



## N-Butyl Cyanoacrylate

### Abstract

### Efficacy of Transcatheter Arterial Embolization with N-Butyl Cyanoacrylate in Acute Bleeding Patient

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**Background:** N-Butyl Cyanoacrylate (NBCA) is a liquid embolic material that can be useful for transcatheter arterial embolization (TAE) of acute bleeding especially in patients with coagulopathy, because it does not depend on coagulation for its therapeutic effect. The aims of this study were to evaluate the clinical efficacy and safety of TAE with NBCA in acute bleeding patients.

**Methods:** Between August 2003 and September 2004, TAE using NBCA for acute bleeding was performed in 23 patients (16 men, 7 women; mean age, 56.5years). The causes of bleeding were gastric ulcer (n=5), post-operative bleeding (n=4), post-biopsy bleeding (n=3), postpartum bleeding (n=3), duodenal ulcer (n=2), angiodysplasia (n=2), gastric lymphoma (n=1), iatrogenic injury (n=1), CMV gastritis (n=1), stab injury of the liver (n=1). TAE was performed using 1:3 mixtures of NBCA and iodized oil. The angiographic and clinical success rate, recurrent bleeding rate, procedure-related complication and clinical outcomes were evaluated.

**Results:** The angiographic and clinical success rate was 100% and 91.3% (21/23), respectively. There was no serious ischemic complication. Recurrent bleeding occurred in 2 patients (8.7%) and they were managed with successful second TAE (n=1) and endoscopic treatment (n=1). Nine patients (39.1%) had coagulopathy at the time of TAE and clinical success rate in this group of patients was 88.9% (8/9).

**Conclusions:** TAE with NBCA is highly effective and safe treatment modality for acute bleeding patients, especially when the patient has a coagulopathy.

**Key Words:** Hemorrhage, Therapeutic embolization, Cyanoacrylates

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 , (Postpartum bleeding) 3 ,  
 (Duodenal ulcer) 2 ,  
 (Angiodysplasia) 2 , (Gastric lymphoma)  
 1 , (Iatrogenic injury) 1 , CMV

(CMV gastritis) 1 , (Stab injury of the  
 liver) 1 .  
 (Left gastric  
 artery) 6 , (Hepatic artery branch) 4  
 , (Uterine artery) 3 ,  
 (Gastroduodenal artery) 2 ,  
 (Ileocolic artery branch) 2 , (Deep  
 femoral artery) 1 , (Great pancreatic  
 artery) 1 , (Short gastric artery) 1 ,  
 (Superior rectal artery) 1 ,  
 (Middle colic artery) 1 , (Inferior epi-  
 gastric artery) 1 가  
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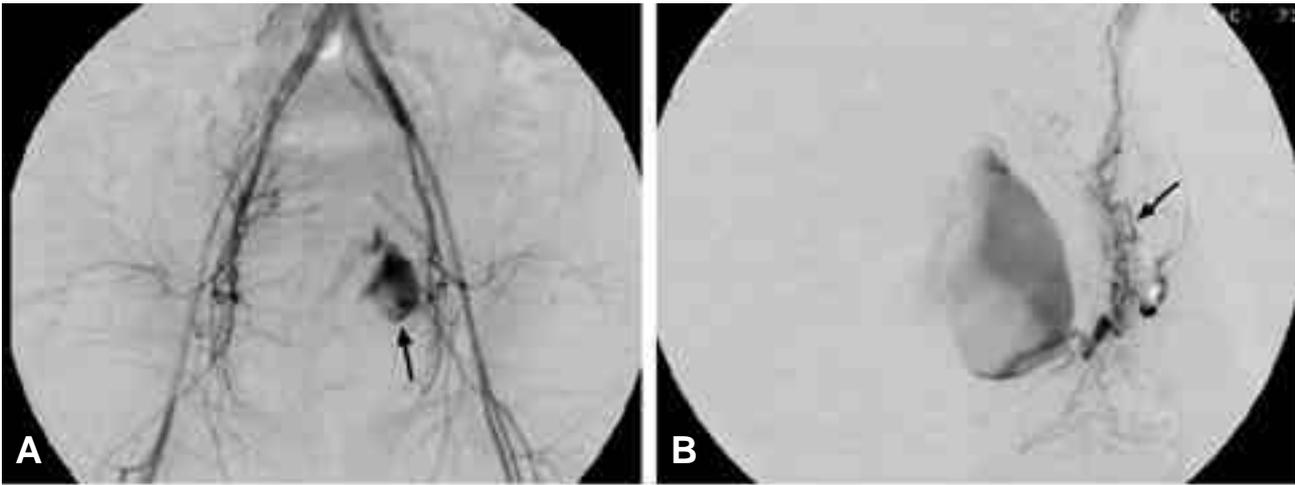
3. (2,7,8).  
 가 NBCA 100%  
 91.3% (21/23) , 2 (8.7%)  
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 (prothrombin ratio) 1.5 ,  
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 45 80,000/μL 가 39.1% (9 )  
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**Table 1.** Clinical data of 23 patients who underwent embolization with NBCA mixture

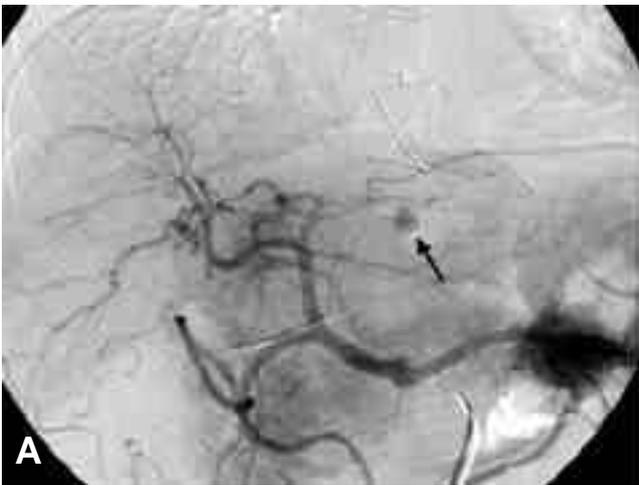
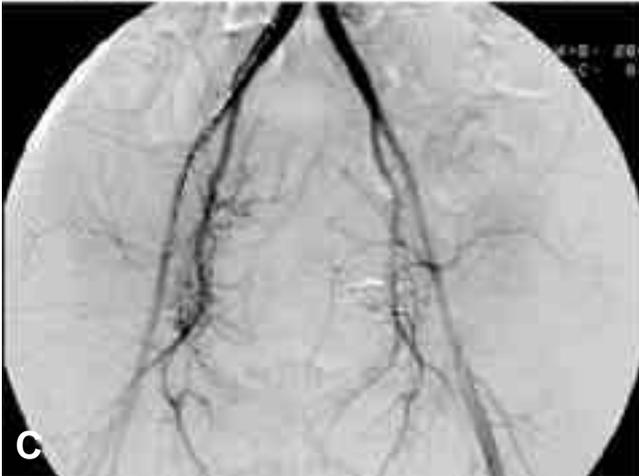
No	Age/ Sex	Underlying condition	Coagul- -opathy	Embolized artery	Reble- -eding	Follow-up
1	63/M	Stab injury of the liver	No	Hepatic artery branch	No	Discharged
2	58/F	LT, post-biopsy bleeding	No	Hepatic artery branch	No	Discharged
3	52/M	ESRD, DU	No	Gastroduodenal artery	No	Discharged
4	74/M	CVA, GU	No	Left gastric artery	No	Discharged
5	64/M	RCC, post-op. bleeding	No	Sup. rectal artery	No	Discharged
6	70/M	DM, GU	No	Left gastric artery	No	Discharged
7	35/F	Postpartum bleeding	No	Uterine artery	No	Discharged
8	19/M	Angiodysplasia	No	Ileocolic artery branch	No	Discharged
9	78/M	LC, angiodysplasia	Yes	Ileocolic artery branch	No	Discharged
10	31/F	Postpartum bleeding	No	Uterine artery	No	Discharged
11	55/M	AGC, post-op. bleeding	Yes	Middle colic artery branch	No	Discharged
12	49/F	LC, iatrogenic injury	Yes	Inferior epigastric artery	Yes	Discharged
13	57/M	Pseudomyxoma peritonei, post-op. bleeding	Yes	Great pancreatic artery	No	Discharged
14	82/M	Aplastic anemia, GU	Yes	Short gastric artery	No	14 days: death, cerebellar infarct
15	60/F	LT, DU	Yes	Gastroduodenal artery	No	49 days: death, septic shock
16	51/M	LT, CMV gastritis	No	Left gastric artery	No	57 days: death, septic shock
17	39/M	Hemangioma, post-op. bleeding	No	Muscular branch of deep femoral artery	No	Discharged
18	66/M	LT, post-biopsy bleeding	Yes	Hepatic artery branch	No	Discharged
19	29/F	Postpartum bleeding	Yes	Uterine artery	No	Discharged
20	72/F	Gastric lymphoma	No	Left gastric artery	No	Discharged
21	57/M	Hepatic tuberculosis, post-biopsy bleeding	Yes	Hepatic artery branch	No	Discharged
22	78/M	Chronic pancreatitis, GU	No	Left gastric artery	Yes	Discharged
23	61/M	GU	No	Left gastric artery	No	Discharged

LT, liver transplantation; ESRD, end stage renal disease; DU, duodenal ulcer; CVA, cerebrovascular accident; Gu, gastric ulcer; LC, liver cirrhosis; AGC, advanced gastric cancer

88.9% (8/9) . 3  
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**Fig. 1.** Twenty-nine year old female presented with postpartum bleeding. She had a coagulopathy. Pelvic aortography shows massive extravasation (arrow) of contrast media from left uterine artery (A). Left uterine artery was catheterized with microcatheter, but the microcatheter could not reach the bleeding focus and there was another inflow tract from left ovarian artery (arrow) (B). NBCA was used for effective embolization of both inflow tracts by single injection. Post-embolic angiography shows the successful embolization of the bleeding focus(C).



**Fig. 2.** Sixty-three year old male presented with stab injury in the liver. Celiac angiography shows a pseudoaneurysm (arrow) in the left hepatic lobe (A). Successful embolization with NBCA mixture was performed and the pseudoaneurysm is not seen any more on the postembolic angiography (B).

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9 (39.1%)

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