

Short and long-term results of balloon-occluded retrograde transvenous obliteration for esophageal and gastric varices: A 12-year experience



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Introduction

Balloon-occluded retrograde transvenous obliteration (BRTO) is one of the interventional techniques for the treatments of gastric varices, and this method is developed and widely used in Japan.

BRTO involves two procedures; first, occlusion of blood flow into an outflow shunt such as gastro-renal shunts by an inflated balloon catheter, and second, injection of 5% ethanolamine oleate into gastric varices in a retrograde manner.

BRTO is a very useful treatment for gastric varices in terms of efficacy (success rate of 87-100%), safety, and less invasiveness, and the recurrence rate of gastric varices has been also reported to be 0% -10% after BRTO.

However, there are few reports that investigated about influence of liver function and hepatic encephalopathy before and after the BRTO procedures.

Purpose

Purpose of this study was to retrospectively evaluate the effects of BRTO, especially changes in liver function and encephalopathy.

Patients and Methods I

Patients

Between April 1998 and August 2009, a total of eligible 44 patients

(14 in the Child-Pugh A, 21 in the Child-Pugh B, 9 in the Child-Pugh C) suffering with portal hypertension or liver cirrhosis underwent BRTO procedures at our institution to treat their esophageal and gastric varices.

Additional procedures, percutaneous transhepatic obliteration, partial splenic embolization, and others, were used by necessity.

Table 1. Characteristics of patients about **liver function**

	Child-Pugh A	Child-Pugh B	Child-Pugh C
Number	14	21	9
Age (years)	64 (12-77)	64.5 (47-78)	58 (46-80)
Sex (male/female)	7/7	11/10	5/4
Etiology (HBV/HCV/alcohol/other)	0/5/3/6	2/12/1/6	0/6/1/2

Table 2. Characteristics of patients about **encephalopathy**

	encephalopathy
Number	17
Age (years)	68.06 (mean, 47-80)
Sex (male/female)	9/8
Etiology (HBV/HCV/archool/other)	1/10/0/6
blood ammonia	137.6(mean, 84-329)

Patients and Methods II

Data analysis

- 1) Changes in the Child-Pugh score before and after the B-RTO procedure in each group were statistically analyzed by means of (Wilcoxon's) signed rank test.
- 2) Change of encephalopathy before/after BRT0

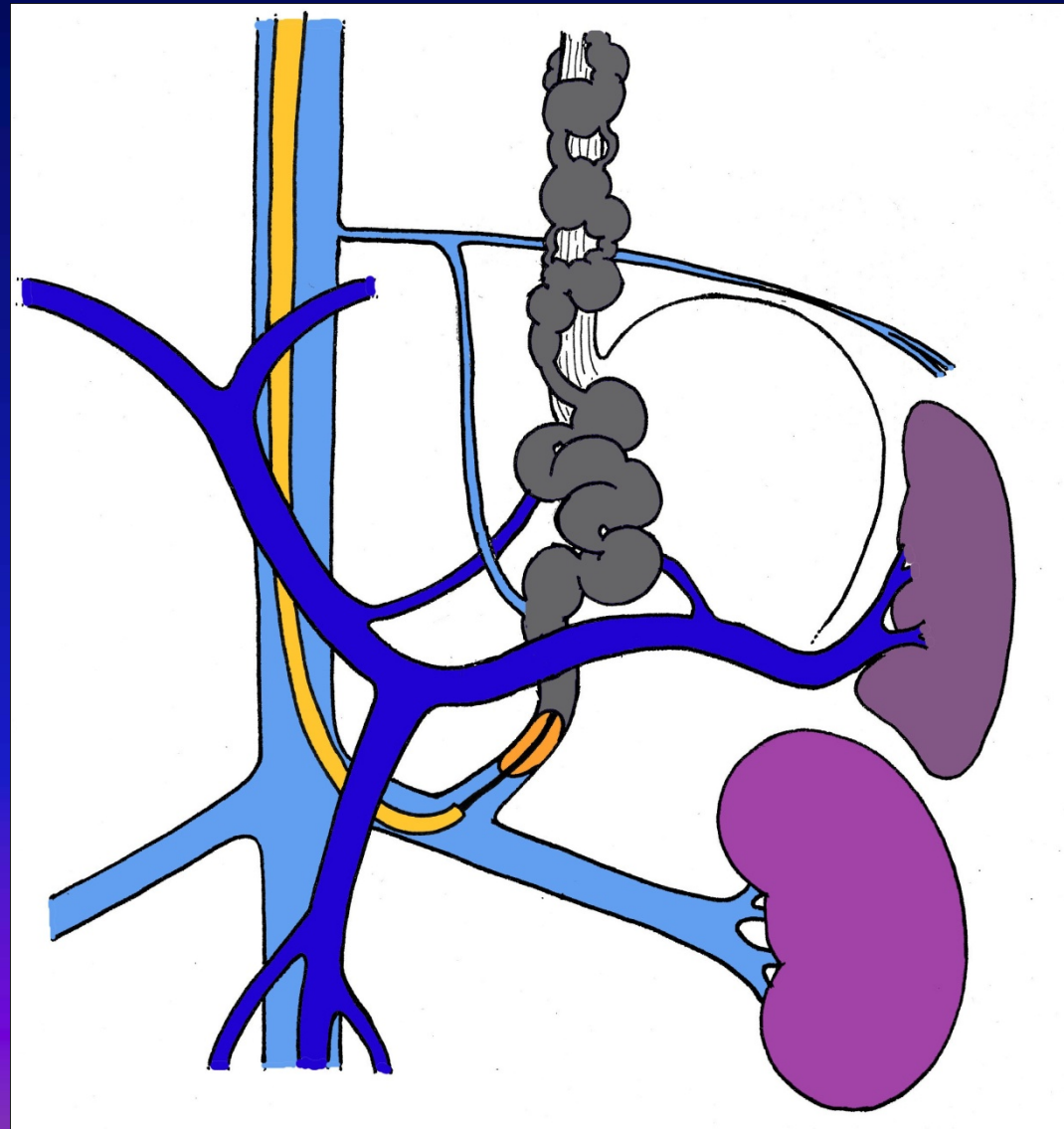
Standard B-RTO procedures

① 6-Fr balloon catheters is percutaneously inserted via the rt. internal jugular vein to the lt. adrenal vein.

② The balloon is inflated to occlude the gastro-renal shunt.

③ Under fluoroscopic guidance, an equal mixture of ethanolamine oleate (EOI) and contrast medium was slowly infused into the gastro-renal shunt until the vascular space in the gastric varices was opaque.

④ The balloons were kept inflated overnight, or more than 6 hours.

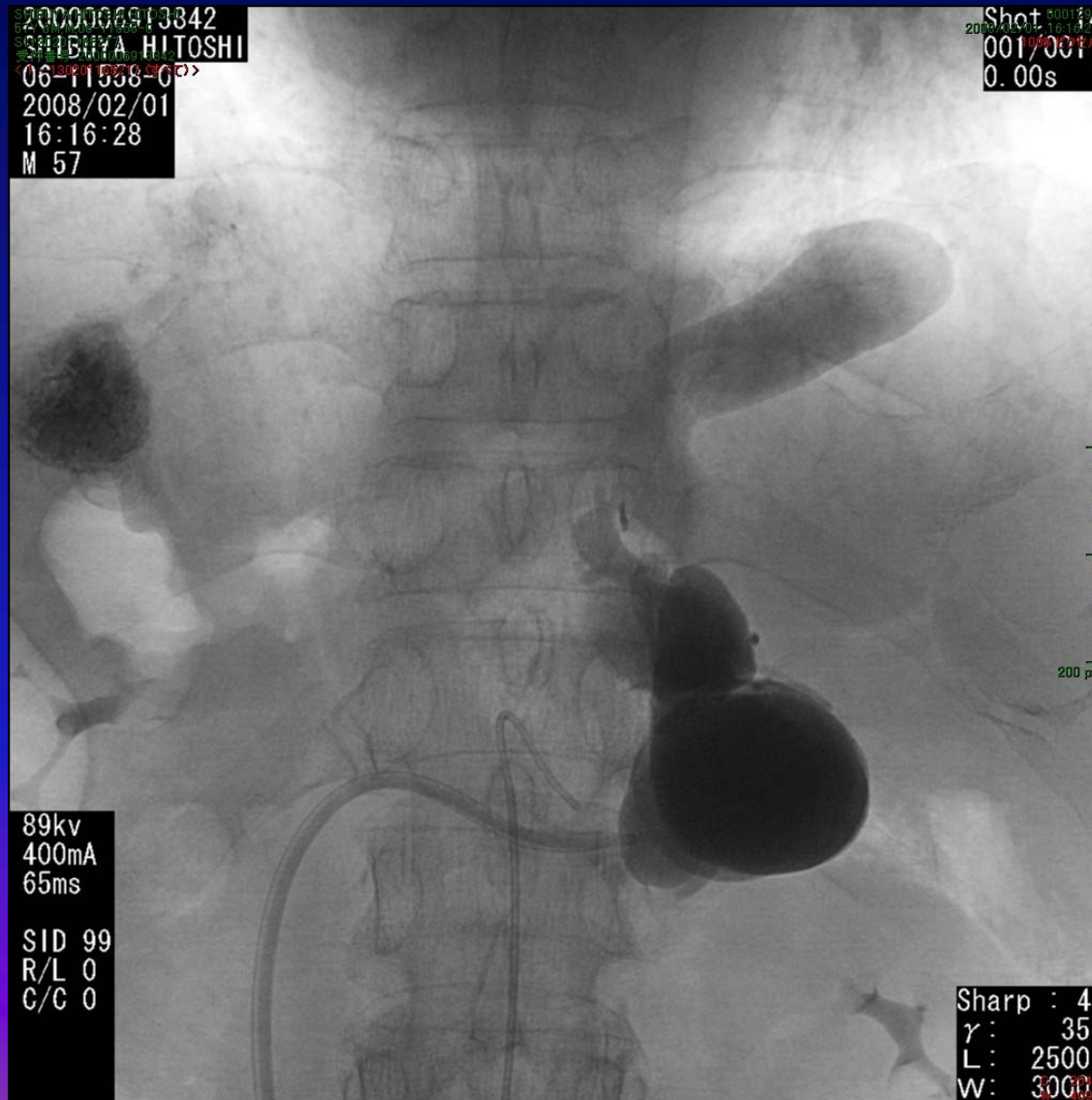


Case: A 57-year man with gastric varices

Superior mesenteric arteriogram demonstrates a hepatofugal portal venous flow via the left gastric vein into the left renal vein through tortuous dilated varices.



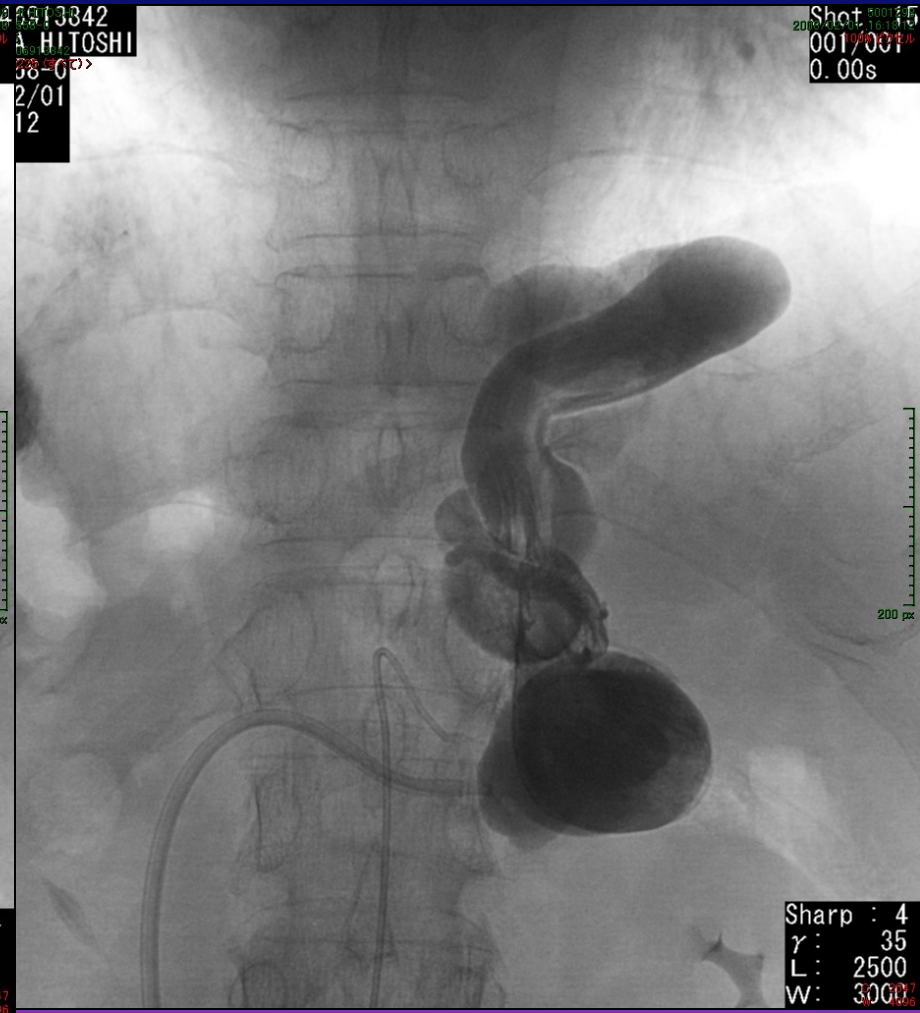
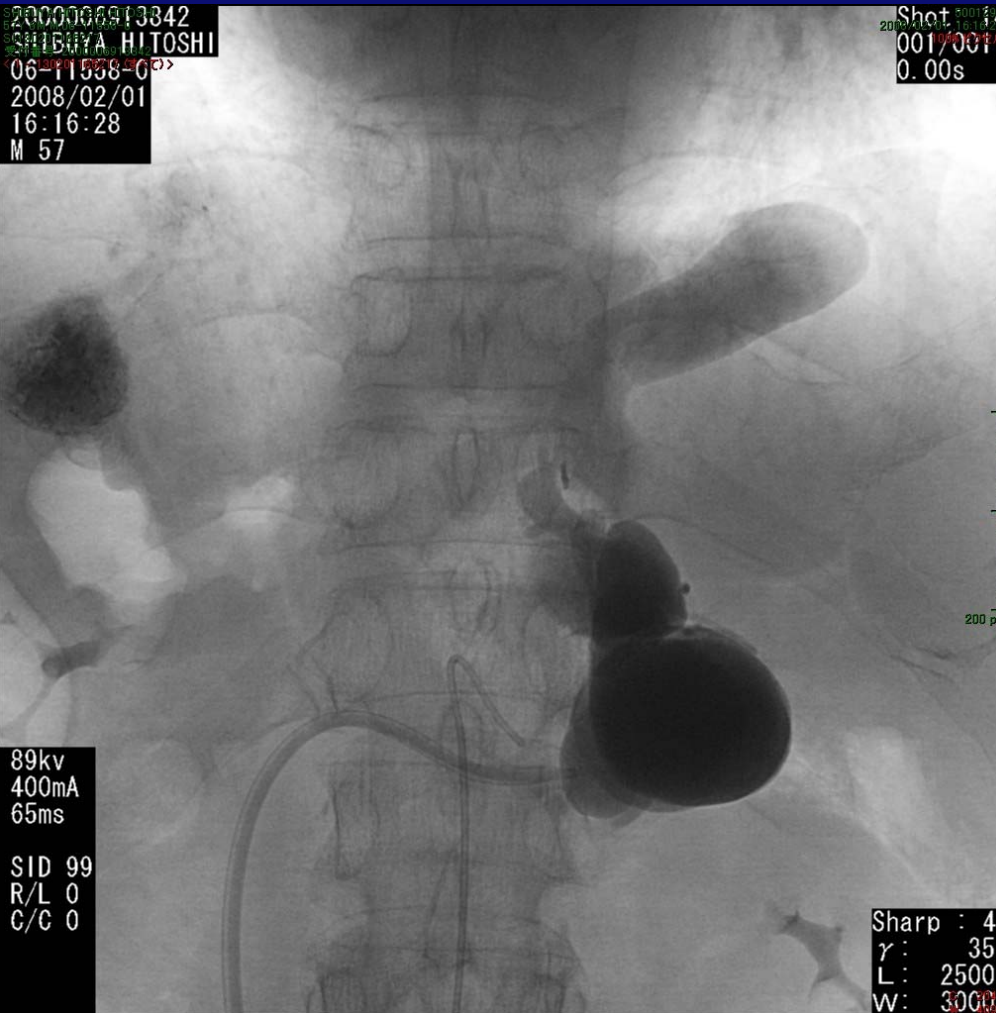
Balloon occluded retrograde venogram via the suprarenal vein shows the gastric varices.



Radiogram before and after injection of EOI

Balloon occluded retrograde venogram

Radiogram after injection of EOI



Results I

Liver function (Figure 1)

Ten of 14 (71.4%) patients with the Child-Pugh A maintain their score, but 4 of 14 (28.6%) patients were changed to Child-Pugh B.

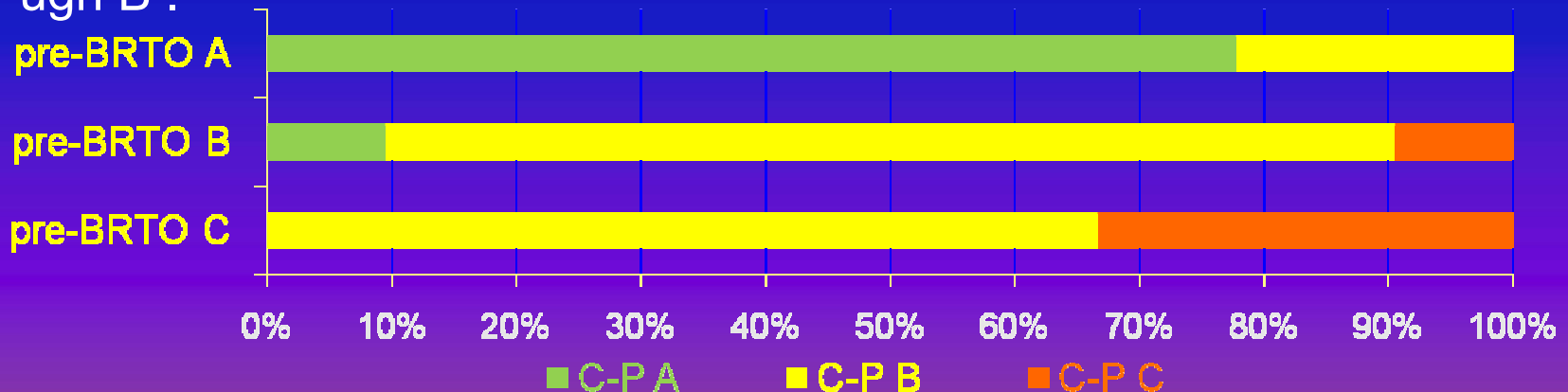
The patients with the Child-Pugh B score were changed to Child-Pugh A in 2 of 21 (9.5%) patients, unchanged in 17 of 21 (81.0%) patients, and was changed to Child-Pugh C in 2 of 21 (9.5%) patients.

Six of 9 patients (67 %) with the Child-Pugh C were changed to Child-Pugh B.

Statistically analysis

The Child-Pugh score was not significantly improved both in patients with the Child-Pugh A or B. However, it significantly ($P=0.028$) improved after the B-RTO procedures in patients with the Child-Pugh C, and got the Child-Pugh B.

Figure 1: Liver function changes before/after BRTO



Results II

2) Encephalopathy (Figure 2)

The change of encephalopathy before/after BRTO is shown in Figure 2.

There were 15 of 17 (88.2%) patients who were significantly ($P < 0.001$) improved.

The mean of blood ammonia could be decreased from 137.6 to 62.1.

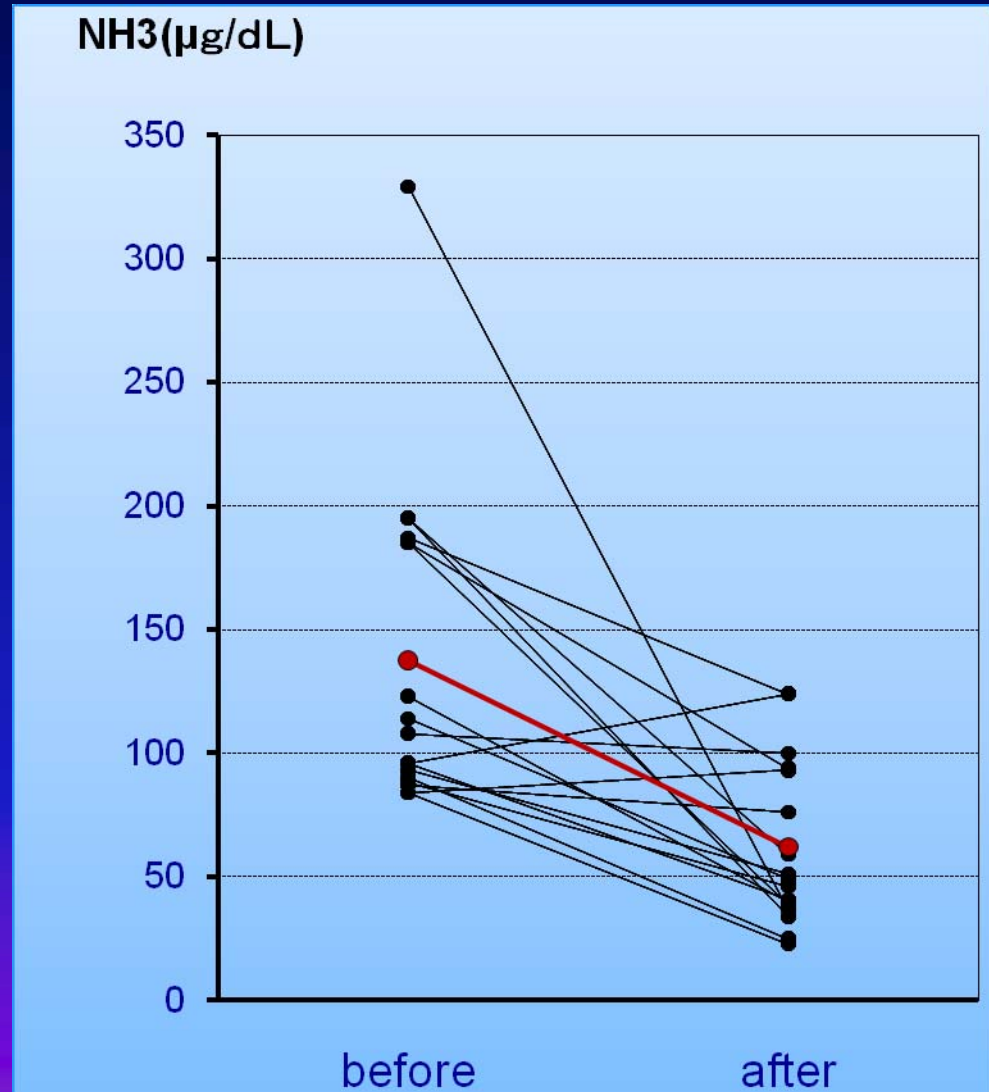


Figure 2: Change of blood ammonia before/after BRTO

Discussion

1) Liver function

The patients with Child-Pugh C were significantly improved

($p=0.028$) their Child-Pugh score after BRTO.

However, the patients with relatively mild liver dysfunction (Child-Pugh A or B) tended to be worse.

These results indicated that BRTO is significantly effective procedure in cases of severe liver cirrhosis in terms of improving liver function, but it notes careful attention to undergo the patients with mild liver cirrhosis.

To our knowledge, there have never been reported about BRTO related to liver function.

Discussion

2) Hepatic encephalopathy

Concerning hepatic encephalopathy we obtained clinical success rate of 88.2%.

This result indicated that BRTO can effectively control hepatic encephalopathy.

Conclusion

BRTO can effectively control hepatic encephalopathy, and improve liver dysfunction in cases of severe hepatic cirrhosis and hepatic encephalopathy.

However, we should care and attention that BRTO has possibility to exacerbate liver dysfunction in case of mild hepatic cirrhosis.



Thank you for your time and attention