OBJECTIVES

To discuss the use of ONXY™: an ethylene vinyl alcohol copolymer liquid embolic agent in the treatment of peripheral (extra-cranial) vascular anomalies (malformations).

- Selected case-based illustrations across a range of peripheral vascular anomalies.
- Correlation with technical, clinical success and patient satisfaction.

BACKGROUND/CLASSIFICATION

- Vascular malformations (VM) are Non-proliferative structural anomalies of vessels – Normal endothelial turnover (n) Tumour regression (p).
- ONXY™ is an ethylene vinyl alcohol (EVOH) copolymer disbursed in dimethyl sulfoxide (DMSO). Microinjected Tantulum powder in the mixture enables fluorescent visualization ( Indo-opaque). It is classified as a liquid, non-erosive, permanent embolic agent.
- The FDA approved ONXY™ for treating cerebral vascular anomalies in 2005 (1-3). In Europe, ONXY™ is reimbursed for the treatment

ONXY™: Co-polymerizes (spoon-like) on contact with blood

METHODS

- Between Sep 2014 and Oct 2017, 15 patients were referred to our department with suspected vascular anomalies. 10 patients had morphologies suitable for embolization.
- Cases were reviewed at dedicated vascular anomalies MD.
- Patient demographics: Age range: 23-67 years; Equal number of men and women.
- Locations: Multiple vascular malformations (p<2), superficial (n=1), upper limbs (n=2), calf (n=2), and feet (n=2).
- Patient satisfaction survey (questionnaire) was carried out 3,6 & 18 months follow up in 9 patients and at 6 months in one patient.
- Patient satisfaction questions:
  - Q1: How satisfied are you with the treatment you have undergone for your vascular abnormality?
  - Q2: How would you rate your current symptoms after the procedure?
  - Q3: How partial was the post-operative period on a scale of 0-10 (10 being most painful)?
  - Q4: Were you satisfied with the explanation given by your doctor prior to the procedure? Yes/No
  - Q5: Has the treatment improved your quality of VM?

RESULTS

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<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>Diagnosis</th>
<th>Site</th>
<th>Clinical anatomy</th>
<th>Technical success</th>
<th>Clinical success (months)</th>
<th>ST</th>
<th>Patient satisfaction</th>
<th>Complication</th>
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Table 1: Clinical details and results of embolization. NdCB: N-butyl cyanoacrylate glue (Gelfoam); Sodium tetradecyl sulfate (duettressant); N/A: Not applicable.

DISCUSSION

Figure 1: Right upper thigh VM

Right upper high superficial VM. ONXY was injected directly into the nodule (b). Cols were used to block the draining veins (Image c, blue arrows). 18 month follow up US shows ONXY cast and no flow.

Figure 2: Right shoulder venous malformation

Right shoulder slow flow VM with subcutaneous and intramascular component (a). ONXY was injected directly into the superficial and deep component (b,c). MRI done 3 months post procedure shows areas of decrease in size of the superficial component (d). 3 month follow up US shows ONXY cast and absent flow.

Figure 3: Right supra clavicular swelling (VM).

Right supraclavicular VM (a). ONXY was injected percutaneously directly into the nodule and via the internal jugular vein (b1 & b2). Post-op appearance (c) 18 month follow up US shows ONXY cast and no discernable flow (e) and ONXY cast (d).

Figure 4: Nidus, flow voids, early venous filling: High flow AVM.

Pathinal high flow AVM at the side of the left foot (a). ONXY injected via the draining vein (b) and directly into the nidus (c). Final angiogram shows obliteration of the AVM (d). Follow up US shows ONXY cast (blue arrow).

Figure 5: High flow AVM

The technique used to embolize AVM. ONXY injected into the nidus penetrates deeply embolizing smaller countercurrent feeder vessels and therefore providing a complete treatment for all branches of the AVM. This technique was particularly useful in the above case, where it was impossible to navigate the microcathether (Image b, blue arrow) into the tortuous and small distal branches of the AVM. Post procedural US depicts ONXY cast (d).

CONCLUSION

The essence of handling and control during complex embolization procedures, in combination with its established safety profile makes ONXY™ the first choice embolic material in suitable morphologies of vascular anomalies. Treatment with ONXY™ in our experience has resulted in significant improvement in quality of life of the treated patients.

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