Low Flow (Venous) Malformation Management

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Session 94: 8:36a - 8:44a
Low-Flow Vascular Malformations
Program O (93-96), Diagnosis & Treatment of Vascular Malformations
7a-12p, Friday, November 16, 2018

Disclosures:
• Nothing to disclose

Clinical Workup
• office clinical consultation
• level of morbidity
• risks/benefits
• labs (coagulation profile)
• medical photography
• anesthesia consultation

Clinical Workup
• MUST BE MULTI-DISCIPLINARY !!!
• MRI review
• consultation from vascular, plastic surgery, or orthopedic oncology, medicine (hematology)
• image guided biopsy (in selected cases)


Sclerotherapy: Rationale

- malformations are caused by continued disordered growth in size of vascular channels occurring and controlled at the endothelial level

  - a chosen sclerosant acts endoluminally and is “endothelial-cidal”

Indications for Sclerotherapy

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<th>Absolute Indications</th>
<th>Relative Indications</th>
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<td>Venous hypertension</td>
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**Sclerotherapy Technique**

**Phlebographic Patterns**

- Cavitary
- Spongy
- Dysmorphic

**My general rules of thumb**

- mass since childhood
- at least 2 years
- longer if older adult

**BIOPTY**

**atypical findings?**

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**atypical findings?**
Phlebographic Patterns

- spongy
- cavitary
- dysmorphic

**Why does morphology matter?**

- evidence based and anecdotal predictors of higher treatment success are found in lesions that are:
  - cavitary and spongy
  - Type 1 or 2
  - MRI Grade I or II (evaluation of size and margins)

**Choice of Sclerosant**

- personal preference and experience are important factors in your decision
- lesion morphology must be considered
- should be based on the agents’
  - relative toxicity
  - viscosity
  - previous experience in the same lesion
  - proximity to vital structures
- one may consider more “mild agents”

**Choice of Sclerosant**

*DEHYDRATED ALCOHOL INJECTION USP*

*a much more caustic sclerosant*

administration rate: NO GREATER THAN:
0.1 ml / kg / 10 min
to a max of 1.0 ml / kg
Choice of Sclerosant

thought to be a less caustic sclerosant

maximum dose: 0.5 ml / kg

Bleomycin

- the new "up and comer" showing beneficial results
- recent studies have shown it to be slightly less efficacious than ethanol but better tolerated
- need to consider pulmonary fibrosis!!
- 450 mg recognized in the oncology literature as being associated with increased risk
- given in 1 mg/cc = 1 unit with 2-15 units given per session
- literature range is 15-250 units per patient
- possible case(s) of IR related pulmonary fibrosis


Other Proprietary Options

the efficacy and safety profile appear to be well-aligned

the fact that the foam is 2/3 O₂ and 1/3 CO₂ with 0.8% nitrogen quells fears of right to left shunting

the foam remains stable for much longer than foam of 3% sodium tetradecyl sulfate (all other variables being equal)
given it’s anesthetic properties, the foam is much more comfortable when administered
this, in turn decreases reliance on anesthetic support

Advantages

Varithena

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1% polidocanol in the form of Varithena is not inexpensive however, one canister has sufficient sclerosant to last for multiple patients having to only change the inexpensive "transfer unit" one canister and can be used for 7 days we have "stacked" multiple venous malformation cases on single days this is also easier given less anesthesia / faster room turnover when one takes into account the cost of Lipiodol and sodium tetradecyl sulfate, the costs become more comparable

Cost Issues

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Disadvantages

is only commercially available in 1% in North America the percentage concentration in the venous malformation literature ranges from 0.25% to 4% it is my opinion that larger lesions and vascular spaces will require higher concentrations the silicone free syringes do not have a "smooth" and "responsive" tactile feedback that I am used to in other procedures

Choice of Sclerosant

I NO LONGER HAVE A DEFAULT SCLEROSANT will have a low threshold to use them synergistically the first visit is always "conservative" i.e. not a stronger agent, unless if I encounter a "lucky" situation that may never reveal itself again the volume of the cavernous spaces are significant and I am concerned about rapid dilution avoid the use of stronger agents if the lesion is close to vital structures avoid stronger agents if the lesion is near the skin, consider bleomycin

Basic Sclerotherapy Technique

Basic Sclerotherapy Technique

• often requires multiple access sites
• local tissue pressure does not allow the entire lesion to be reached from one point
• local sclerosant effects
• will first redirect the sclerosant
• will eventually shut down local venous channels due to increased resistance
Sclerofoams

Increased dwell-time leads to increased efficacy

Sclerotherapeutic Efficacy

- Increased dwell-time leads to increased efficacy

Success

Failure

Dwell Time

Concentration

Creating a Sclerofoam

Tessari Method

3:6.5:0.5

Benefits of Sclerofoams Using Ultrasound

- the extreme echogenicity of foam allow easy tracking of penetration and distribution into the lesion

Basic Sclerotherapy Technique

- phlebography is performed noting:
  - volume distribution
  - type and rate of venous drainage
  - proximity to vital structures
  - sclerosant is administered to “displace” contrast under subtraction

pre sclerotherapy

post sclerotherapy
Basic Sclerotherapy Technique

Polidocanol Sclerotherapy Technique

Benefits of Lipiodol
- Introducing lipiodol into ethanol has two benefits
- It slows the flow of the agent within the lesion
- Acts as a "tracer bullet" to monitor your rate and distribution of sclerosant

Benefits of Lipiodol

Use Gravity!
- If using a lighter than blood sclerosant, access the most dependant portion of the lesion
- Bolster or change the position of the body part if it helps

Clinical Followup
- Recovery area, conservative analgesia
- Kefotel 30 mg IV
- Sparing use of compression
- LMWH for a minimum of two weeks (if indicated)
- Interval to next sclerotherapy no less than one month
- Schedule sclerotherapy sessions in groups of three
- MRI no earlier than 6 months after last sclerotherapy
**MRI Followup**

- allows serial evaluation of changes in size of lesion
- helps direct selection of regions to be treated on subsequent sessions
- sclerosed regions will exhibit decreased size and signal on T2-weighted imaging

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**Efficacy of LM Sclerotherapy**

Picibanil™ or Bleomycin for LMs
- contrast injection
- fully distended
- aspiration
- OK432 or Bleomycin injection

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**T1**  **T1 Gad**  **FSE T2**  **FSTIR**

**Sclerotherapy**

**Lymphatic**  **Malformation**