



ADVANCING GI PATIENT CARE 2022

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APRIL 23–24, 2022
SOUTHLAKE, TEXAS



This activity is supported by an educational grant from Phathom Pharmaceuticals Inc., Ferring Pharmaceuticals Inc., Madrigal Pharmaceuticals, Merck & Co., Inc., Janssen Biotech, Inc., administered by Janssen Scientific Affairs, LLC, and Takeda Pharmaceuticals U.S.A., Inc.



A city skyline at dusk, featuring a prominent skyscraper illuminated in green. The sky is a mix of blue and orange, suggesting sunset or sunrise. The foreground is partially obscured by a large orange diagonal shape.

Variceal Bleeding, BRTO vs TIPS

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Disclosures



- Speakers Bureau: Gilead, Intercept, Salix
- Speakers Bureau: Madrigal
- Research (paid to institution): Allergan, Sagimet, Salix

Introduction



- Esophageal variceal (EV) bleeding is more common than Gastric variceal (GV) bleeding
- GV bleeding is associated with higher morbidity and mortality
- Management of GV bleeding has developed differently in the East (US) vs the West (Korea, Japan)
- Philosophies differ: decompress the portal system (TIPS) vs discrete management of the problem (BROTO)

Transjugular Intrahepatic Portosystemic Shunt (TIPS)

- Concept is one of creating a connection between the portal and hepatic venous systems
- First published in animals in 1979
- Data in humans began in Europe/US in 1989-90
- Early outcomes plagued by
 - Stent failure/occlusion
 - Hepatic encephalopathy
 - Effects on hepatic function
- Polytetraethylene (PTFE) covered stents 2003

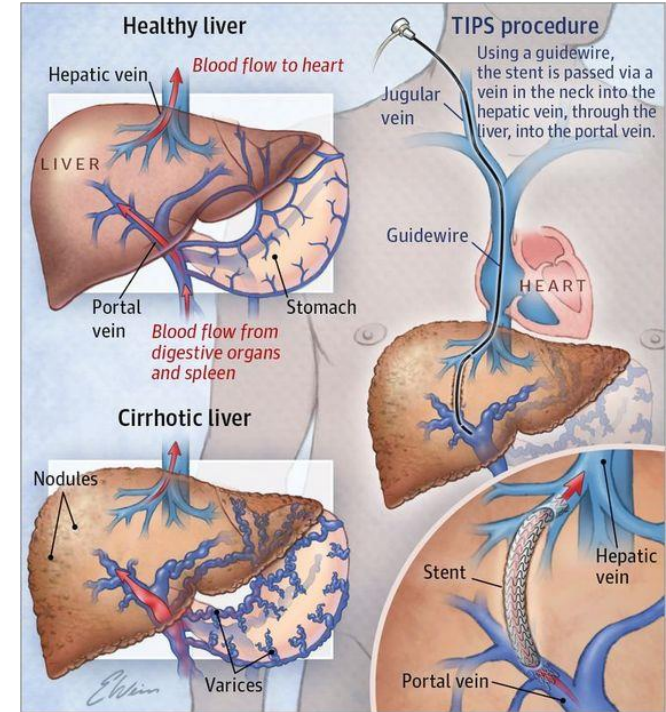
Burgener FA et al. *Rofo*. 1979;130(6):686–688; Burgener FA et al. *Rofo*. 1984;141(3):327–332; Burgener FA et al. *J Radiol*. 1985;66(1): 7–11; Sahagun G et al. *Am J Gastroenterol*. 1997;92(9): 1444–1452; LaBerge GM et al. *Radiology*. 1993;187(2):413–420; Angermayer B et al. *Hepatology*. 2003;38(4):1043–1050.

Balloon-Occluded Retrograde Transvenous Obliteration (BROTO)

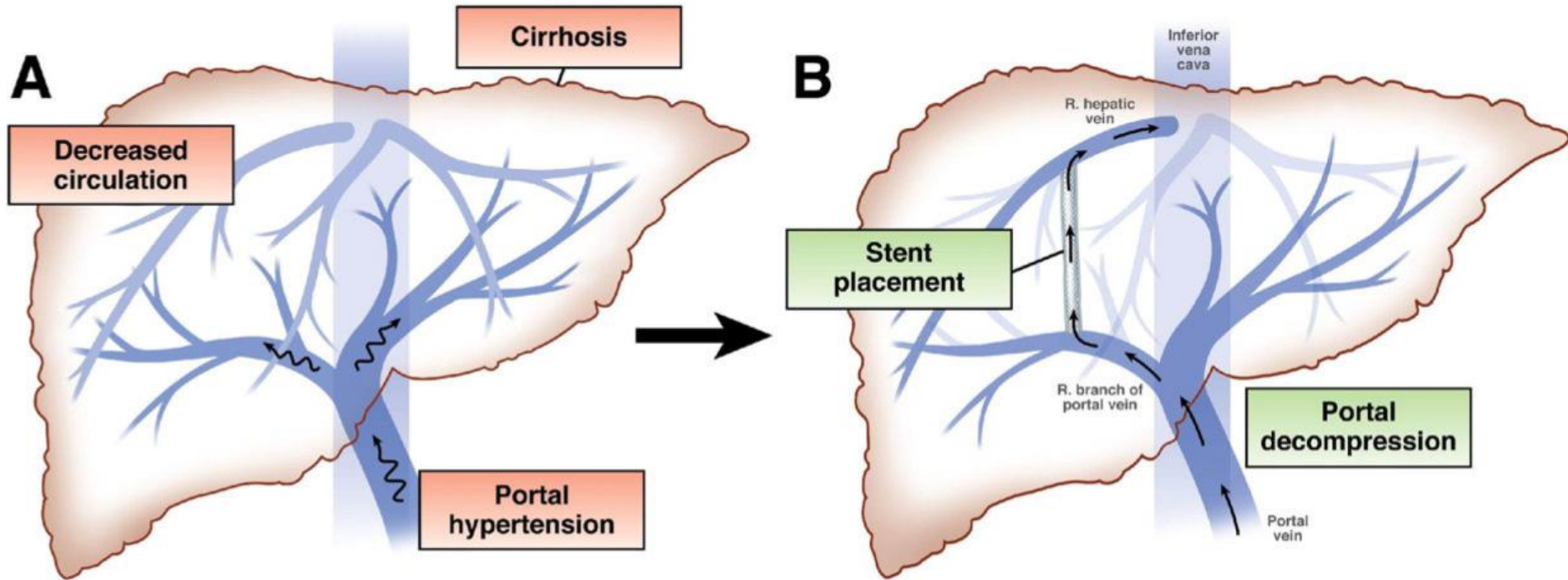
- First reported 1991-93 Kanagawa et al
- Occlusion of gastro-renal shunt
- Sclerosant (ethanolamine oleate)
- Delay to adoption in the US
 - Lack of antidote (haptoglobin)
 - Focus on decompression of portal venous system in treatment of bleeding varices

TIPS

- TIPS involves the creation of a channel between the hepatic vein and the intrahepatic portion of the portal vein
- The tract is kept patent by the deployment of an expandable metal stent across the connection
- Goal is to reduce portal pressure to <math><12\text{ mm Hg}</math>
- The result is a reduction in the portal pressures as blood can move directly back to the systemic circulation through the stent



TIPS



TIPS: Complications

- Hepatic encephalopathy
 - 15-67% in 2-year followup
 - Persistent overt HE 8%
 - Covert HE 35%
 - Risk reduced to 18% with use of 8mm PFTE (polytetraethylene) covered stents (vs 10 mm)
 - Prophylactic lactulose/rifaximin not recommended
 - Shunt diameter reduction/occlusion to treat
- Hepatic failure
- Worsening heart failure
- Thrombosis/Stenosis: up to 80% reduced with PFTE covered stents

TIPS Contraindications

Advanced liver disease (CP >11, Bili >5 mg/dL, MELD > 18)

Severe renal failure (Cr >3 mg/dL)

Heart failure

Pulmonary hypertension (mPAP > 45 mmHg)

Recurrent or persistent HE

Uncontrolled sepsis

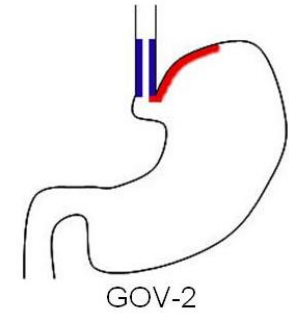
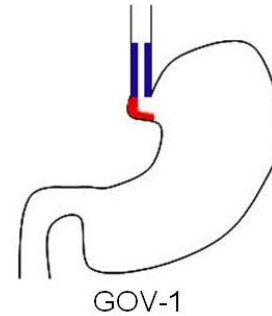
TIPS vs Medical Therapy to Reduce Risk of Bleeding from Esophageal Varices

- Meta-analysis of 12 studies
- 7 countries
- TIPS associated with
 - Reduced rate of rebleeding: OR 0.32 ($p < 0.00001$)
 - Reduced rate of death due to rebleeding: OR 0.35 ($p < 0.002$)
 - Increased rate of HE: OR 2.21 ($p < 0.00001$)
- No differences in hospitalization days or all cause deaths

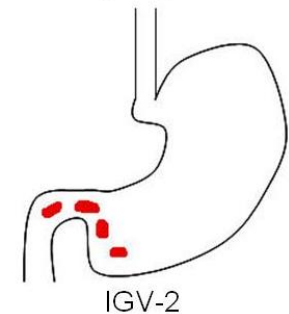
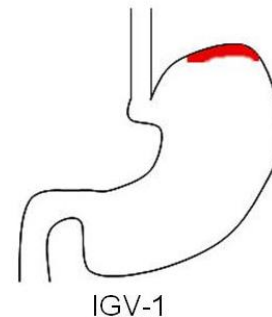
Classification of Gastric Varices

- GOV-1
 - Managed like EV
- GOV-2 and IGV-1
 - Bleed less frequently
 - More difficult to control
 - Increased risk of rebleeding
 - Increased risk of mortality

Gastro-esophageal varices (GOV)



Isolated gastric varices (IGV)

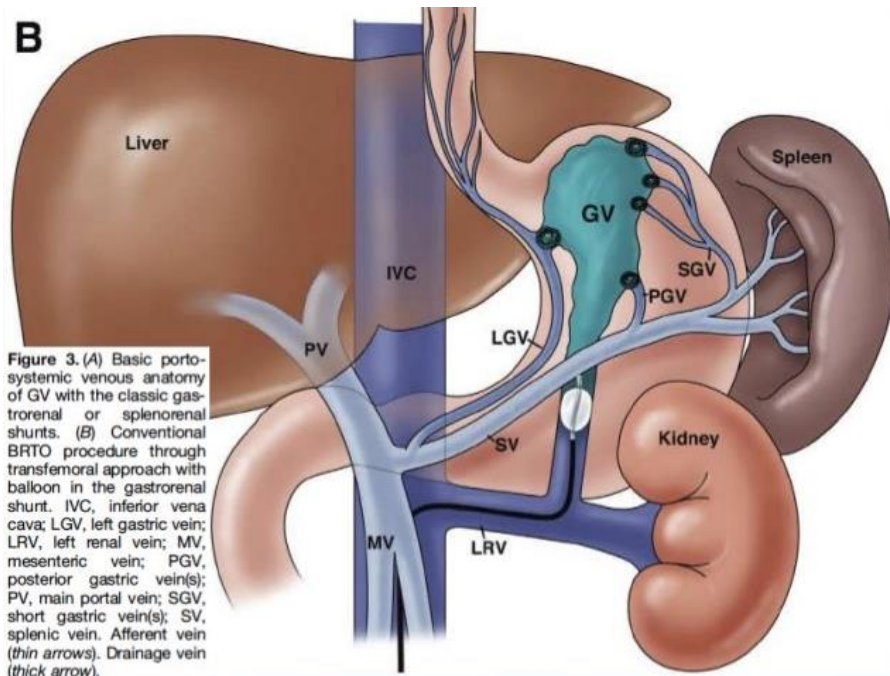


TIPS in Management of Gastric Varices

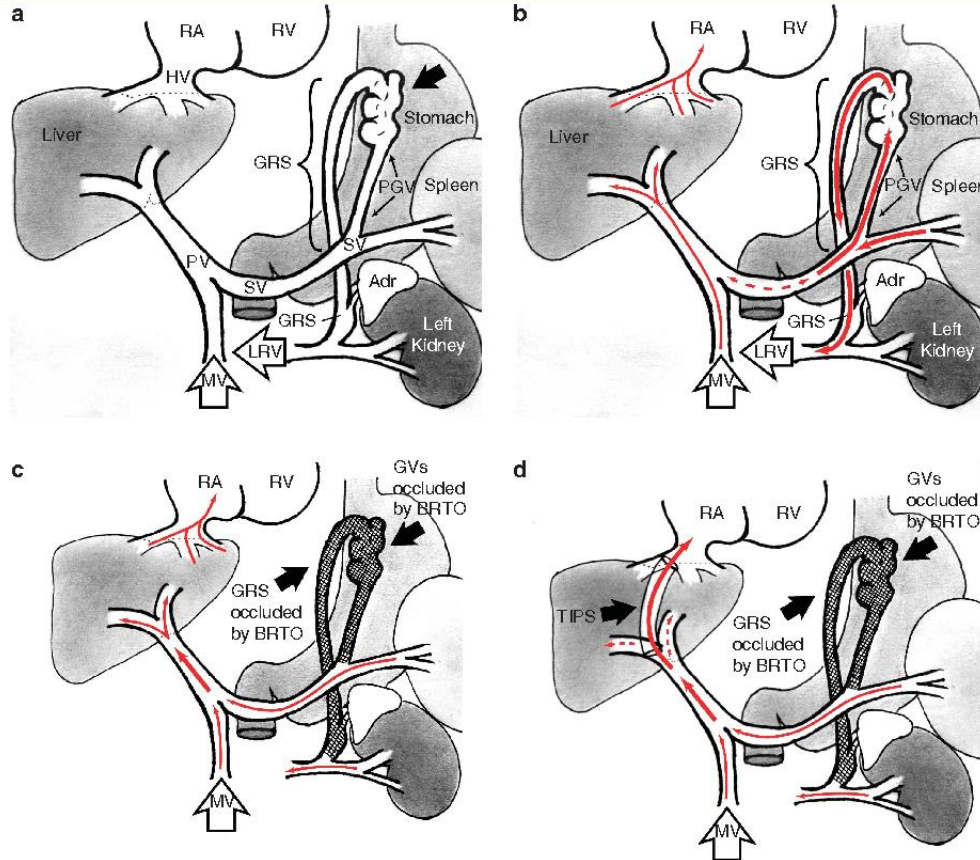
- 6 studies (147 patients with gastric varices)
- 2 studies (bare stents) published before 2000
 - Bleeding controlled 94%
 - Rebleeding 30%
 - Hepatic encephalopathy 16%
- 4 studies (bare stents) published after 2000
 - Rebleeding rate 11-20%
- Stent patency has improved from 30-69% to 76-92%
 - Stent patency most associated with rebleeding rate

BRTO

- First published in Japan in the early 1990s
- First BRTO reported in the US 2006
- Accessing the gastro-renal shunt through the left renal vein (femoral or transjugular)
- Injection of sclerosant following balloon occlusion of the shunt outflow



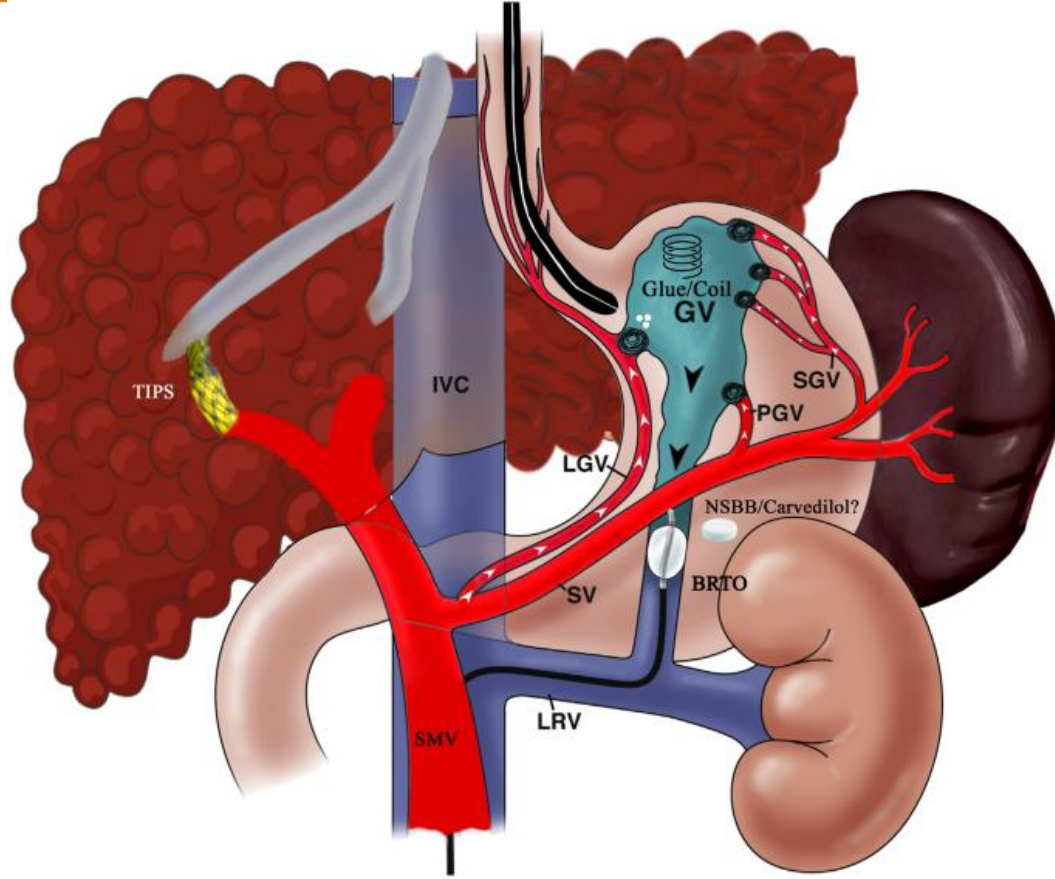
BRTO



BRTO Outcomes and Complications

- Successful obliteration varies 86-100%
- Rebleeding rates vary 0-12%
- 30-day mortality up to 4% (primarily liver)
- Complications
 - Gross hematuria with AKI up to 4.8%
 - Pulmonary embolism 1.5%-4%
 - Anaphylaxis to ethanolamine oleate up to 5%
 - Cardiac arrhythmias up to 1.5%
 - Rapid decline in hepatic function 5-7%
 - Increased portal hypertension
 - Ascites
 - Hydrothorax
 - Worsening of EV (up to 63% with bleeding up to 24%)

Can BERTO Make EV Worse?



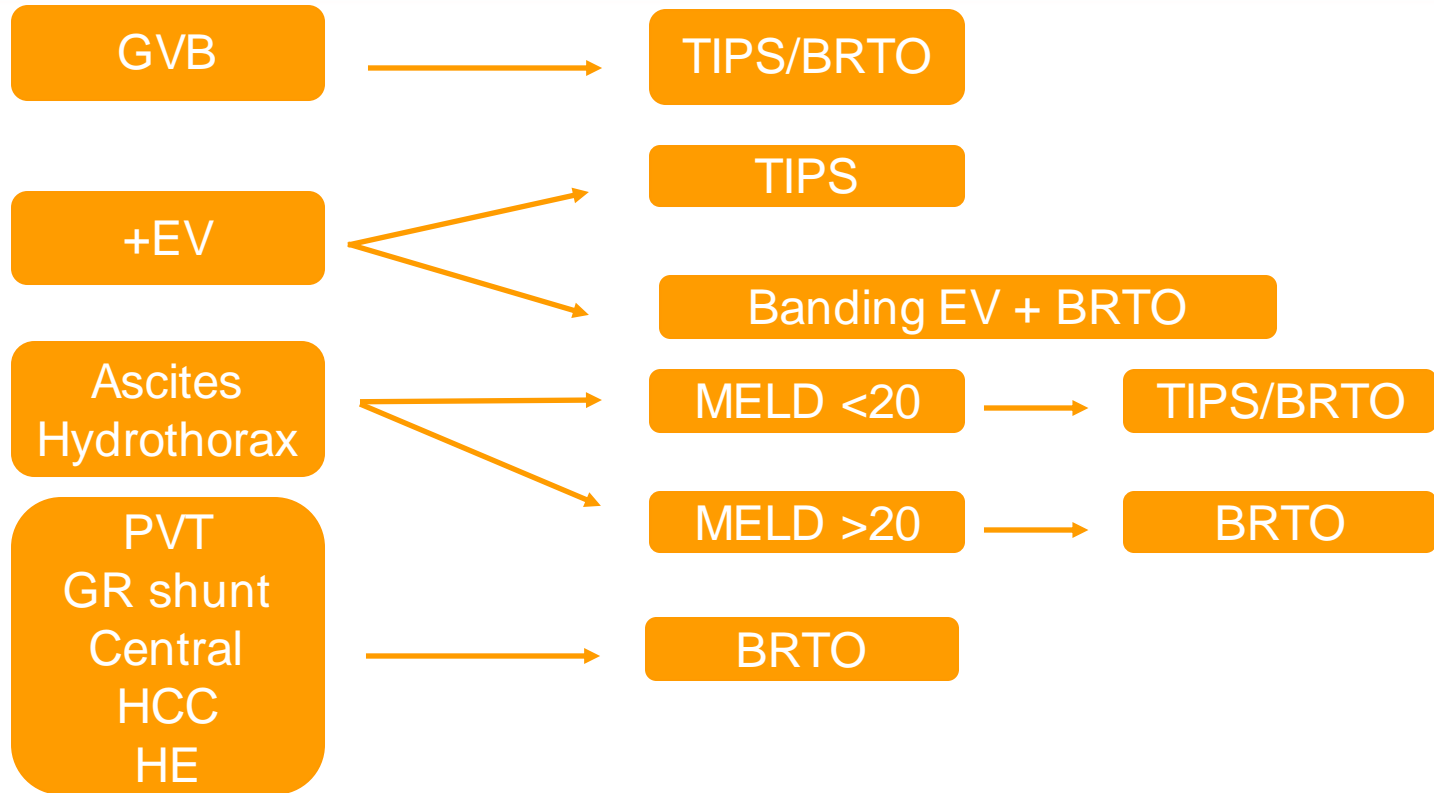
Gastric Varices: TIPS vs BRTO

- TIPS is effective for management of GV
 - Rebleeding 7-31%
 - HE 3-43%
- BRTO equivalent to TIPS in managing bleeding and decreasing risk of rebleeding
- BRTO results in less HE as compared with TIPS

Gastric Varices: TIPS or BRTO?

- BRTO (occluding a PSS thereby increasing portal pressure)
 - History of HE or high MELD
 - Recurrent GV bleeding following TIPS
 - Technically complicated anatomy (PVT or cavernous transformation)
 - Centrally located tumor without window for placement
- TIPS (creating a PSS thereby reducing portal pressures)
 - BRTO results in complications (balloon rupture)
 - Intractable ascites or hydrothorax
 - EV in addition to GV

Algorithm



Summary



- TIPS and BRTO procedures are important tools in the management of both EV and GV
- Different skill sets are required
- Choice of procedure will depend on local skill set as well as specific clinical scenario
- Isolated EV best managed with TIPS
- Optimal treatment for GV consider
 - Severity of portal hypertension, size of shunt
 - Additional complications such as HCC, ascites, HE
 - Overall hepatic reserve