Varicocele Embolization
Sclerosants and/or Liquids are Essential

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• Consultant: Cook Medical
19 yo man with recurrent left varicocele and exertional discomfort

• 3 years earlier – surgical ligation, recurrence

• 16 months earlier – coil embolization

• Developed recurrent left scrotal exertional discomfort & varicocele on physical and US
  – refluxing veins up to 5 mm, smaller left testis
Varicocele Embolotherapy

- **Goal**
  - occlude refluxing ISV & collateral refluxing routes that might reconstitute & resupply the varicocele
  - collateral veins are the cause of recurrence in both varicocelectomy and embolization
  - collaterals present ≥70%
Varicocele Embolization with Sclerosant & Coils

Parallel channels appear after initial coil. Sclerosant displacing contrast, into upper PP.
Still some inferior flow
Additional STS foam
SP coils in 2nd channel, more STS, & coils at junction both channels

Varicocele and discomfort resolved (7 ml foam, 1 vial)
Liquid Agents for Varicocele

- **Sclerosant**: intimal inj, thromb → obliteration
  - detergents
    - sodium tetradecyl sulfate (STS)
    - polidocanol
    - sodium morrhuate (+ benzyl alcohol)
  - hypertonic glucose
  - boiling contrast
  - ethanol

- **Cyanoacrylate glue**
  - exothermic polymerization → mechanical obstruction, intimal injury, thrombosis
Advantages of Liquid Agents

- More contiguous occlusion of main channel
  - reach beyond catheter from \( ^\uparrow \)er ISV position

- Travel into side/collateral channels
Advantages of Liquid Agents

- Easy delivery
- Foam
  - displaces blood with no dilution of agent
  - more thorough intimal contact
  - longer duration of contact
  - small amount sclerosant → large volume foam
- Excellent response
- Generally minimal expense
## Comparison of Different Methods of Varicocele Embolization

<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Tech suc*</th>
<th>Clin suc*</th>
<th>US suc*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puche-Sanz, 2014</td>
<td>154</td>
<td>95.9</td>
<td>86.9</td>
<td>68.6</td>
</tr>
<tr>
<td>Gandini, 2008</td>
<td>280</td>
<td>97.1</td>
<td>96.4</td>
<td>95.5</td>
</tr>
<tr>
<td>Jargiello, 2015</td>
<td>33</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Favard, 2015 -compared 3 methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glue</td>
<td>203</td>
<td></td>
<td>91.2, sig ↑er in glue, but shortest fu</td>
<td></td>
</tr>
<tr>
<td>Cls/plugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sc1+cls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAP ↓ for glue than mech, but other comparisons =</td>
<td></td>
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</tbody>
</table>

*success in %
## Embolization Agents: Costs

<table>
<thead>
<tr>
<th>Agent</th>
<th>USA cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical – Coils</strong></td>
<td></td>
</tr>
<tr>
<td>Platinum</td>
<td>~85</td>
</tr>
<tr>
<td>Detachable</td>
<td>7-10 x above</td>
</tr>
<tr>
<td><strong>Mechanical – Plugs</strong></td>
<td></td>
</tr>
<tr>
<td>Amplatzer Vascular Plug 2</td>
<td>~832</td>
</tr>
<tr>
<td>Amplatzer Vascular Plug 4</td>
<td>~950</td>
</tr>
<tr>
<td><strong>Sclerosant</strong></td>
<td></td>
</tr>
<tr>
<td>STS 3% one 2 ml vial (4-10 ml foam)</td>
<td>~94</td>
</tr>
<tr>
<td>N-BCA glue 1 gram</td>
<td>~3422</td>
</tr>
</tbody>
</table>
Risks Possibly Unique to Liquid Agents in Varicocele Embolization

• Pampiniform plexus thrombophlebitis and testicular injury?
  – extremely rare
  – Gandini 2008: pure sclerosant therapy
    ♦ self-limited testicular swelling 0.7%
  – Jargiello 2014: sclerosant + coils
    ♦ none

• Superior nontarget migration
  – no certain reports of renal vein, pulmonary, CNS effects attributable to liquids
  – rare reports of coil migration
Conclusions

• Liquid agents are not limited by collaterals, which can reconstitute the varicocele
  – difficult to address these with mechanical agents

• Treat non-catheterized segments main ISV

• High clinical & ultrasound success, w ↓ risk

• Detergent sclerosants an inexpensive option
  – ~cost of one pushable coil
  – far lower than plugs or detachable coils
  – if combine w coils, fewer coils than coils alone
  – typically only one vial needed if use foam