Yakes Type IV Infiltrative AVM’s Curative Treatment Strategies: A New Entity

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Disclosures: none

The Yakes Classification System

Type IV angioarchitecture not described before

Yakes Type IV AVM:

- Definition of AVM is a artery to vein connection without intervening capillary bed
- Diffusely infiltrating the affected tissue
- Other than brain AVM: bleeding occurs if Ulcer is present (no barrier) or if mucosa is involved (bowel)

How to access?

- Infiltrates tissue
  - Tissue is viable and not devitalized
  - Normal capillary beds present admixed among innumerable AVFs

How to treat?

- Challenge as normal capillaries have to be maintained

- Transarterial
- Direct Puncture
Physiologic Concept

Arteriovenous fistulas • 100 mmHg

Normal capillaries • 20 mmHg

• The innumerable micro-AVF drain into multiple veins
• The capillary beds also have vein outflow, lower pressure
• normal post-capillary venous drainage then competes with the arterialized vein out-flow → restriction of normal tissue flow

Capillary out-flow veins become engorged, backing up blood into capillary beds and then backing up blood to the arterial in-flow
• AVF’s have lower pressure and increased arterial flow compared to the normal capillaries

How to treat
Take advantage of this physiologic state:

50/50% Mixture of Contrast and Ethanol
Dilute ethanol, thicken fluid by increasing viscosity and specific gravity
→ preferential flow into AVF’s in transarterial injections
Normal arteries, arterioles and capillaries remain intact while AVF’s sclerose

When to use 50:50 mixture?

Pure ethanol if puncture distal to nutrient arteries

50:50 mixture contrast:ethanol
50/50% Ethanol

Additional Benefit of adding contrast
→ injection is visible on fluoroscopy

To consider:
• needs more overall ethanol as it is diluted
• Not efficient in larger vessels but in type IV microfistulas
• Use only non-ionic contrast, ionic contrast solid precipitates

Conclusion

• Yakes Type IV is a new entity
• Understanding of hemodynamics enables treatment strategy
• Transarterial or DP access, retrograde from venous side
• Concept 50/50 mixture of contrast and ethanol
• Cure of Yakes Type IV AVM is possible