LIQUID EMBOLIC AGENTS IN THE TREATMENT OF CRANIOFACIAL AVMS AND AVF: TECHNIQUES AND RESULTS

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Disclosures
- Microvention/Terumo - consultant
- Medtronic - consultant and proctor
- Penumbra - consultant
- Surpass Medical/Stryker - shareholder
- Medina Medical/Medtronic - shareholder
- InNeuroCo – shareholder
- Off-label use will be discussed

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VASCULAR ANOMALIES
ISSVA CLASSIFICATION

Legiehn GM, Heran MKS. Semin Intervent Radiol 2010

High-Flow Vascular Malformation

- AVM and AVF
- Rare; 1.5/1 F/M ratio
- Likely present at birth but clinical manifestation at infancy to middle age
- Schobinger stages (1 to 4)
- Progression can be provoked
- Skin changes, increase local temperature, pulse, thrill, bruit, ischemia, ulceration

High-Flow Vascular Malformation

- Treatment goals:
  - symptomatic control
  - cosmetics
  - preservation or restoration of vital functions
  - cure is difficult to achieve in diffuse lesions
- Best chance for cure: embol + surgery?
- Neurointerventional treatment: embolization (liquid embolics) and ethanol, endovascular or percutaneous
Results of liquid embolics

- Arat et al. AJNR 2007 – 9 patients treated with Onyx – 6 with AVF and 3 with AVM – no neurological complications but 1 skin discoloration; all AVFs were cured; results not so exciting for AVMs
- Clarencon et al. AJNR 2012 – pre op emb of parpebral AVMs (Onyx, glue) in 8 patients; no significant complications; 3/8 were cured post embo
- Thiex et al. AJNR 2012 reviewed 21 patients (18 AVMs, 3 AVFs) who underwent 70 embolizations with Onyx; the goal of procedure which was symptomatic relief and bleeding control was achieved in all patients; minor transient complications occurred in 7 procedures (10%)
- Dabus et al. JNIS 2013 – patients with symptomatic scalp AVF treated with Onyx; all cases cured with no complications

Results – our experience

- 17 patients (12 females and 5 males) with 21 AVM/AVF
- 4 to 66 years old (mean 45.2 years)
- All patients were symptomatic (pain, bleeding and mass/disfigurement were the most prevalent symptoms)
- One patient had 2 separated arteriovenous malformations; one had 3 separated AVF
- One patient with a nasal arteriovenous malformation had CM-AVM syndrome.
- 13 arteriovenous malformations and 8 arteriovenous fistulae treated in 28 embolizations procedures (ranging from 1 procedure to 4 procedures; mean 1.6 procedures).
- Onyx was used in 21 procedures; 3 procedures were done with ETOH; 2 procedures were done with nBCA; and 2 procedures used only coils
- Direct puncture was the only access in 10 procedures; transarterial technique was the only route in 13 procedures; 4 procedures used combine transarterial and direct puncture techniques; one procedure used transvenous route only
- In 28 procedures there was one procedural complication - skin ulceration
- At the end of last treatment session 12 out of 17 patients had angiographic cure or minimal residual vascular malformation (all 8 AVFs and 6 AVMs).
- Symptomatic control was achieved in all cases with all patients stating that the symptoms had resolved or significant improvement (mean follow up 8 months)
- Five patients underwent scheduled surgery to remove the arteriovenous malformations
20 F hx of multiple procedures in past, now with pain in the lip, bleeding and disfigurement

2nd session 6 weeks later
2nd session 2 months later

60yo F hx of facial pain and tinnitus
16-month f/u

19F Hx 3 sx and 9 embo in the past

Left ICA

Right ECA

Left ECA
Summary

- In AVFs cure is possible using liquid embolics
- Localized AVMs have the best chance of cure using embolization + surgery? or other embolic agents such as ethanol
- In diffuse AVMs cure is rare and symptomatic control is usually the goal of the treatment
- Craniofacial AVMs are rare lesions and should be managed in centers with expertise

“We are what we repeatedly do. Excellence, then, is not an act, but a habit.”

Aristotle 384 BC-322 BC

Thank You!

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