

MANAGEMENT OF HEPATIC ENCEPHALOPATHY: WHAT EVIDENCE WE HAVE ?

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HEPATIC ENCEPHALOPATHY

- The incidence of HE following TIPS ranges from 20% to 55% @ 2 years;
- Episodic HE can lead to repeated hospitalization:
 - Alcoholic intake, rebleeding, sepsis – infections, dehydration, aggressive diuretic therapy.
- 3-7% of TIPS have recurrent or refractory HE necessitating shunt reduction or occlusion.

Riggio, Hepatology 2010

Boyer, Hepatology, 2010

Zheng, J Clin Gastroenterol, 2008

HEPATIC ENCEPHALOPATHY

Predictive factors of post-TIPS HE:

- Older age;
- High degree of reduction of porto systemic gradient;
- Previous episode of HE;
- Non alcoholic cirrosis;
- Child – Pugh class B or C;
- Hypoalbuminemia.

Post-TIPS HEPATIC ENCEPHALOPATHY

Therapy:

- Identify precipitating factors (when present);
- Medical therapy (Lactulose?, Rifaximin?);
- Reduction of TIPS overflow :
 - "hourglass stentgraft “
 - " sheath controll “
- TIPS occlusion (Plug, coils, etc)

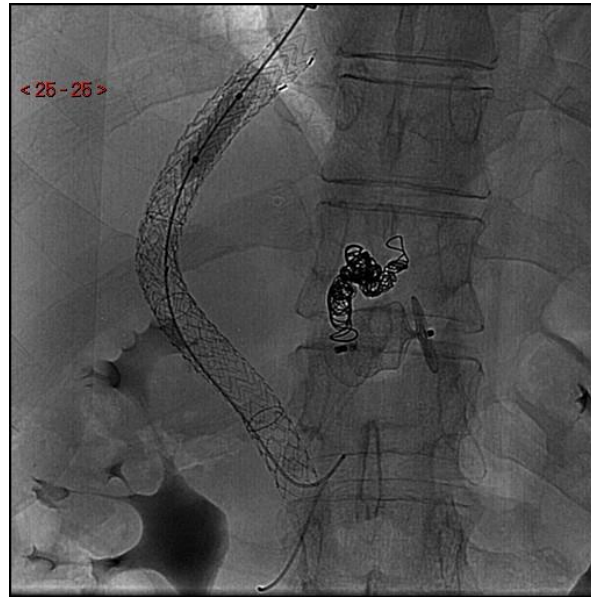
Management of Refractory Hepatic Encephalopathy After Insertion of TIPS: Long-Term Results of Shunt Reduction With Hourglass-Shaped Balloon-Expandable Stent-Graft, *Fanelli AJR, 2009*; Bidirectionally adjustable TIPS reduction by parallel stent and stent-graft deployment. *Sze, JVIR 2008*; Transjugular Intrahepatic Portosystemic Shunt Flow Reduction with Adjustable Polytetrafluoroethylene-Covered Balloon-Expandable Stents Using the "Sheath Control" Technique. *Blue CVIR 2015*

Hourglass technique for TIPS caliber reduction

The diameter of hourglass waist can be calibrated!



PSG 5mmHg



PSG-guided
stepwise dilation
Ø 6mm → 21mmHg
Ø 7mm → 16mmHg
Ø 8mm → 12mmHg

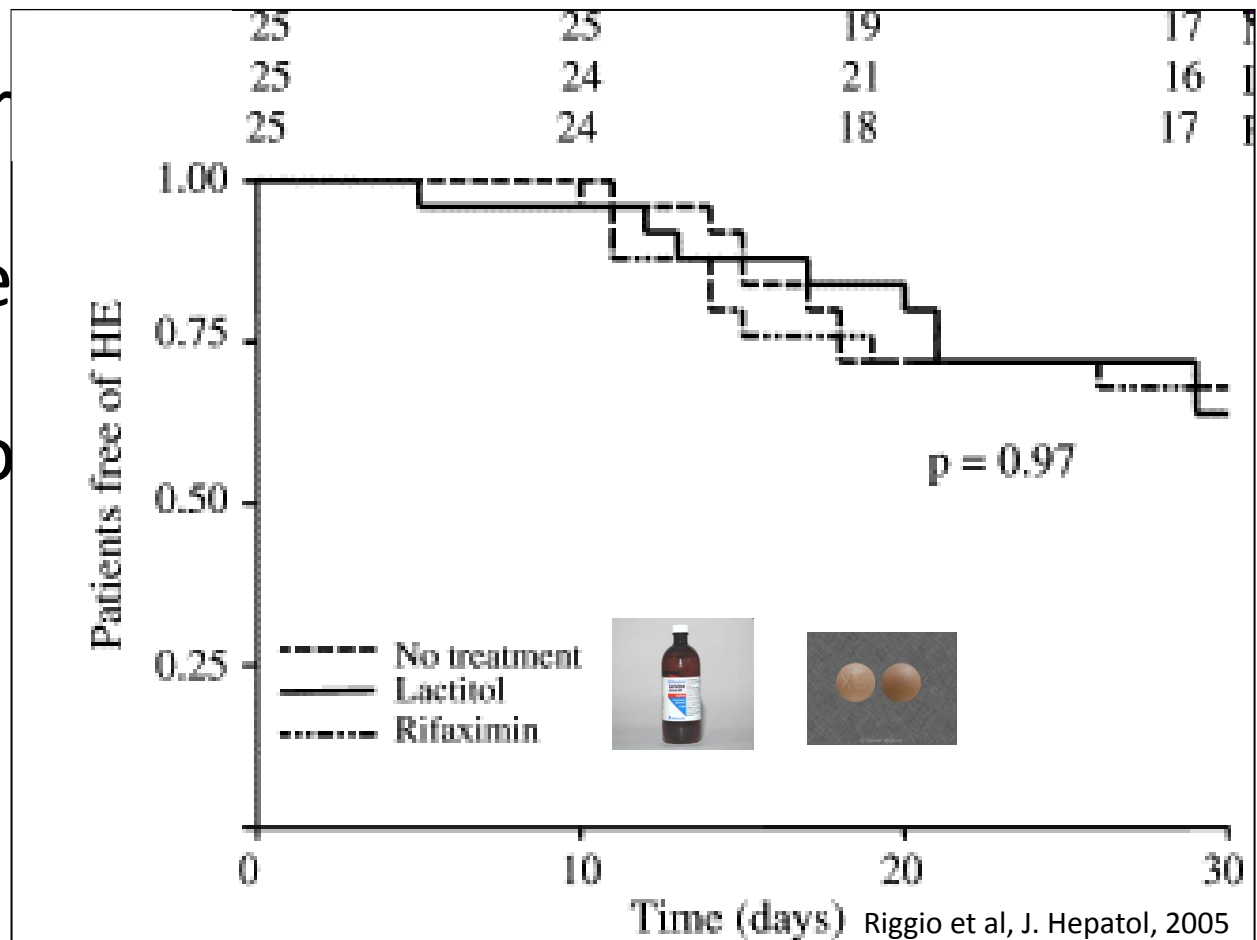


PSG 12 mmHg

HEPATIC ENCEPHALOPATHY

Do we have strategies to avoid/reduce post-TIPS HE?

- Use of cover
- Small-dia
- Underdilatio



Post-TIPS HEPATIC ENCEPHALOPATHY

Covered stent as first line approach to reduce post-TIPS HE

- Despite HE frequency and severity would be expect higher with covered stent because its diameter remained unchanged over a long period of time, unlike BMS, which show progressive reduction of diameter from intimal hyperplasia, some studies have shown a lower frequency of HE with covered stent.
- By improving TIPS patency and reducing TIPS dysfunction, covered stent decrease the number of episodes of bleeding potentially precipitating HE

Can small TIPS reduce HE?

Riggio et al, 2010

45 unselected PTs (ascites and bleeding),

randomized to Viatorr TIPS 8mm Vs 10mm:

- 22 Viatorr Ø8mm (54% reintervention for complications -> 1 occlusion only);
- 23 Viatorr Ø10mm (13% reintervention for complications -> all occluded).

Freedom from HE at 1y: 42,8% for 8-mm vs 46,7% for 10-mm. (p=0.48)

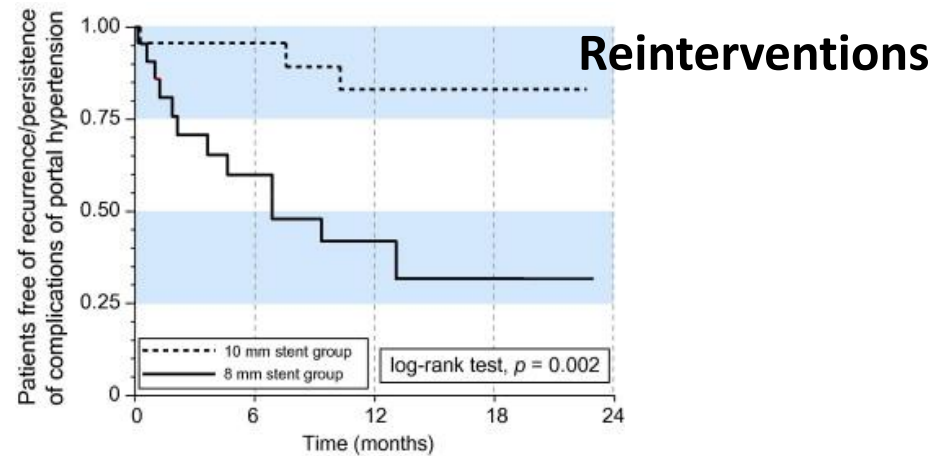
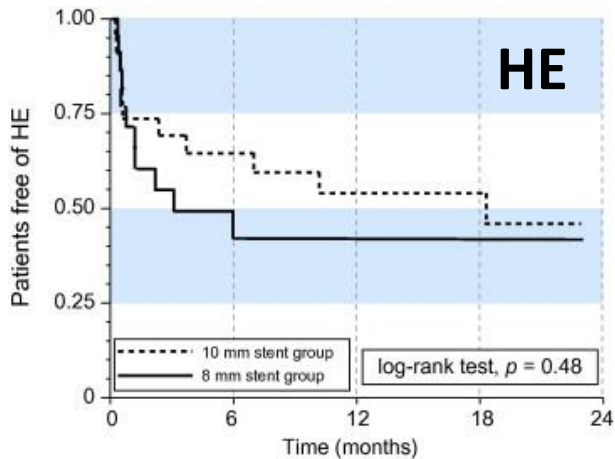
NH4: pre post TIPS: unchanged in 8-mm vs 50 to 98 µg/dl in 10-mm

Only 1 refractory HE in the 8-mm group and 2 in the 10-mm group

Can small TIPS reduce HE?

- No difference in HE occurrence (11 in 8mm, 12 in 10mm);
- More reinterventions in 8 mm PTFE TIPS.

($P=.008$ for ascites, $P=.125$ for bleeding)



Riggio's conclusions:

"As a consequence of the premature closure of the study, the trial cannot provide any evidence for the risk of developing HE".

«... we cannot exclude that by completing the enrollment until the calculated sample size, some advantages in terms of HE would have occurred.»

Can small TIPS reduce HE?

Sauerbruch et al, 2015

Large Multicenter randomized trial from German Study Group (180 PTs):

- Viatorr TIPS Ø 8 mm (nominally expanded) Vs Medical therapy and Endoscopic Varices Ligation for secondary prophylaxis in bleeding PTs.

	TIPS	Med. Therapy and EVL	P
@ 2-year rebleeding rate	7%	26%	.002
@ 2-year HE rate	<u>18%</u>	8%	.05

HE and Portal Pressure Gradient after 8 mm TIPS:

- Average decrease of PPG 50% of basal value;
- PPG reduction < 12 mmHg 61% Patients,
- No difference in HE incidence with PPG < or > 12 mmHg.

Underdilatation: is it reliable?

Pieper et al 2014

- 39 TIPS evaluated (28 10mm \odot Viatorr underdilated to 8 mm; 1 8mm \odot Viatorr underdilated to 7 mm; 10 12mm \odot Wallstent underdilated to 9 or 10 mm);

% area changes in vivo on CT follow up:

- VIATORR area increases from $64\% \pm 2.3\%$ to $88\% \pm 7.9\%$ of nominal area
- WALLSTENT area increases from $65\% \pm 8.5$ to $82\% \pm 19\%$ of nominal area

The area of self-expandable stent **underdilated** in respect of nominal diameter significantly increases over time, potentially influencing the long-term portosystemic gradient.

Underdilatation: is it reliable?

Gaba et al 2015

- 61 Viatorr-TIPS (60 PTs) evaluated on CT:
 - 41 under-dilated to 8 mm (if portal systemic gradient < 12mmHg)
 - 20 expanded to 10 mm

No difference in pre-post TIPS PSG

HE similar - 14\41 (8mm group)
- 4\20 (10 mm group)

No difference in median stent diameter:

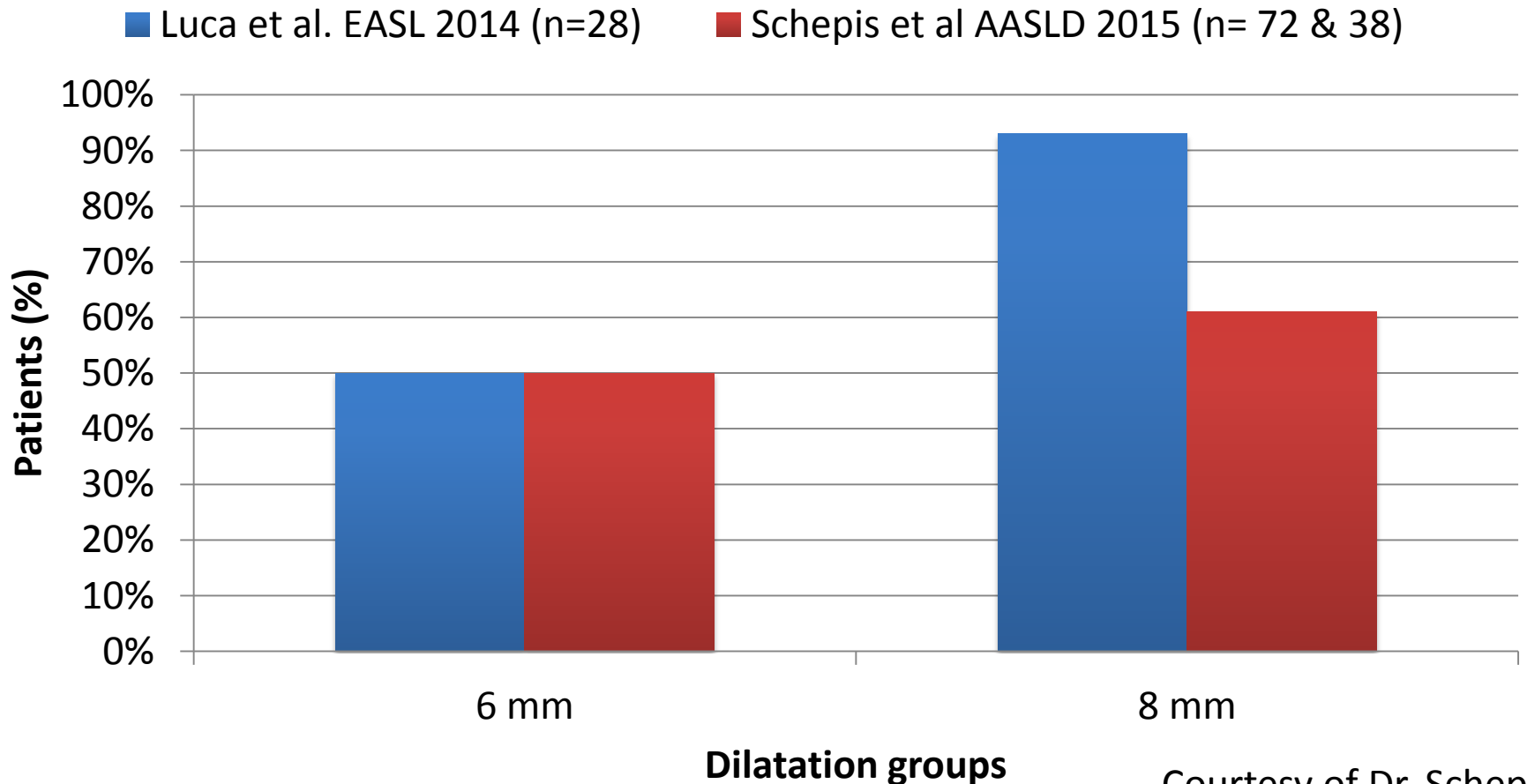
- underdilated group (9.8 mm range 8.4-10.2);
- nominal expanded (9.9 mm range 9.3-10.5)

30\41 (73% of 8 mm dilared VIATORR) expanded to 9.5mm

A Target PPG below 12 mmHg after TIPS is Optimal

PPG after underdilatation to 6 mm and after expansion to nominal 8 mm using 8 mm Viatorr TIPS

Post TIPS PPG < 12 mmHg



Courtesy of Dr. Schepis F.

Conclusion

- HE remains one major concern after TIPS;
- Beside medical therapy TIPS diameter reduction or occlusion represent the corner stone of post-TIPS high grade HE treatment;
- Underdilation may be an acceptable method to reduce overflow immediatly after TIPS with questionable success in mainteining durable smaller caliber;
- Smaller TIPS caliber (8mm) independently from PSG in selected patients could represent a new strategy.

“...Perhaps, another technological advancement will lead to a TIPS with variable diameters that will accommodate varying portosystemic shunting and reduce the incidence of post-TIPS encephalopathy.”

Saad WE.

*The history and future of transjugular intrahepatic portosystemic shunt: food for thought, **Seminars in Interventional Radiology, 2014***