How shall we treat varicose veins in the future?

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Disclosure of Interest

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I have the following potential conflicts of interest to report:

- Consulting : Quali Med
- Shareholder in a healthcare company : Miravas
Past, Present, Future

- Past: REMOVE Stripping
- Present: RETRACT Thermal, Chemical techniques
- Future: REPAIR
Remove

Cryo stripping : 1978
RETRACT

• ENDOVENOUS TECHNIQUES:

--- Laser
--- RF
--- Steam
Histologic patterns

Thermal

Microscopic study after One month / Animal

Chemical
The Venifit® generator (Medtronic)
The Veno Steam® generator (Cerma Vein)
Combining thermal techniques

- Radio Frequency has a proven record of efficiency in Great Saphenous trunks ablation and is considered the Gold Standard.
- Steam is invaluable for tributaries and recurencies
- Both generators have been introduced nearly 10 years ago
Chemical techniques

Figure 1. The Clarivene occlusion catheter.

The VenaSeal® glue (Medtronic)
Figure 3. Varithena polidocanol injectable foam.
B.O.B : BALLOON ON BALLOON
Advantages

• No blood interface between wein wall and sclerosing agent
• Time of contact can be several minutes
• No tumescence
• No pain
Repair

• Non Invasive valvuloplasty:
  in 25% of our patients primary defect was reflux at the subterminal valve (Matrix)

• Prosthetic valve
External cuffing - 1993

- We used 0.1 mm thickness Teflon pericardial patch (Gore®) because it does not induce fibrosis.
- Abolition of reflux was checked with a CW Doppler catheter which we developed.
Non Invasive Valvuloplasty

Johann Chris Ragg (Berlin)

Principle of percutaneous valvuloplasty: a) healthy vein, b) dilated and insufficient valve zone with preserved valve structures (early stage of vein disease), c) perivenous gel, valve zone diameter normalized, function restored.
Moderate reflux of proximal GSV and two side branches (1200 ms), b: orthograde flow after injection of 6.8 ml hyaluronan gel (< 0.2 mm particle size), c: gel distribution pattern.

Another hyaluronan (Macrolane, particle size < 1 mm): a) Moderate reflux of proximal GSV (1800 ms), elliptical shape most probably due to former postinflammatory adhesions, b: orthograde flow after injection of 9.0 ml hyaluronan gel, c: gel distribution pattern.
The problem: Gel embolization

Solution: Thermo sensitive gel
Injected as a liquid, heated by ultrasound
Prosthetic Venous Valves

- Many animal studies, some human implantations
- With disappointing results

2 Main Problems

- No man made material could reproduce the physical properties of valve tissue
- All these valves were supported by a Rigid stent, which is contrary to the Physiology of the vein wall

Graphene, the ideal material
Advantages

- **Graphene** can be used to manufacture very strong, thin and light elements.
- 3D Printers for Graphene are now available.
- Graphene is non-thrombogenic.

The insertion ring

- Ultraviolet activated glue which does not harden when polymerized.
- Hollow Silicone ring extruding the glue when correctly positioned.
  * Inserted like an expendable stent.
Conclusion 1

• Thermal techniques were introduced in 1999/2000 but recommended as first choice by guidelines only 3 years ago.
• They will be used for many more years as the new procedures will need time to be reimbursed.
* Home made Foam will be widely used too.
Conclusion 2

- Early detection of venous insufficiency is necessary to implement these conservative techniques.
- Patients with a family history of venous disease could be targeted first.
- Gene therapy will one day make our devices obsolete!