

Outcome of Cyanoacrylate Glue Injection for Bleeding Gastric Varices

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ABSTRACT

Introduction: Gastric variceal bleeding is catastrophic and difficult to manage. Use of N-butyl-2-cyanoacrylate (NBCA) is recommended for bleeding gastric varices but the data on efficacy and complications are variable. Hence our study has assessed the outcome of endoscopic NBCA injection in bleeding fundal varices.

Methods: We prospectively analyzed 24 patients of bleeding gastric varices between April 2023 to March 2024 who were treated with N Butyl 2-Cyanoacrylate. Repeated injections were done on single sessions or multiple sessions as required till the varices were solidified properly. Patients demographic profile, initial endoscopic findings, volume (sessions) of glue used and complications were recorded.

Results: A total of 24 patients were treated with glue injection. Mean age was 52.6±14.8 years and 15(62.50%) were males. Cirrhosis was the major cause for gastric variceal bleeding in 20 patients (83.33%) and ethanol consumption 13(54.17%) was the major cause of liver cirrhosis. Majority of gastric variceal bleeding were due to GOV2 23(95.83%) followed by IGV1 in 1(4.17%). Haemostasis was achieved in 13(54.17%) cases with 1 ml of NBCA injection, while 9(37.50%) of patients needed 2 ml and 2(8.33%) needed 3 ml. We achieved complete hemostasis in 19(79.2%) patients in one session and rest needed a second session. Sixteen patients (66.7%) did not have any complications. One patient had major complication with mesenteric vein thrombosis however rest developed minor complications including pain abdomen in 7(29.17%) and post injection site ulcer noted in 3(12.5%).

Conclusions: N-butyl-2-cyanoacrylate (NBCA) also called Glue injection for bleeding gastric varices is highly effective even with a single session with minimal complications.

Keywords: *N-butyl-2-cyanoacrylate (NBCA); Glue Injection; Bleeding Gastric Varix; Efficacy; Complications.*



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INTRODUCTION

Variceal bleeding is a common complication of decompensated cirrhosis.[1-3] Variceal bleeding can be either due to Esophageal Varix (EV) or Gastric Varices (GV).[4-6] Bleeding GVs is catastrophic and usually present with massive Upper Gastrointestinal (UGI) bleeding unlike esophageal varices. [7, 8]

Rubber band ligation commonly used for EVs treatment is not effective for GV related bleeding. [9, 10] The discovery of tissue adhesive glue (Cianoacrylate) has changed the management of gastric variceal bleeding since 1980s. It is injected over the bulging gastric varices via a retroflexed endoscope with successful hardening of varices. It poses risk of sticking to the endoscope and spillage to eyes or vital parts of endoscopist or patient as well. [11, 12]

The evidence to support recommendations for management of gastric Variceal Hemorrhage (VH) is much less robust than that for EV. Efficacy and complications of its use are also variable in different studies. [11] Hence our study has focused on the efficacy of hemostasis and complications of its use.

METHODS

It was a descriptive cross-sectional study done in the Department of Medicine of Pokhara Academy of Health Sciences (PoAHS) over a period of 1 year from April 1st2023 to March 31st 2024. The approval for the study was taken from Institutional Review Committee (Ref no: 145/079). Written informed consent was taken from all the patients. Total of 24 patients with active gastric variceal bleeding or recent stigmata of bleeding having Gastroesophageal Varices type 2 (GOV2) or

Isolated Gastric Varix type 1 (IGV1) were enrolled in the study. Patients with Gastroesophageal Varix type 1 (GOV1) or Isolated Gastric Varix type 2 (IGV2) were excluded from the study since IGV1 are easily managed by esophageal variceal band ligation. For IGV2 no convincing data available regarding glue therapy. Intra venous fluid resuscitation and packed red blood cell transfusion was done for patients with hypotension and Hemoglobin (Hb) <7.0. All patients were started on injection octerotide infusion or terlipressin as per protocol/guidelines.[2] Upper GI Endoscopy were performed with Pentax EPK V 1500 C model of endoscope after proper stabilization of patients within 12-24 hours. Gastroesophageal varices were classified on endoscopy as per Sarin's classification. [8] GOV type 1 (GOV1) appears as a continuation of esophageal varices (EVs), extending for 2 to 5 cm below the gastro esophageal junction whereas a GOV type 2 (GOV2) extends beyond the junction into the fundus of the stomach. IGV1 are located in the fundus (IGV1). Isolated GV type 2 (IGV2) are varices located elsewhere in the stomach. [8]Active GVH was defined as spurting or oozing of blood from a GV. Evidence of recent bleeding was defined as the presence of a white nipple or red plugs. Successful initial hemostasis was defined as cessation of bleeding with no recurrence for 2 days with proper hardening of varix on compressing with biopsy forceps. [13,14] All details of patient including age, sex, etiology of Chronic Liver Disease (CLD), volume(ml) needed to solidify the varices, sessions needed to completely obliterate the varices, Complications if any (epigastric pain, embolism-pulmonary, mesenteric, variceal ulcer, fever) were noted. Pain abdomen was categorized as major only

if required hospitalization or pharmacotherapy. [12]

Endoscopy was done without sedation. All necessary safety precautions were taken by wearing safety face shield, goggles and mask. Patient's eyes were covered by a towel. Glue injection was done in a retroflexed position of endoscope. Commercially available flexible sclerotherapy injectors with a 6 mm/21-gauge needle were used for gastric variceal injection. After proper stabilization of scope, the catheter was advanced through the working channel. Catheter was primed with 0.8-1.2 ml of distilled water followed by N butyl, 2-cyanoacrylate glue injection. Amount of glue was decided according to size of varix i.e 1-4 ml in a session. However, the amount of glue injection was decided subsequently after checking for hardening of varix with closed tip of biopsy forceps following glue injection. After fixing the position of the scope in retroflexed position the sclerotherapy needle was taken out and injected over the varix. Following visualization of red catheter sign, N-butyl-2-cyanoacrylate (Histoacryl™, B. Braun, Melsungen, Germany) was injected as a bolus dose of 1ml Glue injection was done on the largest varix first. After injecting the Endoscope/catheter was be taken out and the tip of the needle was cut by scissors. The procedure was repeated with 1 ml of glue if required until solidification of all varices after checking for hardening of varix with closed tip of biopsy forceps. In case of presence of esophageal varices, endoscopic variceal ligation was done in the same setting. Repeat sessions of check endoscopy were done in 2-6 weeks.

All cases presenting to emergency of Pokhara Academy of Health Sciences were enrolled for study if they have fundal varices with stigmata of bleeding on endoscopy. Continuous variables were expressed as means \pm standard deviation. Frequencies and percent were calculated. The extracted data were analyzed using SPSS software package version 21.

RESULTS

A total of 24 cases that were treated with N Butyl 2-Cyanoacrylate (NBCA) for bleeding gastric varices were enrolled in the study. Patient's age ranged from 18-70 years with mean age of 52.6 ± 14.80 years. The baseline characteristics of patients are shown in Table 1. The majority of the patients were male (n = 15, 62.50%). Both hametemesis and malena was the most common presenting complaint 13(54.17%), while 9(37.50%) presented with hametemesis and 2(8.33%) presented with malena. Cirrhosis was the major cause for gastric variceal bleeding (n=20, 83.33%) followed by Extra Hepatic Portal Vein Obstruction (EHPVO) (n=4, 16.67%). Among cirrhosis 13(54.17%) were due to ethanol related followed by 4(16.67%) Non-Alcoholic Steatohepatitis (NASH), 2(8.33%) Viral Hepatitis (each B and C), and 1(4.17%) was cryptogenic. Among cirrhotics 12(60.00%) had Child Turcotte Pugh score (CTP) B score, 5(25.00%) had CTP C and 3(15.00%) had CTP A. Majority of gastric variceal bleeding were due to GOV2 (n=23, 95.83%) and 1 (4.17%) patient was of IGV1.

Table 1: Base line characteristics of the study population (n=24)

Characteristics	Number of patients (n=24)	Percent (100%)
Male/Female	15/9	62.50/37.50
Age, years (mean \pm SD)	52.6 \pm 14.80	
Etiology of Cirrhosis:		
Ethanol related	13	54.17
NASH related	4	16.67
Viral Hepatitis	2	8.33
Cryptogenic	1	4.17
EHPVO	4	16.67
Severity of cirrhosis:		
CTPA/CTP B/CTP C	3/12/5	15.00/60.00/25.00
Types of Gastric Varix		
GOV2/IGV1	23/1	95.83/4.17

Hemostasis was achieved in 13(54.2%) cases with 1 ml of NBCA injection, while 9(37.5%) of patients needed 2 ml and 2(8.3%) needed 3 ml. We achieved complete hemostasis in 19(79.17%) patients in one session and rest 5(20.83%) needed second session of glue injection.

Common complication noticed was pain abdomen in 7(29.17%) which was managed with minor analgesics (injection hyoscine) while one among this developed mesenteric ischemia requiring prolonged hospitalization. Other complications included Post injection site ulcer in 3(12.50%). Sixteen patients (66.67%) did not have any complications as shown in Table 2.

Table 2: Complications of Cyanoacrylate Glue injection. (n=24)

Type of complication	Number (%)
Pain abdomen	7(29.17%)
Post Glue Ulcer	3(12.50%)
Mesenteric Vein thrombosis	1(4.17%)
No complications	16(66.67%)

DISCUSSION

Variceal bleeding is a life-threatening emergency. Gastric varices bleed less frequently than esophageal varices but their bleeding is torrential and fatal. Initial management is focused on resuscitation. Hb is maintained >7 and early endoscopy is done within 12-24 hours maintaining on octerotide and terlipressin. Gastric varices can be seen in cirrhotic and non-cirrhotic like EHPVO. Trans Jugular Intrahepatic Portosystemic Shunt (TIPS) is the preferred modality for treatment but it's not available at all centers. Cyanoacrylate injection is the best way in achieving hemostasis in bleeding or with recent stigmata of bleeding gastric varices. Larger Gastric Varices (GV) these days are tackled with Endoscopic Ultrasound (EUS) guided coiling also.

Our study showed majority of male patients having gastric variceal bleeding accounting 62.5% which was similar in previous studies. Average age of patients was 52.6 years which matched with study of from North India. [16] Majority of gastric variceal bleeding was due

to cirrhosis (83.3%), and alcohol (54.2%) was the major etiology followed by NASH and Viral Hepatitis. A Study showed similar alcohol predominance however studies from Thailand showed equivalence of alcohol and viral hepatitis.[16, 17] Hepatitis B and C were the only causative agents of cirrhosis in a study from Pakistan. [18]Hence the geographical location, cultural values play a role in the etiology of cirrhosis. Most patients presented with both hematemesis and malena unlike study from Cambodia, possibly due to late presentation of our patients. [19] Clinically patients were mostly of CTP B class with GOV2 as major finding of bleeding gastric varix similar to previous studies. [16, 17] Regarding volume of glue injection 1 and 2 ml achieved hemostasis in majority (54.2 % and 37.5% respectively). A study showed average of 2.75±0.95 ml injection which lesser volume averaging 0.5 ml needed.[19]Our study showed good efficacy of cyanoacrylate glue in a sense that majority(79.2%) of varices achieved hemostasis in a single session while 20.8% need two sessions. Previous studies also showed > 80% haemostatic efficacy in 1stsession. Few studies showed very high efficacy with >95% hemostasis in a single session. [14][20, 21]

There are various complications of glue injection reported in literature. It can be either risk to the treating doctors and nurse assistant or to Endoscopy instrument and patient related risks. Glue can accidentally stick to face and eyes of doctors/nurses causing serious complications. Also, glue can block the endoscope air/water channel and camera as well. Our study did not show any such complications; however, we could have encountered if we have done for longer duration in high volume patients. Patient related complications were there similar to

previous studies. Pain abdomen requiring minor analgesics was noted in 29.2% of patents. This is lower compared to study done in 2005 where there was epigastric discomfort in 46% of patients.[17] Study from Korea showed fever as the main complication in 6.8% of patients followed by abdominal pain in 3.7 %. [14]Discrepancy might also be due to difference in subjective parameters among observers and lack of uniform assessment tools. Among them one patient was found to be having mesenteric vein thrombosis. Another study from Bangkok also found mesenteric emboli in 1 patient similar to our study. [17] Post Glue ulcer was seen in 12.5% of patients. It was higher in the same study from Thailand in nearly 38% of patients. [17] Studies have shown fever as one of the major complications of post glue injection. A study from Glasgow (UK) found fever as complication in 6% of patients. However there were no other complications expect fever. [21] There were no documented cases of fever in our study. In our study 66.7% of patients did not have any complications. Hence Cyanoacrylate Glue injection is a good option for treating bleeding fundal varices. It gives confidence on the treating physicians that few complications are seen with glue injection and are self-subsiding or needing minor conservative management. However proper precautions and case selection is must in preventing any untoward complications. Limitations of study included small sample size, study in one center only and lack of long term follow up. Also, we did not encounter very large varices which might benefit from EUS guided coiling which is currently not available in Nepal. Hence a study with large sample size with variety of patients and long term follow up is recommended.

CONCLUSIONS

N-butyl-2-cyanoacrylate (NBCA) also called Glue injection for bleeding gastric varices is highly effective even with a single session hence highly recommended for treatment. Minor complications of abdominal pain and post glue ulcer can be present.

CONFLICT OF INTEREST

None

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None

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