Portal Hypertension- The possible role of MRI to determine changes in blood flow and HVPG

Raj Mookerjee – r.mookerjee@ucl.ac.uk
The Clinical Need..

A sensitive and non-invasive measure of Liver haemodynamics that infers change in flow-pressure relationships

• Monitoring treatment/dose responses (e.g. BB, Carvedilol)
• Utility in testing intervention with novel therapies in Man

The Challenge.... Can MRI technology be adapted to fulfil this need?

• Informing intensive management of advanced disease
PC-MRI – preliminary rodent data

Reduction in PV flow in sham and cirrhotic BDL animals after terlipressin:

<table>
<thead>
<tr>
<th></th>
<th>TTUS (n = 3)</th>
<th>PCMR (n = 3)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV flow (ml/100g/min)</td>
<td></td>
<td>138.97±13.67</td>
<td>0.422</td>
</tr>
</tbody>
</table>

(Adapted from D’Almeida et al. Am J Physiol 1996;271(40):H2701-2709.)

Sham vs. BDL
- Difficulty imaging smaller vessels – hepatic artery
- Partial voluming over vessel wall, pulsatility etc.
- So, a subtractional IVC measurement was adopted......
Data from Cardiac Cine MRI and ASL protocols in cirrhosis rodent models, also being translated to clinical protocols

On-going study at RFH assessing Liver haemodynamics and Cardiac protocol for patients Pre-Post BB: Academy of Med Sci funded
Summary

• Lowering portal pressure is associated with improved outcome but practical translation assessing efficacy of intervention, warrants non-invasive measures

• Assessment of flow is equally important when assessing efficacy of therapies not just portal pressure change in decompensated patients

• Early studies suggest PC MRI and ASL may have value in determining portal flow dynamics

• Harness collective strengths RFH, Nottingham, Edinburgh, and Birmingham to deliver a robust model of liver blood flow/resistance/cardiac dynamics for early clinical translation

• Acknowledgement: Manil Chouhan, David Patch and Ahmed Amin