

1

2

3

:

: 2001 9 2002 5

10

가 7 , 가 3  
2

52 (40 - 77) . 3

가

5 - F

5% ethanolamine oleate - lipiodol

4

. 1 - 4 3

, 8

가

: 10 9

1

가

8

3

1  
3

. 1  
3

: 가

가

가 1

가 Sarin (1)  
45%

(2). Sanyal (3)

(Transjugular intrahepatic portosystemic  
shunt)

가

(4 - 6).

가

1  
2  
3

2002 9 3 2003 1 14

(7)

가 .

2001 9 2002 5

10

가 7 가 3

52 (40 - 77) .

. 3 2

(gastrorenal shunt)

가

가 가

Hashizum (8)

Lg - c,

Lg - f,

Lg - cf . Lg - c가 4 , Lg - f가 2 , Lg - cf

가 4 5

가 child A가

1 , child B가 4 , child C가 5 .

9 - F (Cook, Bloomington, IN, U.S.A.) 5 -

F Cobra catheter (Cook, Bloomington, IN, U.S.A.)

. 0.025 0.035 - inch

(Terumo, Tokyo, Japan) 5 6 -

F selecon balloon catheter (Clinical Supply, Gifu, Japan)

가

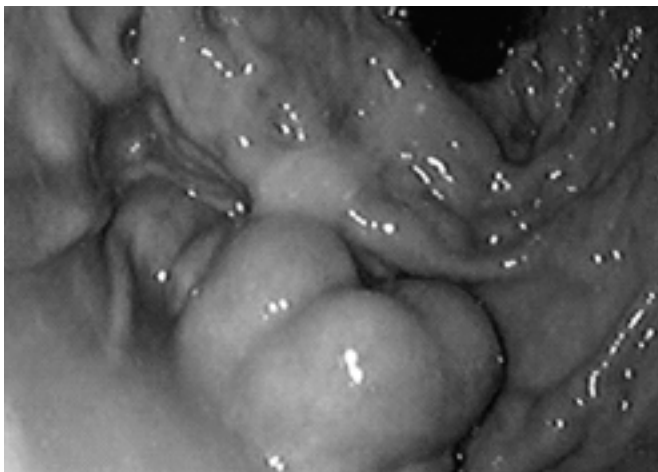
(Fig. 1).

9

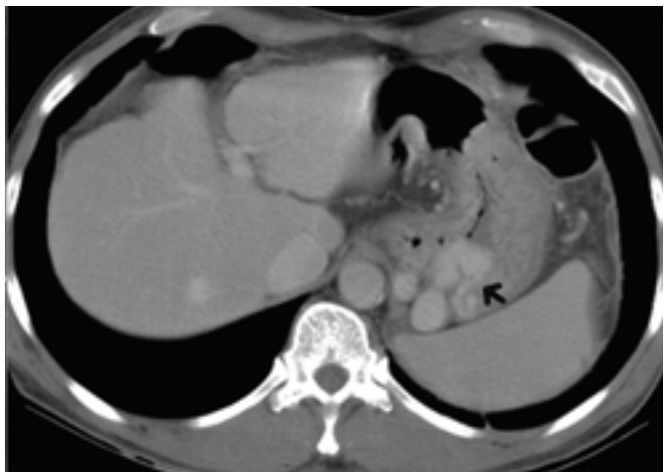
11 mm

1 20 mm 8 - F occlu -

sion balloon catheter (Boston Scientific, Watertown, MA, U.S.A.)



A



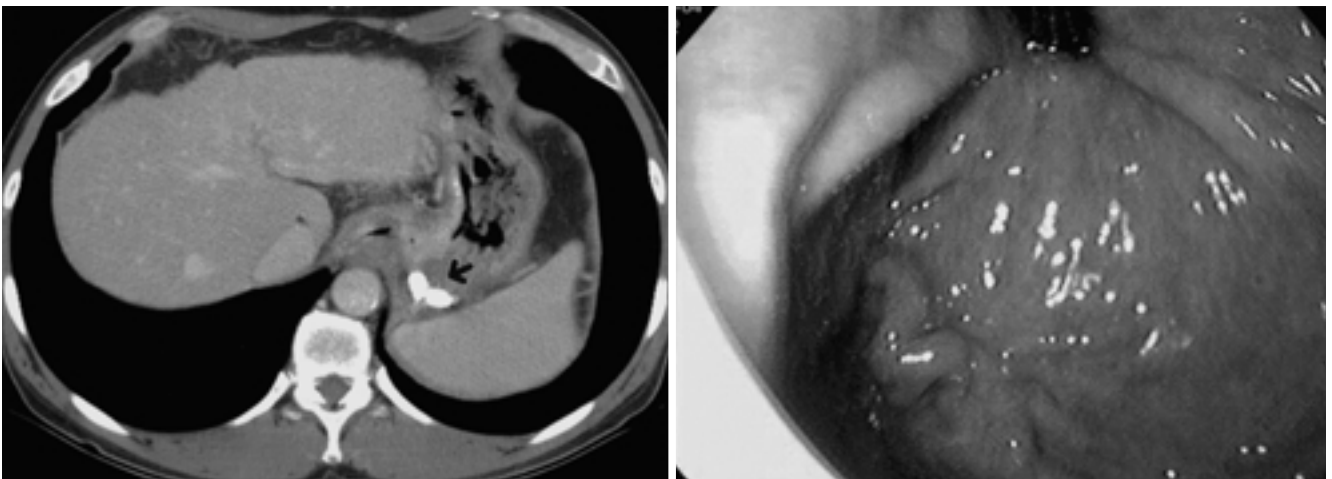
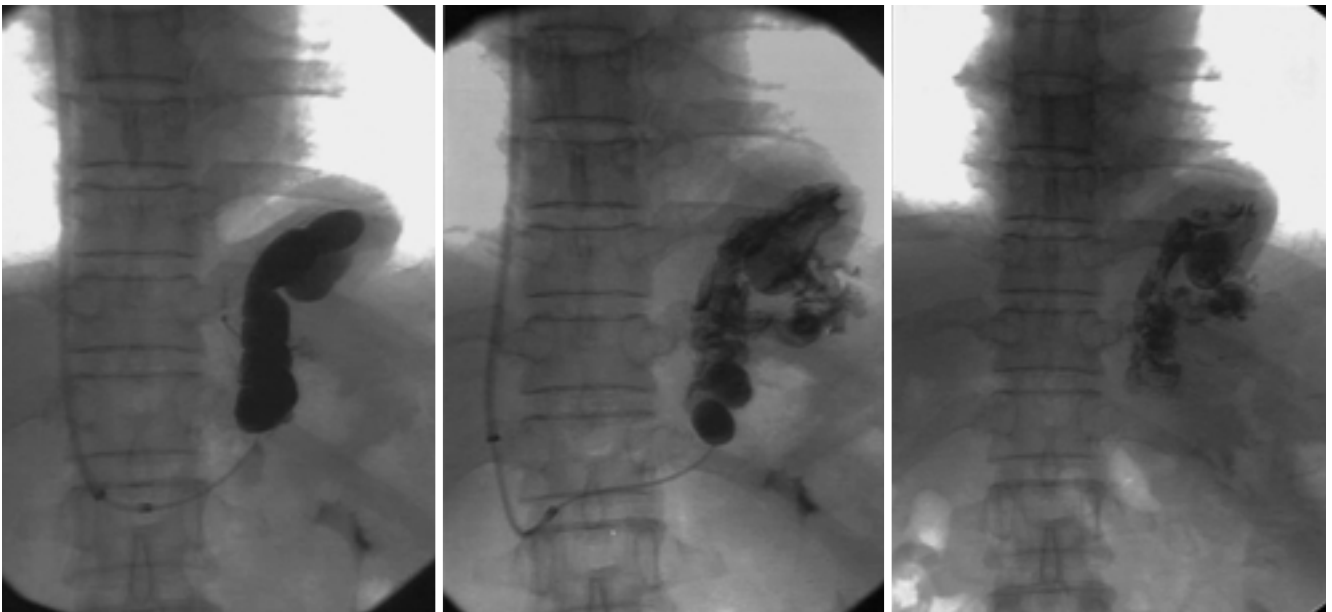
B



C

**Fig. 1.** A 49-year-old man with gastric variceal bleeding.  
**A.** Endoscopy on admission shows large gastric fundal varices (Lg-f).  
**B, C.** Contrast enhanced CT scan reveals large gastric fundal varices (arrow) and gastrorenal shunt (arrowhead).

가 , 가  
Hirota (6) 57가  
Grade 1,  
가 4 30 cc 30 cc 가 3  
Grade 2, 가  
Grade 3, 3 가  
Grade 4, 가  
Grade 5 . 1

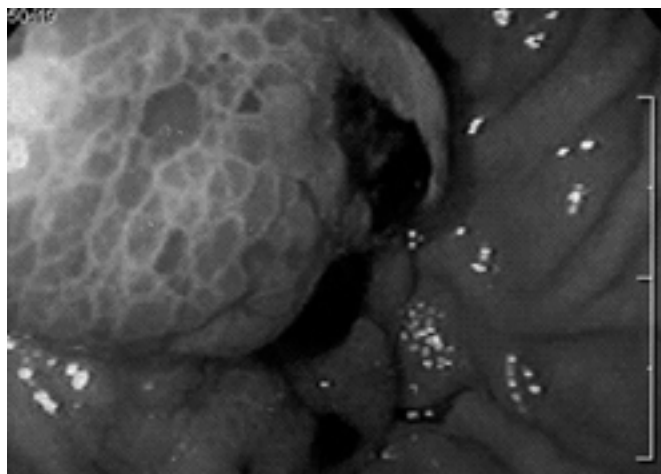


**Fig. 1.** D. Balloon-occluded left adrenal venogram shows large gastric fundal varices without collateral veins (Grade 1 gastric varices).  
E. Balloon-occluded retrograde transvenous obliteration was performed with 24 ml of the 5% ethanolamine oleate-lipiodol mixture for 2 hours.  
F. Simple radiograph after 1 day shows no evidence of lipiodol washout.  
G. Follow-up enhanced CT scan obtained 2 weeks after the procedure shows complete clot formation of gastric varices (arrow).  
H. Follow-up endoscopy obtained 4 months after the procedure shows marked improvement of gastric fundal varices.

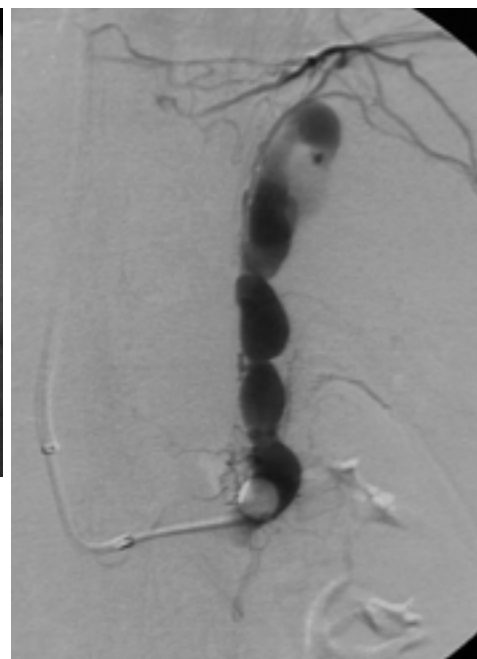
Grade 1, 5      Grade 2, 2      Grade 3, 2      Grade 4  
 4      . Grade 3      4      3 -  
 F Renegade microcatheter (Boston Scientific, Watertown, MA, U.S.A.)      3 mm      5 mm      (Cook, Bloomington, IN, U.S.A.)

가 (Fig. 2). 5% ethanolamine oleate ( , , ) lipiodol 5:1

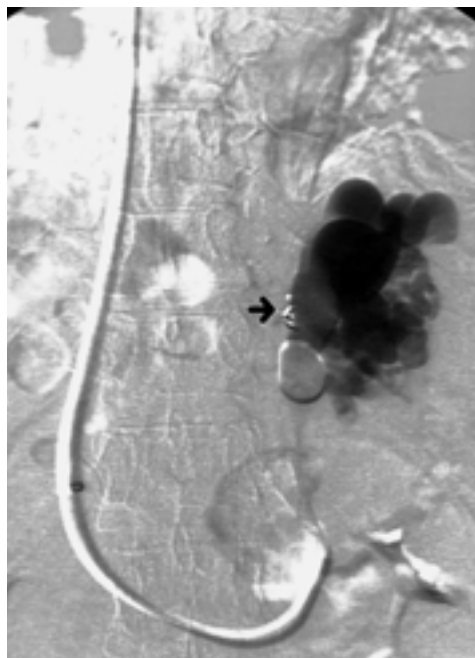
: 가 . 가 20 - 30 cc 30 cc . 1 - 2 가 가 가 가



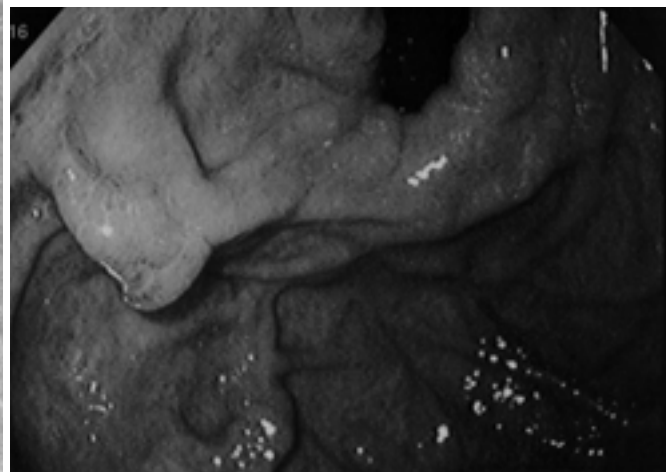
A



B



C



D

**Fig. 2.** A 53-year-old woman with gastric variceal bleeding.

**A.** Endoscopy on admission shows large gastric varices (Lg-cf) with presence of fresh blood.

**B.** Balloon-occluded left adrenal venogram reveals grade 3 gastric varices. There are few medium-sized collateral veins. The gastric varices are only partially visualized.

**C.** Balloon-occluded left adrenal venogram obtained after embolization of collateral veins with 5 mm coils (arrow) reveals complete visualization of gastric fundal varices.

**D.** Follow-up endoscopy obtained 4 months later shows marked improvement of gastric varices.

가  
1  
가  
5, 10  
가  
가  
(arterial oxygen saturation) 10 9 15  
5% ethanolamine oleate - 가  
lipiodol 5  
가  
1-4 3, 8 9 8  
6 4  
가 3 Grade 2 1  
lipiodol  
5% ethanolamine oleate - lipiodol  
가 lipiodol

**Table 1.** Clinical Data of Patients

Patient	Sex	Age	Underlying disease	Child's class	Hirota's grade	Endoscopic grade	Dose of sclerosing agent (ml)	Balloon size	Sclerosing time	Technical success	Clinical success	Worsening of EV (months)	Result (months)
1	M	48	LC	Child B	Grade 1	Lg-cf, EV	24	11 mm	2 hrs	yes	yes	yes (7)	Living (12)
2	F	53	LC with HE	Child C	Grade 3	Lg-cf	24	11 mm	2 hrs	yes	yes	yes (4)	Living (9)
3	M	51	LC	Child B	Grade 3	Lg-c	30	20 mm	1.5 hrs	yes	yes	yes (4)	Living (8)
4	M	53	LC with HCC	Child C	Grade 4	Lg-cf, EV	30	11 mm	2 hrs	yes	yes		Died (1)
5	M	43	LC with HE	Child B	Grade 4	Lg-c	30	11 mm	2 hrs	yes	yes		Living (8)
6	M	40	LC	Child A	Grade 2	Lg-f, EV	25	11 mm	1 hr	yes	yes		Living (7)
7	M	65	LC with HE	Child C	Grade 2	Lg-c, EV	30	11 mm	1 hr	yes	yes		Living (6)
8	M	41	LC with HCC	Child C	Grade 2	Lg-f, EV	30	11 mm	1.5 hrs	yes	yes		Living (4)
9	F	77	LC	Child C	Grade 2	Lg-c	20	11 mm	2 hrs	yes	yes		Living (4)
10	F	53	LC	Child B	Grade 2	Lg-cf	30	11 mm	15 min	no	no		Living (6)

HE = hepatic encephalopathy, HCC = hepatocellular carcinoma, EV = esophageal varix, hrs = hours, IPV = inferior phrenic vein.

**Table 2.** Laboratory Data before and after BRTO of Patients

Patient	Alb/Bil/GOT/ GPT <sup>a</sup> before Tx	Alb/Bil/GOT/GPT after Tx		BUN/Cr <sup>b</sup> before Tx	BUN/Cr after Tx		Ammonia <sup>c</sup> before Tx	Ammonia after Tx
		< 3days	> 1wk		< 1 wk	> 1 wk		
1	2.8/0.4/35/38	2.7/1.1/48/46	3.7/0.4/29/26	28.5/0.7	32.1/0.9	7.8/0.7		
2	1.8/1.2/45/40	2.2/2.3/85/45	3.0/1.3/54/33	35.9/0.7	15.2/0.6	12.5/0.6	69	19
3	3.0/1.3/49/36	3.0/4.5/198/128	3.0/1.3/50/42	30.3/1.4	33.6/1.4	14.0/1.1		
4	3.5/3.6/83/43	3.1/4.5/91/34	2.9/7.5/93/63	6.2/0.7	15.3/0.8	12.1/0.6		
5	3.2/1.1/35/38	2.6/1.6/39/37	3.7/0.6/31/29	19.4/0.6	22.0/1.0	7.2/0.7	68	26
6	3.5/1.2/50/49	2.9/2.3/53/36	3.5/1.0/29/25	23.0/0.8	16.6/1.0	13.4/0.8		
7	2.8/4.3/57/34	2.5/5.7/62/31	2.8/2.0/43/28	16.3/0.8	26.1/0.9	10.6/1.0	99	35
8	2.1/3.1/234/87	1.9/4.4/265/86	2.9/1.3/59/14	14.5/0.7	67.0/1.5	6.6/1.0		
9	1.9/1.8/51/16	2.1/7.9/97/57	2.8/2.6/43/21	38.0/1.7	72.0/1.7	18.0/0.8		

Tx = treatment.

<sup>a</sup>Alb = albumin(g/dl), Bil = total bilirubin(mg/dl), GOT = serum glutamate oxaloacetate transaminase(U/L), GPT = serum glutamate pyruvate transaminase(U/L). <sup>b</sup>BUN = blood urea nitrogen(mg/dl), Cr = serum creatinine(mg/dl). <sup>c</sup>Ammonia = serum ammonia(umol)

:

Lg - c,

9

. 1 -

Lg - f,

Lg - cf

. Obara (9)

Lg - f

78% 가

(Fig. 1). 1 - 4

, Lg - cf 63%, Lg - c 43% .

8

. 4

6

가

가

(1)

80%

(Fig. 1, 2).

9

가

가

가

5

가 1

가

1

7

가

(10).

(Fig. 1).

가

2

4

(Table

가

1).

50%

(3).

(portal perfusion)

AST, ALT, Albumin, Bilirubin

8

3

1

. 1

3

BUN, Creatinine

7

5

가

(2).

Oslon (11) ethanol

가

1

3

1984

80%

ammonia

(Table 2).

10

3

3

, 1

3

2

가

가

1

(12)

가

(13).

3

amonia

20%

가

가

(short gastric vein)

(posterior gastric vein)

가

가

가

Sarin (1)

20%

9%

30%

45%

(1).

Hashizum (8)

	ethanolamine oleate	0.5 ml/kg	
	(20).	Lee (17)	0.1
가	ml/kg 5% ethanolamine oleate	36	
	(14)		
	Oslen (11)	ethanolamine oleate가	
ethanol	ethanol		
	ethanol		10
Kanagawa (4)		9 (90%)	
ethanolamine oleate	Oho	9	
(15)	butyl	4	6
cyanoacrylate가	ethanolamine oleate		
	butyl cyanoacrylate		
가	ethano - lamine	2	가
oleate	Ethanolamine oleate		가 1
ethanol		7	
	Hirota (6)		가
가	ethanolamine oleate가	가	
	가		
	50% glucose solution 20 ml	가	
	50% glucose solution	가	가
가 가		가	
ethanolamine oleate			
iopamidol			
iopamidol	ethanolamine oleate		
lipiodol			
	0.6 ml/kg		
30 ml	Ethanolamine oleate		
(disseminated intravascular coagulopathy)			
(16 - 18). Ethanolamine oleate			
ethanolamine oleate가			
	(free hemoglobin)가		
	(renal tubular dysfunction)		
Ethanolamine oleate			
Hashizume (19)	haptoglobin		
(conjugation)			
	haptoglobin		
	haptoglobin		
1	macrohemoglobinemia	7	
	(adult respira -		
tory distress syndrome)	ethanolamine		
oleate			

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## Balloon-Occluded Retrograde Transvenous Obliteration for Gastric Variceal Bleeding patient<sup>1</sup>

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**Purpose:** To evaluate the technical feasibility and clinical efficacy of balloon-occluded retrograde transvenous obliteration (BRTO) in the treatment of gastric variceal bleeding.

**Materials and Methods:** Between September 2001 and March 2002, ten patients with gastric variceal bleeding and gastroduodenal shunt, underwent BRTO. Three of the ten also had hepatic encephalopathy. To evaluate the gastroduodenal shunt and exclude portal vein thrombosis, all patients underwent pre-procedural CT scanning. An occlusion balloon catheter was inserted from the right internal jugular vein and on ballooning was wedged into the left adrenal vein. A sclerosing agent (5% ethanolamine oleate-lipiodol mixture) was injected until the varices were completely filled. In four patients, the collateral veins seen at balloon-occluded adrenal venography were embolized with coils prior to sclerotherapy. Post-procedural follow-up CT ( $n=3$ ) or endoscopy ( $n=8$ ) was performed 1 - 4 weeks later, and both before and after the procedure, hepatic function was also monitored.

**Results:** Treatment was successful in nine cases: the failure involved rupture of the occlusion balloon during inflation, and a transjugular intrahepatic portosystemic shunt was performed. The cessation of bleeding was confirmed endoscopically or clinically; in three patients, follow-up CT showed complete obliteration of the varices. Hepatic function improved in eight patients, but three weeks after the procedure, one expired due to progressive infiltrative hepatoma. The clinical symptoms of the three patients with hepatic encephalopathy showed remarkable improvement.

**Conclusion:** Although more extensive studies and long-term follow up are needed to overcome the limitations of our study, we believe that BRTO is a technically feasible and clinically effective treatment for gastric varices and hepatic encephalopathy.

**Index words :** Stomach, varices

Bleeding, therapeutic blockade

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