Innovative Approach To Angiogenic Cell Therapy For CLI: Hope For The Future And BOLD MRI: A New Method To Measure Calf Perfusion To Monitor Its Effects

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Tissue Perfusion in the lower limb

• TcPO$_2$, LDI, VOP: Surrogates
• Perfusion imaging
  – Diagnostic
  – Inform revascularisation
  – Assessment of novel therapies

Blood Oxygenation level dependent (BOLD) MRI

• Mapping brain activation
• Cardiac perfusion
• Saturation state Hb: endogenous contrast agent
• Paramagnetic deoxyHb: low T2* signal intensity

T2* signal intensity time curves

Disclosures

Consultancy to Cook Medical
Grant Support Cook Medical, Medtronic Inc
Automated analysis of images

A = Anterior, L = Lateral, D = Deep Posterior, S = Soleus, G = Gastrocnemius

Perfusion changes in critically ischaemic limbs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Young Controls (n=12)</th>
<th>Age-Matched Controls (n=10)</th>
<th>CLI Patients (n=34)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (median)</td>
<td>25 (24-28)</td>
<td>67 (52-71)</td>
<td>66 (37-86)</td>
</tr>
<tr>
<td>Sex (m:f)</td>
<td>8:4</td>
<td>7:3</td>
<td>26:8</td>
</tr>
<tr>
<td>Smoker</td>
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<td>1</td>
<td>24</td>
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<tr>
<td>Hypertension</td>
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<td>20</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>
| Rutherford
| Classification | IV 22                  | V 9                        | VI 3                |

BOLD-MRI based assessment of perfusion in the lower limb

Pre-Intervention
Post-Intervention

Changes in perfusion after limb revascularisation

Summary

- BOLD MRI identifies ischaemic muscle
- BOLD MRI detects improvements in perfusion
- Functional (BOLD) and anatomical (MRA) imaging
- Guide interventions
- Better assessment of outcome after intervention
- Novel endpoint for cell therapies

Improve limb salvage
Acknowledgements

Academic Dept Vascular Surgery
Leeds, UK
Prof Alberto Smith
Prof Stuart Egginton
Mr Ashish Patel
Mr Adnan Bajwa

Universita Vita-Salute San Raffaele, Milan
Dr Francesca Ludwinski
Prof Michele De Palma
Dr Gopinath Damadoran
Miss Joanna Furmston

University College London
Mr Prakash Saha
Dr Suwan Jayasinghe
Mr Hany Zayed
Mr Oliver Lyons

Leicester University
Ms Susan Clark
Prof David Cousins
Ms Laura Harley
Dr Mohammed Ikram

KCL Cardiovascular Division
Prof Quingbo Xu
Dr Aleksandar Ivetic
Dr Richard Siow
Dr Emanuele De Rinaldis

KCL Division of Imaging Sciences
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