Purpose

- To determine optimal ethanol endovascular embolization treatment strategies for the management of problematic AVMs of bone.

PATIENTS

- 36 Patients
  - 21 female; 15 male
  - Age range: 11 – 48 yrs.
  - Mean age: 22 yrs

PATIENTS

- 16/36 patients with bone AVMs had 2 or more AVMs
- 44% of patients with bone AVMs had multiple AVMS, whether in soft tissues or other bones

Outcome

- 33/36 patients AVMs cured,
  - 3 cases on-going Rx
- F/U range: 3 mos. – 83 mos.
- F/U mean: 42 mos.
- 3 patients therapy on-going
- No recurrences noted

Complications

- 1 patient had coil migration to the lung; coil retrieved.
- 2 patients had skin injuries that healed with conservative care.
- 1 patient had slight weakness in the left quad. fem. muscle group prior to treatment; unchanged with curative embo treatment.
- Transarterial
- Direct puncture
- Retrograde vein
- ETOH
- ETOH and coils

- 15 yo female with Rt mandibular and lower lip AVMs, loose teeth, gingival hemorrhages, and pain syndrome.
- Yakes Type IIIb AVM

Rt mandible AVM supplied by Rt Inferior Alveolar artery.

RIM injection

AP direct puncture DSA intra-osseous position in the Rt mandible with 21g needle
Lateral Rt mandible direct puncture DSA with 21 g needle; note multiple out-flow veins Yakes Type IIIb AVM

11 Month Followup

Yakes Type IIIa AVM

- 32 yo male school teacher with long-standing pain and severe stiffness in the Lt thigh with hypertrophy of the Lt thigh musculature and fibrosis in the muscular tissues limiting motion.
33-year-old female with severe left pelvic bone pain due to repeated microfractures in the left iliac wing. Severe pain in the left femur. Severely restricted ability to stand and walk. Exercise intolerance with cardiac outputs were 11 l/min.

Yakes Type IIIb AVMs

Intraosseous AVM of iliac wing and soft tissues and second AVM of femur
Massive Lt Iliac wing
Yakes Type IIIb AVM
arterial phase

Venous phase
Note the vein aneurysms

Stainless steel & platinum coils

Direct puncture DSA demonstrating thrombosis of this major AVM compartment with coils alone.

Cure at 14 months F/up
18 year old boy with diffuse intraosseous AVMs treated with direct puncture and coils
CONCLUSIONS

- Long-term f/up documents cure of treated bone AVMs.
- Bone AVMs typically are of the Yakes Type IIIa/IIIb AVMs.

- Bone AVMS are rare entities, usually type IIIa and IIIb
- Multiple embo approaches are necessary for curative treatment.
- ETOH, ETOH/coils, coils alone embos are proven efficacious and curative.
- Multiple AVMs possible in 50% of patients.