TIPS – Current and Future Applications

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Presented by U. Teichgräber
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Disclosure

Speaker name:
Thomas Vogl

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other: travel grant

I do not have any potential conflict of interest
Interdisciplinary Competence Center for Liver Diseases – Frankfurt

- Internal Medicine, Gastroenterology and Hepatology
- General Oncologic Surgery
- Transplantation Surgery
- Diagnostic and Interventional Radiology
- Interdisciplinary: Case conferences, Tumor board, Ward rounds
- Other medical disciplines: Anaesthesiology, Psychosomatics

All in one – Center for Liver Diseases Frankfurt

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TIPS and LTX: Open Questions

1. Indications for TIPS placement:
   - impact on chances for subsequent successful LTx?

2. TIPS:
   - benefits/harm for LTx?

3. TIPS – therapy refractory ascites:
   - high impact on course of disease?
     - change of decision to perform LTx: pro and contra?
TIPS: Clinical Issues

Quelle: http://clinicalgate.com/portal-hypertension-and-gastrointestinal-bleeding/
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TIPS: Clinical Issues

- **Prehepatic portal hypertension:**
  1. Recanalization of the veins (mechanical, lysis therapy)
  2. Occlusion of portosystemic collaterals (embolization, BRTO)
  3. Reduction of portal blood supply (embolization)

- **Hepatic portal hypertension:**
  1. Placement of portosystemic shunts (TIPS)
  2. Occlusion of portosystemic collaterals (embolization, BRTO)
  3. Reduction of portal blood supply (embolization)

- **Posthepatic portal hypertension:**
  1. Recanalization of the liver veins
  2. Placement of portosystemic shunts (TIPS, DIPS)
  3. Occlusion of portosystemic collaterals (embolization, BRTO)
  4. Reduction of portal blood supply (embolization)

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Tests Before TIPS Placement

- **Laboratory tests:** serum electrolytes, BUN and creatinine, blood count, bilirubin, albumin, AST, ALT, PT

- **Sonography/duplex sonography of the abdomen:**
  - coeliac trunk and hepatic artery
  - liver veins
  - portal venous flow
  - ascites? catheter drainage if necessary

- (Duplex) sonography of internal jugular vein
TIPS: Materials

0.035 guide wires
- Amplatz
- Terumo
- J-guide wire

Balloon catheter

Modified Ross needle (15G)

Sheath F8-11
12 cm (40 cm)
1. Cannulation of hepatic vein & establishing connection to portal venous system
2. Dilatation of porto-systemic shunt with balloon catheter
TIPS

3. Stent application
4. Check blood flow within stent
And in Difficult Situations: Image Fusion / IR Method
And in Difficult Situations: Indirect Portogram
### TIPS: Transjugular Intrahepatic Portosystemic Shunt

<table>
<thead>
<tr>
<th></th>
<th>Bare Stent</th>
<th>Viatorr®</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary technical success</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>30-day patency</td>
<td>87.0%</td>
<td>96.0%</td>
</tr>
<tr>
<td>occlusion/stenosis</td>
<td>23.3%</td>
<td>14.28%</td>
</tr>
<tr>
<td>revisions</td>
<td>11.1%</td>
<td>0%</td>
</tr>
<tr>
<td>recurrent bleeding</td>
<td>18.7%</td>
<td>11.62%</td>
</tr>
<tr>
<td>procedure-related mortality</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>30-day mortality</td>
<td>2.77%</td>
<td>2.77%</td>
</tr>
<tr>
<td>HE ≤ 1 (1st year)</td>
<td>8.57%</td>
<td>12.3%</td>
</tr>
<tr>
<td>Liver TX</td>
<td>11.42%</td>
<td>5.55%</td>
</tr>
</tbody>
</table>
TIPS: Complications

- Refractory hepatic encephalopathy (III-IV) (51)
- Arterioporal fistula (5)
- Transient bilhemia (6)
- Intraabdominal haemorrhage (5)
- Stent migration (5)
- Minor complications:
  - haemobilia
  - gall bladder haematoma
  - subcapsular haematoma

Radiologische Universitätsklinik Frankfurt 1999-12/2014, n = 531 Patienten

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TIPS: Shunt Reduction

reduction stent
TIPS: Shunt Reduction
Life-threatening oesophageal variceal bleeding

Emergency TIPS

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Early Use of TIPS in Patients with Cirrhosis and Variceal Bleeding

Juan Carlos García-Pagán, M.D., Karel Caca, M.D., Christophe Bureau, M.D., Wim Laleman, M.D., Beate Appenrodt, M.D., Angelo Luca, M.D., Juan G. Abraldes, M.D., Frederik Nevens, M.D., Jean Pierre Vinel, M.D., Joachim Mössner, M.D., and Jaime Bosch, M.D., for the Early TIPS (Transjugular Intrahepatic Portosystemic Shunt) Cooperative Study Group.
Indication: Acute Bleeding

"32 Early TIPS (within 72 hours)"
"31 Vasoactive drugs (3 - 5 days) + banding (long-term)"

During a median follow-up of 16 months, rebleeding or failure to control bleeding

**CONCLUSIONS**

In these patients with cirrhosis who were hospitalized for acute variceal bleeding and at high risk for treatment failure, the early use of TIPS was associated with significant reductions in treatment failure and in mortality. (Current Controlled Trials number, ISRCTN58150114.)

Atrial survival was 61% in the pharmacotherapy–EBL group versus 86% in the early-TIPS group (P<0.001). Seven patients in the pharmacotherapy–EBL group received TIPS as rescue therapy, but four died. The number of days in the intensive care unit
**Objective:**
The purpose of this study is to compare the technical success of transjugular intrahepatic portosystemic shunt (TIPS) in transplanted versus nontransplanted livers and to assess the clinical outcome of TIPS in liver transplant recipients.

**Materials and Methods:**
- TIPS procedures: n = 715
- TIPS post LTX: n = 39 (90% had ascites)

**Results:**
The technical success rates for TIPS were 97% (38/39) in transplanted livers versus 97% (657/676) in nontransplanted livers (p = 1.00). One-year graft survival for a MELD score less than 17 versus a score of 17 or higher was 54% versus 8%, respectively (p < 0.05).

*Saad WE et al, Am J Roentgenol 2013 Jan; 200(1):210-8*
DISCUSSION:

- Whole grafts: no additional technical difficulties in comparison with nontransplanted livers

- Piggyback inferior vena cava (IVC) anastomoses:
  - can pose technical difficulty

- Split grafts → may be a greater challenge:
  - small graft size
  - little room for needle manipulation
  - obtuse hepatoportal angles

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