Human Thiel-embalmed cadaveric aortic model with perfusion for aortic stent graft training and device development

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The Dr Hadwen Trust (DHT) is the UK’s leading non-animal biomedical research charity that exclusively funds and promotes human-relevant research that replaces the use of animals whilst supporting the progress of medicine.
Disclosure

Speaker name: Professor Andreas Melzer

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(s)

- I do not have any potential conflict of interest

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Cardiovascular Procedures – the Devices

- **Visualisation**
  - Device – bending/plane
  - Delivery
  - Deployment device

- **Avoidance adjacent structures**

- **Is it in correct place?**
Thiel Embalming
Centre for Anatomy and Human Identification - CAHID

Walter Thiel
• Method uses very little formalin, making it less hazardous to work with than formalin embalming methods.
• Thiel process results in improved properties, tissue retains flexibility and has more ‘life like’ properties

Thiel Embalming
Centre for Anatomy and Human Identification - CAHID

• Method uses very little formalin, making it less hazardous to work with than formalin embalming methods.
• Thiel process results in improved properties, tissue retains flexibility and has more ‘life like’ properties
• Vascular tree patent, similar flexibility and postmortem clot can be dissolved and removed.
Vascular Modeling

AIM: Introduction of Flow to vessels to develop a working vascular model.

MULTI MODAL IMAGING
- X Ray
- CT
- Magnetic Resonance Imaging
- Ultrasound

Interventional Training
Device Development and testing
Circuit Models

- Thoraco-abdominal Aorta
- Iliac
- Carotid
- Intracerebral
- Common Femoral
- Portal Vein
- IVC, Right Atrium
Thiel Aortic Perfusion Model: Temperature and pressure

<table>
<thead>
<tr>
<th></th>
<th>Cadaver 1</th>
<th>Cadaver 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Temperature (Centigrade)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>16.1</td>
<td></td>
</tr>
<tr>
<td>4 mins post infusion</td>
<td>39.1</td>
<td></td>
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<tr>
<td><strong>Pressure (mmHg)</strong></td>
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<tr>
<td>Arch of aorta</td>
<td>38</td>
<td>52</td>
</tr>
<tr>
<td>Distal aorta</td>
<td>37</td>
<td>54</td>
</tr>
<tr>
<td>extracorporeal</td>
<td>78</td>
<td>110</td>
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</tbody>
</table>

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Thoracic stent graft
Training\Testing

Medtronic Valiant Thoracic Stent Graft with the Captivia Delivery System

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AAA EVAR Training

Pre-procedure Planning:
• Anatomical Planning CT
• Measurement and customisation

Procedure:
• Full OR room capability
• Perfusion model
• Standard imaging
Full Operating room simulation: Training The TEAM

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AAA EVAR: Access and deployment
Aorto-uniliac

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Thiel
Post EVAR CT

• Assess anatomical positioning
• Endoleak
• Stent anatomical deformation
• Plan more interventions!

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Interventional Radiology – The Basics (IRTB)

Cuschieri Skill Centre – Dundee 6/7th October 2016
https://cuschieri.dundee.ac.uk
24 Junior Doctors / 12 Faculty

- Short talks
- Vascular Simulators
- Thiel cadaveric models
  - Carotid intervention
  - Embolisation
  - Iliac stenting
  - EVAR

- Workshops
- Course Dinner

P-432 Interventional radiology (IR) procedural training using Thiel cadaver simulation models: trainee survey
P-442 Perfused human Thiel-embalmed cadaveric hepatic model: hi-fidelity teaching model for advanced interventional radiology simulation training

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Future plans - developments

- Integrate into training courses
  - IR The basics 6/7th Oct 2016
  - BSIR Advanced Practice Course 2017
  - CIRSE affiliation/accreditation

- Assess Learning Effectiveness

- Endovascular Device Testing
  - Thoracic stent graft
  - Fenestrated AAA
  - SFA stents
  - Intracranial interventions
  - Cardiac interventions

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