Which venous stents for which indication

Stephen Black
Consultant Vascular Surgeon
Clinical Lead for Venous and Lymphoedema Surgery
Guy’s and St Thomas’ Hospital London
Disclosure

Speaker name:
Stephen Black

I have the following potential conflicts of interest to report:

- Consulting: Medtronic, Cook, Optimed, Volcano, Veniti
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

- I do not have any potential conflict of interest
We treat three groups

Acute Post Thrombotic
Chronic Post Thrombotic
Non-Occlusive Non Thrombotic (NIVL)

The stents sole role is to maintain an adequate lumen
The effect of radius on flow

Suppose the original flowrate is 100 cm$^3$/sec. The effect of changes in the parameters is as follows:

- Double length → 50 cm$^3$/sec
- Double viscosity → 50 cm$^3$/sec
- Double pressure → 200 cm$^3$/sec
- Double radius → 1600 cm$^3$/sec

* With other parameters held at original values

A 19% increase in radius will double the volume flowrate!
Original options limited

Arterial Stents - small diameters

High radial force does not imply crush resistance
New Dedicated Venous Stents

Veniti
Optimed
Cook
Bard
Medtronic
Boston Scientific
Radial Force Vs Crush Resistance

Trade off between strength and flexibility
Stent outcome observations

The inherent forces of any stent

- Circumferential force
- Chronic outward force (COF) and Radial Resistive Force (RRF)
- RRF > COF

Bench test
Strength and coverage for venous disease

Crush Resistance

Newton

9.52
20.19
29.05
Residual compression at the left common iliac vessel crossing

‘Arterial’ stent - open cell structure

Venous Stent - open cell structure

Braided stainless steel stent

Venous Stent – closed cell structure
Flexibility

leg in foetal position
Conclusions

• Dedicated stents potentially improve treatment
• First generation of stent design
• The stent alone is not the panacea
• Know each device and technical issues
• We need long term patient outcome data to support use
• We do not have data yet to know which stent is better