Original Article

# Glue therapy for bleeding gastric varices: a single tertiary center experience in Nepal

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**Abstract**

**Introduction:** Bleeding is a common presentation in the Department of Gastroenterology, Institute of Medicine, Tribhuvan University Teaching Hospital. Of the varied causes of upper gastrointestinal bleed, bleeding gastric varices pose a major challenge to the endoscopist and the treating physician. Endoscopic injection of N-butyl-2-cyanoacrylate is the standard of care for treating gastric varices at present.

**Methods:** We retrospectively evaluated the efficacy and safety of cyanoacrylate in patients presenting with gastric variceal bleed. Between May 2016 to April 2017, 25 patients (14-M, 11-F) who presented to Institute of Medicine, Tribhuvan University Teaching Hospital with gastric variceal bleeding underwent endoscopic treatment with N-butyl-2-cyanoacrylate.

**Results:** Eleven patients had cirrhosis secondary to alcohol, 9 had non-cirrhotic portal hypertension, cirrhosis due to hepatitis B-1, hepatitis C-1, NASH-1, and cryptogenic- 2. Child-Pugh score at presentation for patients was Child A–52 %; Child B–36 % and Child C–12. %. Successful hemostasis, rebleeding rate and complications were reviewed. Immediate hemostasis was observed in 100 % of the cases and early rebleeding rate of 8 % was seen in 2 patients. Complications included post procedure pain 16%, fever 16% and pulmonary embolism 4 %.

**Conclusion:** N-butyl-2-cyanoacrylate is an effective, lifesaving modality for immediate hemostasis of gastric variceal bleeding with an acceptable rebleeding rate.

**Keywords:** N-butyl-2-cyanoacrylate; endoscopic injection; gastric variceal bleed.

## Introduction

Bleeding is a common presentation in the Department of Gastroenterology, Institute of Medicine, Tribhuvan University Teaching Hospital. Of the varied causes of upper gastrointestinal bleed, bleeding gastric varices pose a major challenge to the endoscopist and the treating physician. Gastric varices(GV) are less common than esophageal varices(EV), occurring in about 20 % of the patients who have portal hypertension[1]. Gastric varices are classified according to the Sarin classification[2] as depicted in figure-1.

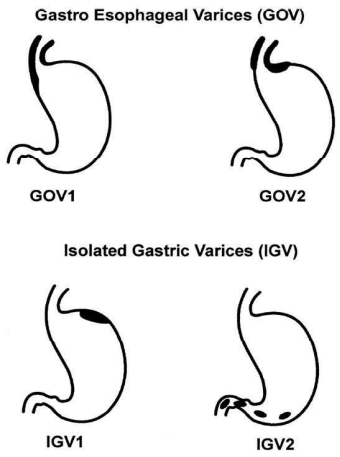



**Figure-1 : The Sarin classification of gastric varices[2]**

Bleeding from GV is less frequently than EV and there is a tendency for gastric varices to bleed at lower portal pressures[3]. Despite gastric varices bleeding (GVB) less frequently than EV, typically, GVB is more severe, more difficult to control, re-bleeding is more common and mortality is higher[4]. Risk factors for gastric variceal hemorrhage include size of fundal varices (large [> 10 mm] > medium [5–10 mm] > small [< 5 mm]), presence of localized reddish mucosal spots or areas on the surface of the GV at endoscopy and Child class (C > B > A).[5] GV are much more common in patients with noncirrhotic portal hypertension and extrahepatic portal vein obstruction.[6]

Gastric variceal obturation (GVO) with the tissue adhesive, *N*-butyl-2-cyanoacrylate, is considered the treatment of first-choice for this condition in most parts of the world due to its cost effectiveness and efficacy of outcome. The liquid monomer polymerizes into a rock hard substance forming a solid cast, obturating the vessel within 10–20 s of coming in contact with ionic solutions such as blood. Gastric variceal obturation achieves hemostasis in over 90% of patients with active bleeding, eradicates GV in over 80% of these patients, and re-bleeding occurs in 3–30% [7].

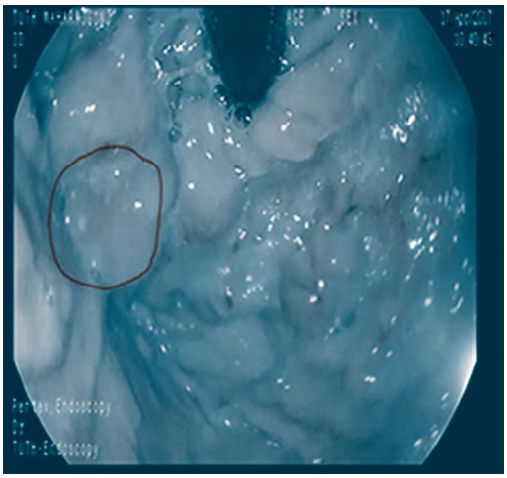
## Methods

This was a retrospective study which evaluated the efficacy and safety of cyanoacrylate in patients presenting with gastric variceal bleed. Between May 2016 to April 2017, a total of 25 patients (14-M, 11-F) who presented to IOM-TUTH with gastric variceal bleeding underwent endoscopic treatment with N-butyl-2-cyanoacrylate.Informed and written consent was obtained from each patient.

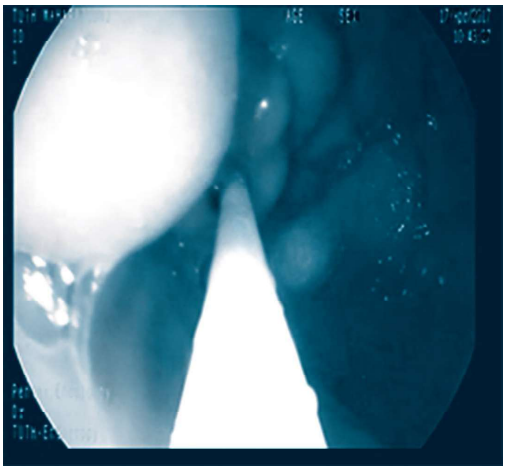
Baseline assessment included a thorough medical history and full clinical examination. A complete panel of laboratory studies, including complete blood count, liver and renal functions, abdominal ultrasound were performed for all patients. Abdominal Doppler study and CT portogram were performed when indicated. Etiological diagnosis was made with clinical, laboratory and radiolological study. The severity of liver disease was assessed using Child-Pugh classification based on patients' clinical and laboratory data (ascites, HE, serum albumin and bilirubin, and prothrombin time).

Upper GI endoscopy (UGIE) was performed for all patients with Pentax EG-290Kp Videoscope to verify the presence of bleeding gastric varices, following which 1-1.5 ml of N-butyl-2-cyanoacrylate was injected via a 21 gauge disposable steel-hubbed sclerotherapy injection needle. Cyanoacrylate was injected in 1 to 1.5mL aliquots by using sterile water about 1.0 mL to flush the glue into the varix. Additional glue was injected if required until the varix was hard to palpation. Gastric varices were classified according to the Sarin classification[2].

Initial hemostasis was defined by the presence of stable vital signs and the absence of bleeding within 48 h after treatment. Rebleeding was defined either as active bleeding from treated varices seen during endoscopy or occurrence of hematemesis and/or melena associated with a decrease in hemoglobin of >2 g/dL or associated with hemodynamic instability. Complications included fever (temp>38°C), lung effusion, pulmonary embolism, cerebral infarction, septicemia and aspiration pneumonia.



**Picture: A- White nipple sign on a recent GOV-2.**



**Picture: B- Cyanoacrylate being injected in to the varix.**

### Statistical analyses

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD and results on categorical measurements are presented in Number (%). The chi-square test was used for nominal variables. *P* values of less than 0.05 were considered statistically significant. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) release 18 for Windows (SPSS, Inc., Chicago, IL). Microsoft word was used to generate tables.

## Results

The present study included 25 patients with gastric variceal bleeding who were admitted in Department of Gastroenterology at Tribhuvan University, Institute of Medicine (TU, IOM) the data was collected during the period of May 2016 to April 2017. Out of 25 patients with bleeding gastric varices 56% were males and 44% were females. The mean age of patients was 37.36 ± 15.8 years with range 13-71years. Among the total patient, etiology for gastric varices was found to be alcoholic cirrhosis -44 %, Non-cirrhotic portal hypertension-36%, cirrhosis due to hepatitis B- 4%, hepatitis C-4%, cryptogenic-8% and NASH-4% as shown in Table 1. None of the patients had undergone prior surgery before the intervention.

Mean hemoglobin (Hb) was 8.7 ± 1.6, Prothrombin time (PT) was 18 ± 4.6. Only 28% of the patients required transfusion for hemodynamic stabilization. Most of the patients presented with hematemesis and melena-76%, isolated hematemesis- 16% and only melena- 8%. Among these patients, 5 (20. %) had active bleeding (spurting or oozing) and 20 (80 %) had high-risk stigmata of recent variceal bleeding, including red wale spots, adherent clot or a nipple sign on a gastric varix .

The location of gastric varices was determined according to the Sarin classification of gastric varices. GOV1 were detected in 8 patients (32 %), GOV2 in 13 (52 %), IGV1 in 4 (16 %) and IGV2 was not detected - Table 1. 21 (84%) patients had concomitant esophageal varices of which 13(52%) underwent endoscopic variceal ligation.

**Table 1: Clinical Characteristics of patients with bleeding gastric varices**

| Characteristics | N (%); mean ± SD/ median (range) |
|---|---|
| Patients | 25 |
| Male/ Female | 14(56%) /11(44%) |
| Age in years | 37.36 ± 15.8 |
| Hb at presentation | 8.7 ± 1.6 |
| **Etiology of gastric Varices** | |
| Alcoholic cirrhosis | 11(44 %) |
| Non-cirrhotic portal hypertension | 9 (36%) |
| Cirrhosis due to hepatitis B | 1 (4%) |
| Cirrhosis due to hepatitis C | 1 (4%) |
| NASH induced cirrhosis | 1 (4%) |
| Cryptogenic cirrhosis | 2 (8%) |
| **Bleeding Status** | |
| Active Bleeding | 5 (20%) |
| Recent Bleeding | 20 (80%) |
| **Child Pugh Classification** | |
| Child A | 13 (52%) |
| Child B | 9 (36%) |
| Child C | 3 (12%) |
| **Gastric Varices classification** | |
| GOV1 | 8 (32%) |
| GOV2 | 13 (52%) |
| IGV1 | 4 (16%) |
| IGV2 | 0 (0%) |

Outcome of treatment: The overall success rate for achieving initial hemostasis with N-butyl-2-cyanoacrylate was 100 %, without recurrent bleeding within 48 h. Rebleeding occurred in 2 (8 %) patients after 48 h for which secondary hemostasis with cyanoacrylate was done. Primary hemostasis failure and rebleeding were statistically independent of CTP class (p=0.145) and sub-types of gastric varices (p=0.752). Complications of the procedure were seen in 6 patients (24 %), which were post procedure pain in 16%, pyrexia (>38°C) in 16 % and pulmonary embolism in 4 % .

## Discussion

Approximately 20 % of patients with portal hypertension will experience variceal bleeding within 2 years after diagnosis. In about 20 % of the cases, the source is from gastric varices, with a higher bleeding incidence for fundal varices. As compared with esophageal varices, gastric varices represent a major therapeutic challenge due to their location, size, more severe course, and worse outcomes. As described by Kim et al.[5], size of the gastric varix > 5mm, advanced Child–Pugh class and the presence of a red spot were associated with an increased risk for a first bleed. The Baveno VI Consensus Workshop recommends endoscopic therapy with tissue adhesive N-butylcyanoacrylate acute bleeding from isolated gastric varices (IGV) and those gastroesophageal varices type 2 (GOV2) that extend beyond the cardia [8].

In this study, we report results that support the safety and efficacy of GV cyanoacrylate injections. The rate for primary hemostasis i.e. successful control of acute gastric variceal bleeding with cyanoacrylate injection was 100% which is comparable to or better than that in most series of patients treated with cyanoacrylate with the reported rate of between 70 % to 100 % [9-10 11].

The overall rebleeding rate was 8 % which is also comparable to rebleeding rates in most series of patients treated with cyanoacrylate with the reported rate of between 11 % to 27%[11-14]

Minor endoscopic related complications from cyanoacrylate injection were fever and abdominal discomfort. Though major fatal complications, usually associated with glue embolism have been described.[15-16] In our patients, fatal complications were not seen- which could have been due to the use of undiluted cyanoacrylate as well as due to small volume instillation.

## Conclusion

Our study showed that N-butyl-2-cyanoacrylate is an effective, lifesaving modality for immediate hemostasis of gastric variceal bleeding with an acceptable rebleeding rate. There were several limitations of our study firstly it being a retrospective study with small number of patient. The results of this study cannot be projected for the large group of general population. Hence further large prospective studies are required to better understand the use of cyanoacrylate in bleeding gastric varices in Nepalese population.

## Conflicts of interest: None declared

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