapy every 2 to 4 weeks until eradication, the efficiency of this sclerotherapy protocol among the failed portoenterostomy patients was poor, despite initially successful eradication, varices eventually reappeared in all [15] and that may be due to difference in age and duration of varices. Also, other reports were in concordance of our study where the mean time needed for varices eradication was 3 to 6 months.[16] At the end of the present study and follow up period, 25 out of 49 had hypertensive gastropathy (51.02%), 4 patients had fundal gastric varices and 2 patients had gastric extensions. In one study, no significant hypertensive gastropathy was encountered. Despite similar sclerotherapy protocol, variceal hemorrhage was significantly more frequent after a failed portoenterostomy than in patients who developed varices several years after an initially successful portoenterostomy. This is not unexpected in the light that after failed portoenterostomy children display rapidly progressive cholestatic liver failure and cirrhosis.[15] Stiegmann and Goff developed EVL as an alternative to endoscopic sclerotherapy However, there was no difference in variceal eradication rate between EVS and EVL which developed recently.[17,13] We used Propofol for sedation and no complications noted. Other authors reported that sedation of children during endoscopy might need further evaluation and standardization, to reduce the rate of specific complications.[18] Some authors use general anaesthesia to optimize examination and minimize the risk of blood aspiration.[19,20]

Conclusions:

Endoscopic sclerotherapy is a safe and effective treatment for esophageal varices in children due to liver disease. Good outcome was correlated significantly with etiology, child classification, years of diagnosis before treatment and number of sittings. All these factors and Long-term outcome had to be studied on large cohort and extended research.

Conflicts of Interest:

No conflicts of interest

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References:

1. Zhonghua Er Ke Za Zhi. Long-term outcome after injection sclerotherapy for esophageal variceal bleeding in children with portal hypertension. 2004 Aug; 42(8): 574-6.
2. Ju´lio R. Pimenta, Alexandre R. Ferreira, Eleonora D.T Fagundes, Thaı´s C.N. Queiroz, Yregiane A.N. Baptista, Yeduardo G. de Arau´jo Moreira, et al., Factors Associated with Bleeding Secondary to Rupture of esophageal varices. JPGN. 2017; 64(2).
3. Sarin SK, Sachdeva GK, Nanda R, Vij JC, Anand BS. Endoscopic sclerotherapy using absolute alcohol. Gut 1985; 26: 120-124.
4. Prandi D, Rueff B, Roche-Sicot J, Sicot C, Maillard IN, Benhamou JP. et al. Life-threatening hemorrhage of the digestive tract in cirrhotic patients. Am J Surg 1976; 131: 204-209.
5. Goncalves ME, Cardosos SR, Maksoud JG. Prophylactic scerotherapy in children with esophageal varices: Long term result of a controlled prospective randomized controlled trial. J Pediatr Surg 2000; 35: 401-405.
6. Okajima C, Arii S, Tanaka S, Matsumura S, Ban D, Ochiai T, et al. Prognostic role of Child-Pugh score 5 and 6 in hepatocellular carcinoma patients who underwent curative hepatic resection. Am J Surg [Internet]. 2015 [cited 2016 Mar 12];209(1):199-205.
7. de Franchis R. Revising consensus in portal hypertension: report of the Baveno V consensus workshop on methodology of diagnosis and therapy in portal hypertension. J Hepatol 2010; 53: 762– 768.
8. Duche M, Habes D, Roulleau P, et al. Prophylactic endoscopic sclerotherapy of large esophagogastric varices in infants with biliary atresia. Gastrointest Endosc 2008; 67: 732–7.
9. Goncalves ME, Cardoso SR, Maksoud JG. Prophylactic sclerotherapy in children with esophageal varices: long-term results of a controlled prospective randomized trial. J Pediatr Surg 2000; 35: 401–5.
10. Stringer MD, Howard ER, Mowat AP. Endoscopic sclerotherapy in the management of esophageal varices in 61 children with biliary atresia. J Pediatr Surg 1989; 24: 438–42.
11. Lilly JR, Stellin G. Variceal hemorrhage in biliary atresia. J Pediatr Surg 1984;19: 476–9.
12. Sarin SK, Misra SP, Singal AK, et al. Endoscopic sclerotherapy for varices in children. J Pediatr Gastroenterol Nutr 1988; 7: 662–6.
13. Zargar SA, Javis G, Khan BA, et al. Endoscopic ligation compared with sclerotherapy for bleeding esophageal varices in children with extrahepatic portal venous obstruction. Hepatology 2002; 36: 666–72.
14. Schneider BL, De Ville de Goyet J, Leung DH, et al. Primary prophylaxis of variceal bleeding in children and the role of MesoRex bypass: summary of the Baveno VI Pediatric Satellite Symposium. Hepatology 2016; 63:1368–80.
15. Hanna Lampela, _Silja Kosola, _Antti Koivusalo, yJouni Lauronen, yHannu Jalanko, Risto Rintala, and _Mikko P. Pakarinen. Endoscopic Surveillance and Primary Prophylaxis Sclerotherapy of Esophageal Varices in Biliary Atresia _JPGN _ Volume 55, Number 5, November 2012.
16. Haafiz AB. Liver fibrosis in biliary atresia. Expert Rev Gastroenterol Hepatol 2010; 4: 335–43.
17. Stiegmann GV, Goff JS, Michaletz Onody PA, Korula J, Lieberman D, Saeed ZA, et al. Endoscopic sclerotherapy as compared with endoscopic ligation for bleeding esophageal varices. N Engl J Med 1992; 326: 1527-1532.
18. Gimson AES, Ramage JK, Panos MZ, Hayllar K, Harrison PM, Williams R, et al. Randomized trial of variceal banding ligation versus injection sclerotherapy for bleeding esophageal varices. Lancet 1993; 342: 391-394.
19. Gimson AE, Ramage JK, Panos MZ, et al. Randomised trial of variceal banding ligation versus injection sclerotherapy for bleeding oesophageal varices. Lancet 1993; 342-391.
20. Avgerinos A, Armonis A, Manolakopoulos S, et al. Endoscopic sclerotherapy versus variceal ligation in the long-term management of patients with cirrhosis after variceal bleeding. A prospective randomized study. J Hepatol 1997; 26:1034.