Treatment of hypervascular tumours

Dr Ian McCafferty
University Hospital Birmingham NHS Foundation Trust
I have the following potential conflicts of interest to report:

- Consulting for Medtronic
- Consulting for Penumbra

- I do not have any other potential conflict of interest
Hypervascular tumours

Tumor definition.
An abnormal mass of new tissue growth
Benign or malignant (cancer)
Cancer - uncontrolled growth, which can invade and metastases.

**MALIGNANT**
- Renal cell carcinoma
- Thyroid carcinoma
- NET – carcinoid tumours
- Hepatocellular carcinoma
- Leiomyosarcoma

**BENIGN**
- Renal Angiomyolipoma
- Arteriovenous Malformations
- Kaposiform Haemangioendotheliomas
- Giant Cell tumours
- Aneurysmal Bone cysts
- Bone haemangioma
### Hypervascular tumours

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Principles of tumour embolisation

- Reduce the abnormal blood supply to a mass
  1. Pre-surgery to reduce haemorrhagic risks
  2. Cause ischaemia and tumour shrinkage
  3. Prophylactically to prevent haemorrhagic Cx
  4. As a chemotherapeutic manoeuver e.g. TACE
- Targeted / focal
- Low morbidity (non-target injury)
“There are many embolic agents available and the choice is often related to operator experience, properties of the agent, cost, availability and target tumour & site.”

- **Particles**: PVA, gelatin sponge
- **Coils & Plugs**: push, detach, micro
- **Liquid agents** – alcohol, glue, Onyx™ liquid embolic system, PHIL
Renal cancer

- Primary embolisation prior to Nx
  - Renal vein involvement
  - Large tumours
Renal cancer

- Primary embolisation prior to Nx
  - Renal vein involvement
  - Large tumours

- Secondary embolisation in treatment of metastasis
  - Symptom relief
  - Pre-emergency spinal surgery
Soft tissue:
Commonly:
Careful:
**Evidence?**

- $N = 59$

<table>
<thead>
<tr>
<th>Embolisation</th>
<th>Median Blood loss</th>
</tr>
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<tbody>
<tr>
<td>None</td>
<td>4350mls</td>
</tr>
<tr>
<td>Coils</td>
<td>2650mls</td>
</tr>
<tr>
<td>PVA &amp; Coils</td>
<td>1850mls</td>
</tr>
<tr>
<td>PVA alone</td>
<td>1800mls</td>
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</tbody>
</table>

Berkefeld et al AJNR 20: 757-763 1999
Angiomyolipoma’s (AMLs)

- Sporadic AML
  - M > F (0.02 Vs 0.29%)
- Tuberose sclerosis complex (TSC) – 67%
- Lymphangioleiomyomatosis (LAM) – 60%
  - Larger, multiple and bilateral
Complications:

1. **HAEMORRHAGE** – “Wunderlich syndrome”
2. **RENAL IMPAIRMENT** - progressive
Rupture risk

Lesion & Aneurysm Size

Aneurysm Vs Lesion Size

Yamakado et al Renal angiomyolipoma: relationship between tumour size, aneurysm formation and rupture

Radiology 2002 225:78-82
Traditional technique

- Selective catheterisation
- PVA embolisation
- +/- coil embolisation of feeding vessel on completion
- Secondary haemorrhage “light bulb” sign
Novel:
Comparison

Traditional

Modern
“But liquid embolic agents need a general anaesthetic and are more expensive”
Onyx™ liquid embolic system - 3 bottles
Onyx™ liquid embolic system - 6 bottles
• All procedures performed with sedation & opiate analgesia
• All patients daycase except 1 O/N stay
<table>
<thead>
<tr>
<th>DELIVERY</th>
<th>VESSEL SIZE</th>
<th>Cost (£)</th>
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<tbody>
<tr>
<td>Guide catheter</td>
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<td></td>
</tr>
<tr>
<td>Catheter</td>
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<td>Medium</td>
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<tr>
<td>Micro catheter</td>
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<tr>
<td>COILS</td>
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<td>X</td>
</tr>
<tr>
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</tr>
<tr>
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<tr>
<td>LIQUIDS</td>
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Kaposiform haemangioendothelioma (KHE)
Summary

- Embolisation of hypervascular tumours requires understanding of the tumour and rationale for treatment
  - Aids choice of agent
  - Catheter choices determine agents available
- Onyx™ liquid embolic system can be a cost effective and safe solution in selected cases
- Its flow characteristics are different in “normal” vessels Vs AVM’s
- Put onto spin at beginning of every potential case
- Ideal = off the shelf ready to use Onyx
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