Miniaturisation of plugs:
How does it advance the embolisation practice?

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Disclosure

Speaker name: Nuno Dias

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
Embolization with Vascular Plugs

**Pros**
- Exact distal landing
- Fewer devices
- Shorter procedure time
- Less artifacts on imaging

**Cons**
- Long landing zones
- Difficult prediction of elongation (prox position)
- Large delivery system profile
- Time to occlusion

Miniaturisation of plugs
MVP - MicroVascular Plug System
## MVP - MicroVascular Plug System

<table>
<thead>
<tr>
<th>MVP-Q</th>
<th>Target Vessel Diameter (mm)</th>
<th>Unconstrained Length (mm)</th>
<th>Unconstrained Diameter (mm)</th>
<th>Min Recommended Catheter ID/OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVP-3Q</td>
<td>1.5 – 3.0</td>
<td>12</td>
<td>5.3</td>
<td>0.021”</td>
</tr>
<tr>
<td>MVP-5Q</td>
<td>3.0 – 5.0</td>
<td>12</td>
<td>6.5</td>
<td>0.027”</td>
</tr>
<tr>
<td>MVP-7Q</td>
<td>5.0 – 7.0</td>
<td>16</td>
<td>9.2</td>
<td>4 Fr 0.38</td>
</tr>
<tr>
<td>MVP-9Q</td>
<td>7.0 – 9.0</td>
<td>18</td>
<td>13.0</td>
<td>5 Fr 0.38</td>
</tr>
</tbody>
</table>
MVP - MicroVascular Plug System
MVP MicroVascular Plug in Practice

Ideal position

Curved segment

Conical segment
Clinical applications

• Endoleak embolization or prevention
  – Type II endoleak embolization
  – Collateral embolization pre-EVAR
  – Branch occlusion

• Trauma / Bleeding

• Pulmonary AVM

• SIRT
Type II endoleaks
Type II endoleaks

- IMA-related
  - Intraluminal embolization
- Lumbar-related
  - Translumbar embolization
- Accessory renal-related
  - Preoperative embolization
  - Translumbar embolization
- Internal iliac
  - Pre- or intraoperative embolization
Inferior Mesenteric Artery - IMA

MVP-5Q
Inferior Mesenteric Artery - IMA

MVP-5Q
Inferior Mesenteric Artery - IMA

MVP-5Q
Inferior Mesenteric Artery - IMA

MVP-5Q
MVP for IMA type II endoleaks

- 9 pts
- Technical success: 100%
- Fluoroscopy time: 18-48 min
Type II endoleaks

- IMA-related
  - Intraluminal embolization
- Lumbar-related
  - Translumbar embolization
- Accessory renal – related
  - Preoperative embolization
  - Translumbar embolization
- Internal iliac
  - Pre- or intraoperative embolization
Accessory Renal Arteries
Accessory Renal Arteries
Safety Embolization of Accessory Renal Arteries

• 119 pts
  – 42 pts coverage Accessory Renal Arteries
  – 42 pts no coverage, no Accessory Renal Arteries
  – 35 pts preserved Accessory Renal Arteries

• No difference in renal function / hypertension

• Accessory Renal Artery > 3 mm
  – high risk Type II Endoleak

**Embolize Accessory renals 3-5 mm**
(if no wall aposition of endograft)

Malgor et al, JVS 2013
Multiple Accessory Renal Arteries
Multiple Accessory Renal Arteries
Creatinine: Preop 57 to 75 µmol/L
Type II endoleaks

• IMA-related
  – intraluminal embolization
• Lumbar-related
  – Translumbar embolization
• Accessory renal – related
  – Preoperative embolization
  – Translumbar embolization
• Internal iliac
  – Pre- or intraoperative embolization
Internal Iliac Embolization

• Avoid embolizing internal iliac
  – Claudication: 31% emboliz vs 0% IBD

• If embolizing
  – Plugs are superior to coils
  – Unilateral preferable than bilateral
  – Proximal embolization

Taudorf et al, JVIR 2015
Internal Iliac Embolization in rAAA
Internal Iliac Embolization in rAAA
Internal Iliac Embolization in rAAA
Internal Iliac Embolization in rAAA
Internal Iliac Embolization in rAAA
EVAR Branch Closure
Off-the-shelf Complex EVAR of TAAA
Branch Closure during TAAA EVAR

Hongku et al, JVS 2017
Branch Closure during TAAA EVAR
Branch Closure during TAAA EVAR
Bleeding / Trauma
Pancreaticoduodenal pseudoaneurysm
Pancreaticoduodenal pseudoaneurysm
Pancreaticoduodenal pseudoaneurysm
Pancreaticoduodenal pseudoaneurysm
Pancreaticoduodenal pseudoaneurysm
Pulmonary AVM
Osler-Weber-Rendu Disease
(Hereditary Hemorrhagic Telangiectasia)
Pulmonary AVM
Pulmonary AVM
Pulmonary AVM

MVP-9Q
Pulmonary AVM

MVP-9Q
Pulmonary AVM

MVP-9Q

right

post release plug
Pulmonary AVM

MVP-9Q
Pulmonary AVM

MVP-9Q
**When to use Miniaturized Vascular Plugs?**

**Yes**
- Exact positioning
- Short devices
- Small diameters
- Less artifacts on imaging
- Open structure distally?

**No**
- Very irregular / tortuous arterial walls
  - Need to complete
- Very stable position and long sealing segment
  - Pushable coils
  - Cost
Conclusion - Miniaturized Vascular Plugs

- Complete and widen the applicability of plugs for embolization
  - Versatile low-profile delivery system
  - Few artifacts on post embolisation imaging
  - Fast occlusion effect

- Further studies are needed
  - Long-term results
Save the date!

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