Matching the Right Venous Stent to Your Patient and Their Individual Anatomy

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Disclosure

Speaker name: Ramon L. Varcoe

I have the following potential conflicts of interest to report:

- Receipt of grants/research support
  Details: Abbott Vascular

- Receipt of honoraria and travel support
  Details: Abbott Vascular, Medtronic, Boston Scientific

- Employment in industry
  Details:

- Shareholder in a healthcare company
  Details:

- Owner of a healthcare company
  Details:

- I do not have any potential conflicts of interest to report
What we know about *Deep Venous Intervention*

- Stents have **superior durability** than simple angioplasty.
- Arterial stents have **several limitations** that make them ill-suited for the purpose
  - Small sizes
  - Low radial strength/crush/collapse
Evolution

1st Generation
Venous Stents

Arterial
Stents

Wallstent

PTA

1st Generation
Venous Stents
The Qualities of the “Perfect” Venous Stent

• Self-expanding

• Flexible to follow the anatomy (kink resistant)
Flexibilty

“Hip flexion results in a folding point 42.8mm above the roof of acetabulum and 35.1mm above the inguinal ligament”
Flexibility
The Qualities of the “Perfect” Venous Stent

• Self-expanding
• Flexible to follow the anatomy (kink resistant)
• Strong (Crush Resistance & Radial Strength) length of the stent
Crush Resistance & Radial strength

**FOCAL LOAD**

Crush Resistance
- Ability to withstand non-uniform **FOCAL** load.

**CIRCUMFERENTIAL LOAD**

Radial Resistive Force
- Ability to withstand uniform **CIRCUMFERENTIAL** load.
The Qualities of the “Perfect” Venous Stent

• Self-expanding
• Flexible to follow the anatomy (kink resistant)
• Strong (Crush Resistance & Radial Strength) length of the stent
• Accurate deployment and positioning
• Minimal foreshortening
• Resists hyperplastic ingrowth
• Large diameters
• Long lengths
Wallstent (Boston)

- **Elgiloy** (Co, Chromium, nickel & Fe)
- **Braided**, closed cell design
- **7-11F delivery system**
- **Diameter 10-20mm**
- **Lengths 20, 40 & 90mm**
Wallstent (Boston)

- Most **clinical experience**
- Repositionable
- Fracture resistant
- BUT
- Foreshortens
- Tapering
- Poor deployment accuracy
- Short lengths (90mm)
Zilver Vena (Cook)

- Nitinol
- Open cell design
- 7F delivery system
- Diameter 14-16mm
- Lengths 60, 100 & 140mm
Zilver Vena (Cook)

- Low profile
- Very flexible

BUT

- Low-medium radial force
- Limited size matrix
  (particularly diameter – only up to 16mm)
Sinus-Venous Stent (Optimed)

- Nitinol
- Open cell, segmented ring design
- 10F delivery system
- Diameter 10-18mm
- Lengths 40, 60, 80, 100, 120 & 150mm
Sinus-XL Flex (Optimed)

- Nitinol
- Open cell design
- 10F delivery system
- Diameter 14-24mm
- Lengths 40, 60, 80, 100, 120 & 150mm
Sinus-Obliquus Stent (Optimed)

- Nitinol
- Hybrid cell design
- Oblique (35%) bevelled proximal end
- 10F delivery system
- Diameter 14-16mm
- Lengths 80, 100 & 150mm
Sinus-Obliquus Stent (Optimed)

• Intended to avoid over-stenting the contralateral CIV
• Also, avoids leaving it too short and requiring a second stent
  BUT
• Can’t approach from jugular
• Doesn’t work for all patient anatomies
NOT SO GOOD
BAD
Venovo (Bard)

- Nitinol
- Open cell design
- Flared ends (3mm)
- 8-10F delivery system
- Diameter 10-20mm
- Lengths 40, 60, 80, 100, 120, 140 & 160mm
Venovo (Bard)

- Easy **single-handed** deployment
- Good size matrix
- Good radial force

**BUT**

- Stiff, may kink, may straighten vein
- Flared ends ?irritant
Vici Stent (Veniti)

- Nitinol
- Unique, closed cell design
- 9F delivery system
- Diameter 12-16mm
- Lengths 60, 90 & 120mm
Vici Stent (Veniti)

- Easy deployment
- Good radial force and crush resistance
- Good for tumour compression

**BUT**

- Stiff, may straighten vein
- Foreshortens
- A lot of coverage
<table>
<thead>
<tr>
<th>Trial</th>
<th>N</th>
<th>Year</th>
<th>Stent</th>
<th>Manufacturer</th>
<th>PTS/NIVL</th>
<th>Findings</th>
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**PTS**
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**MTS (NIVL)**

**THE VERVE SYMPOSIUM**
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MTS & PTS
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**MTS & PTS**

Diagram showing the relationship between MTS (Medial Tibial Sympathetic) and PTS (Posterior Tibial Sympathetic). The diagram includes an MTS & PTS flexion point.

**Table:**

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Conclusion

• Short term *patency rates* seem very good with dedicated venous stents
  (particularly for NIVL)
• We desperately need *more trials*!

• We DO NOT know the best venous stent
• For now, matching the properties of the stents to your individual patient anatomy and condition may achieve best results
Matching the Right Venous Stent to Your Patient and Their Individual Anatomy

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Sydney, Australia