Advances in peripheral embolisation therapies

Embolisation of type II endoleaks with a combination of liquid embolic and microvascular plug

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Disclosure

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I have the following potential conflicts of interest to report:

- Consulting: ab medica, BTG, Endoscout, Medtronic
Endoleaks: challenging drawbacks of EVAR

- **Def.:** persistent blood flow to the aneurysm sac
- **Frequent complication of EVAR / TEVAR**
  - Up to 25% of the cases
- **Urgent treatment for type I and III**
  - Domain of e.g. endostapling
- **Different strategies for type II**
  - In > 40% spontaneous occlusion
  - High recurrency rate

Type 2 EL: to treat or not to treat?

• Majority of European and American guidelines:
  – Treat always if sac expansion is present
• Risk of rupture $\approx 0.9\%$
• Many cases require more than one procedure
• Attempts to predict the outcome of T2EL:
  – Number and diameter of aortic branches, especially IMA
    (e.g. Güntner, et al. 2014, Müller-Wille, et al. 2015)
  – Thrombus protects from sac enlargement
    • Low thrombus volume ($< 30\%$) is risk factor for persistent T2EL
  – Endoleak nidus $> 15$mm is predictive for sac enlargement
Type 2 endoleaks: treatment strategies

• Typical finding:
  – Fed by the inferior mesenteric or a lumbar artery via iliolumbar a.

• Follow-Up surveillance
  – As long as there’s no sack growth
    • 40% occlude spontaneously

• 2 possible treatment strategies
  – Trans-arterial via SMA / hypogastric
    • Can be difficult
    • Reaching the nidus prerequisite for success
  – Trans-lumbar direct puncture
    • E.g. CT guided
Variants of iliolumbar endoleak embolization

Summary:
• Trans arterial treatment of IIb EL can be challenging
• Advanced embolization techniques may be necessary, e.g. Plug and Push technique
• Worth giving it a try
Why Onyx™ as embolic agent?

- **Liquid**
- **Advantages**
  - Immediate occlusion
  - Flexible, fills even complex cavities
  - Reach nidus
  - Easy to use, safe, no expert tool
  - Precisely to control, flow directed
  - Even usable in high flow conditions
  - Low recanalization rate
  - Compatible to ePTFE
Why combine plugs with Onyx™ I

• To safe vasculature

Onyx alone: Occlusion of a large segment of lumbar vasculature

Onyx plus plug: Defined focal occlusion with patent distal vasculature
Why combine plugs with Onyx™ II

First drops of Onyx

Backflow behind catheter tip blocks feeding vessel (plug)

Block of feeding vessel allows push through of Onyx throughout the whole EL or AVM

Used liquid embolic agent: Onyx-18

- Ideal: small difference in diameter between catheter and feeding artery
- Bad: big difference in diameter between catheter and feeding artery will require lot of time and material to plug feeding artery
Male, 76yrs
- EVAR 2017
- Typ IIa EL via IMA

Trans arterial trans riolan probing of IMA and EL

Trans EL embolization of outflow vessels

Protective embolization of IMA ostium with MVP Plug

Summary:
- Trans arterial treatment of IIa EL is method of choice
- Trans EL embolization of outflow vessels reduces pain, volume of embolic agent and risk of recurrence
- Protective embolization of IMA ostium reduces risk of mesenteric non-target embolization
Type II endoleak with lumbar inflow, no trans-arterial treatment option

Planning scan already in prone position

CT guided puncture with aortography needle (short pain): you may orientate by wall calcifications of the aorta

Placement of a Rebar™-18 Microcatheter

Introduction of micro catheter into catheter needle after withdrawal of steel core by use of Y-adaptor
Move to the Angio-Suite, needle and catheter are secured by a sterile person

Endoleakography with depiction of inflow and outflow vessels and to estimate the volume and the whole extent of the endoleak

Trans endoleak probing of outflow vessels with microcatheter

Embolization of outflow with MVP™ Microvascular Plug System 3: safes material and reduces pain

Protective embolization of lumbar outflow

Embolization with mit Onyx™ liquid embolic system 34

Occlusion of puncture defect and canal with Onyx™ liquid embolic system during catheter pullback (slightly painful)

Switching to the Angiosuite for the embolization process after CT guided puncture allows for:
- Navigation within the EL
- Reliable control of embolization
- Protective embolization of side branches
Male, 87yrs
- EVAR 2016
- Iliac side branch right
- Complex combined type Ib and Ila EL

CT guided puncture of hypogastric artery right

In angio suite:
- Embolization of hypogastric artery sidebranches

In angio suite:
- Trans endoleak embolization of lumbar sidebranches

In angio suite:
- EL nidus embolization with 11 vials Onyx™ 34L
  - (2 x 6ml, 9 x 1.5ml)
Summary and conclusion

- **Type 2 endoleaks**
  - Treatment if sac enlargement
  - Endovascular and percutaneous treatment safe with different benefits: patient tailored approach necessary

- **Onyx™ liquid embolic system so far best performer**
  - Safe, fast, easy to use
  - Lower recanalization rate than other embolics

- **Combination of plugs and Onyx increase safety**
  - More capabilities to safe non-target vasculature
  - Effective block of other embolics

- **Protective embolization of inflow / outflow vessels**
Thank you very much for your attention!

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