











Embolization Device Selection: The Pros and Cons of Liquid Agents Versus Coils, or Plugs


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Disclosures Penumbra, Medtronic, Gore, Shockwave, Terumo





| Liquid Embolic | Coils <i>Medtronic</i> | Plugs |
|--|--|--|
|    |    |    |



Embolization Options





Coils


- * Pushable
- * Detachable

Plugs



- Amplatzer™
- MVP™
- AZUR® Plug









Cook® Medical


- * Nester®, Tornado®
- * .018", .035", or .038" compatible
- * 20 cm max. in length
- * 20 mm max. in diameter
- * Delivered with a pusher wire or flush
 - * Lack of control or placement
- * Offers cheap options (\$100 – \$200)



Detachable Coils

| | |
|--|---|
| <p>Boston Scientific®</p> <ul style="list-style-type: none"> * Interlock™-18 and 35 * IDC™-18 Soft * Embold™ <p>Terumo®</p> <ul style="list-style-type: none"> * AZUR® HydroCoil 18 and 35 * AZUR CX 18 and 35 * AZUR HydroPack™ | <p>Medtronic®</p> <ul style="list-style-type: none"> • Concerto™ Helical • Concerto 3D <p>Balt®</p> <ul style="list-style-type: none"> • Prestige Plus |
|--|---|



Liquid Embolics

- * Growing number of liquid embolics on the market
- * Usually premixed and deliverable through an injection
- * Designed typically for smaller distal vessel beds
- * Can cause non-target embolization
- * Typically requires DMSO
- * Provides "improved visibility"



Medtronic®

Onyx™ Liquid Embolic System

- * Available in 18 & 34 viscosity
- * Indicated for neurovascular use only (US)
- * Consist of
 - * EVOH – (Ethylene vinyl-alcohol copolymer)
 - * DMSO (Dimethyl-sulfoxide)
 - * Ta (Tantalum powder)
- * Deliverable through a microcatheter
- * Solidifies after 5 mins



SIRTEX®

LAVA® Liquid Embolic System

- * Available in a 2 mL or 6 mL vial
- * 18 or 34 viscosity
- * Packaged with a delivery syringe and comes premixed
- * First liquid embolic approved for peripheral use
- * DMSO Compatible (comes packaged with it)
 - * Same components as Onyx™
- * 1-year shelf life



Boston Scientific®

Obsidio™

- * Liquid gel embolic indicated for small vessels up to 3 mm
- * Described as a "conformable embolic"
 - * Made with shear-thinning technology that adjusts based on the amount of force used
- * Packaged in 1 mL syringe with minimal prep time
- * Microcatheter compatible (.024" or greater) and no DMSO required
- * Must be stored in a fridge (2 C° to 8 C°)



Plugs

- * Growing number of plugs available
- * Referred to as a "one and done" device
- * Often delivered via a large guide catheter or sheath
- * Proximal embolization
- * Mechanism of action is thrombus formation
- * Covered vs. Uncovered Plugs




Abbott®

Amplatzer™ Vascular Plugs


- * Oversize 30 – 50% larger than target vessel
- * AVP
 - * Requires 5 F – 8 F guide catheter or 4 F – 6 F sheath
- * AVP II
 - * Requires 5 F – 9 F guide catheter or 4 F – 7 F sheath
- * AVP 4
 - * "Low-Profile" plug
 - * Requires .038" 4 F or 5 F catheter




Medtronic® Microvascular Plugs




- * Oversize 30 – 50% larger than target vessel
- * MVP™ 3 and MVP 5
 - * Treats 2 mm – 5 mm vessels
 - * Microcatheter compatible
- * MVP 7 and MVP 9
 - * Treats 5 mm – 8 mm vessels
 - * 4 F or 5 F diagnostic catheter compatible

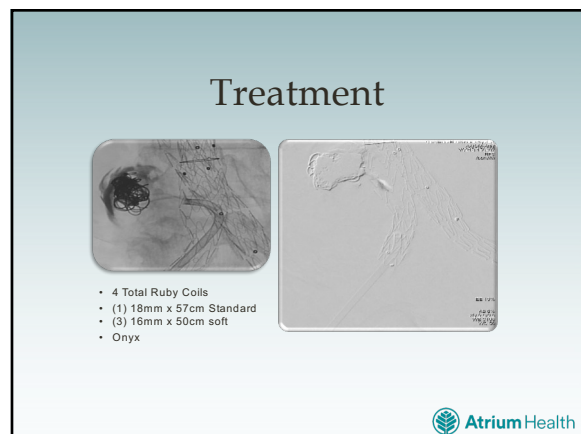
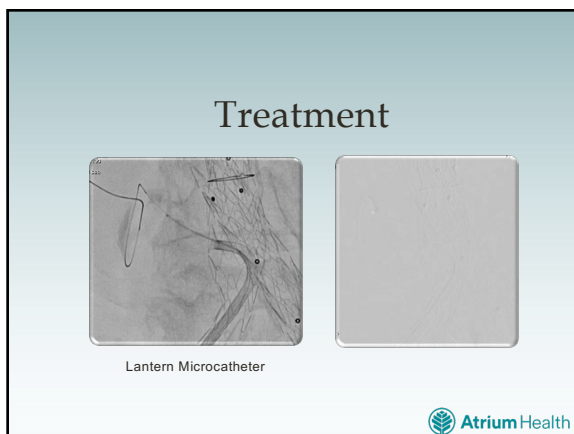
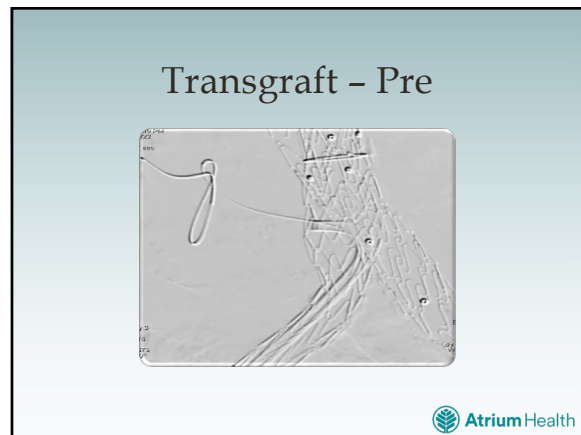
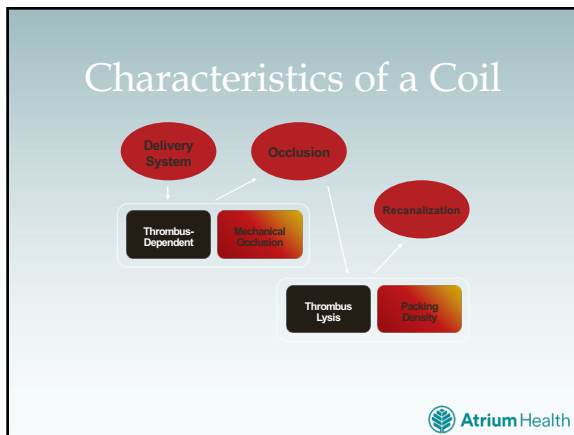


Terumo® AZUR® Vascular Plug

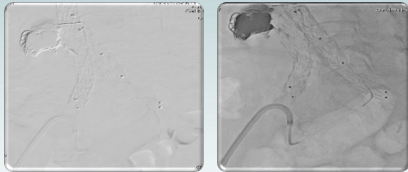


- * 5 mm AZUR Plug (small)
 - * Treats 2.5 mm – 4.5 mm vessels
- * 8 mm AZUR Plug (medium)
 - * Treats 4.5 mm – 6.5 mm vessels
- * 10 mm AZUR Plug (large)
 - * Treats 6.5 mm – 8 mm vessels
- * ePTFE and PET inner membrane
 - * Titled membrane inside of plug allowing blood to pass through while leaving thrombus behind
- * All deliverable via PG Pro 2.8 F microcatheter
- * Electrolytic handle





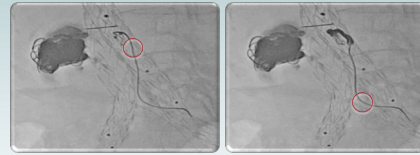
Treatment



Lantern Microcatheter



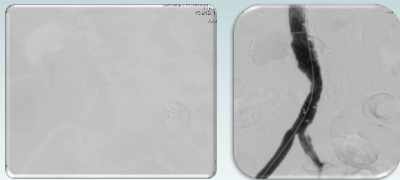
Treatment



(2) Pod Packing 60cm



Post Treatment



Penumbra's Complete Embolization Platform

- *Dedicated Devices for Different Applications
- *Largest Diameter Coil on Market[®] → up to 40 mm
- *Softest Coil on Market[®]
- *Multiple sizes → available in 60 cm lengths
- *100% Detachable
- *High-Flow Microcatheter Compatible
- *Low Profile Microcatheter Compatible

