Selective lumbar coiling prior to EVAR – a valuable strategy to prevent type II endoleaks?

Tim-Ole Petersen

Department of Diagnostic and Interventional Radiology

University of Leipzig
Significance of Type II Endoleak

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Clinical research study

Type II endoleak with or without intervention after endovascular aortic aneurysm repair does not change aneurysm-related outcomes despite sac growth


Joy Walker, MD*, Lue-Yen Tucker, BA*, Philip Goodney, MD*, Leah Candell, MD*, Hong Hua, MD*, Steven Okuhn, MD*, Bradley Hill, MD*, Robert W. Chang, MD*

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Clinical research study

Type II endoleak is an enigmatic and unpredictable marker of worse outcome after endovascular aneurysm repair


Enrico Cieri, MD, PhD*, Paola De Rango, MD, PhD*, Giacomo Isernia, MD*, Gioele Simone, MD*, Andrea Ciucci, MD*, Gianbattista Pariani, MD*, Fabio Verzini, MD, PhD, FEBVS*, Piangiorgio Cao, MD, FRCS*

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1736 EVAR
474 Type 2 EL (27.3 %)

„overall all-cause mortality and ARM were unaffected by the presence of a T2L“

1412 EVAR
218 Type 2 EL (15.4 %)

„type II endoleak appears to be a marker of EVAR failure that is difficult to predict and treat effectively“
Risk factors for T2EL

- Aneurysm configuration (larger proximal neck, larger diameter)
- Thrombus load
- Age
- No Smoking / COPD
- Absence of peripheral arterial disease or coronary sclerosis
- Number and size of aortic side branches (ASB)
Incidence Type 2 EL

- 6 - 42% Type 2 EL (T2EL)
  - Early T2EL > 80%
    - Spontaneous regression 33 - 80% (*, **)
  - Persisting Endoleak > 6m 5 – 33 %
    - Spontaneous regression < 6,1 % (**)

- Indication for treatment
  - Sac growth > 5 mm
    - Dislocation of the graft
    - Rupture of the aneurysm

Treatment of T2EL

- Approaches after EVAR for Embolization:
  - Transarterial: Iliolumbar artery, Arc of Riolan
  - Percutaneous direct puncture
  - Proximal / distal underneath the graft

- Long and difficult procedures (success rate ~42%) *
  - Lumbar type T2EL ~17 – 40%

* Muthu et al. J Endovasc Ther 2007
** Gallagher et al. J Endovasc Ther 2012
Risk factors for relevant T2EL from ASB

- 0-3 patent lumbar art. -> 13% T2EL (*)
- ≥ 6 patent lumbar art. -> 50% T2EL (*)
  - 3rd and 4th LA (OR 0,1 & 0,31) (***)

- Diameter of lumbar art. >2 - 2,4 mm (****/**)
- Patent inferior mesenteric artery – IMA (*)

- Diameter of IMA > 3,8 mm (**)

* Fan et al. Radiology 2001
** Löwenthal et al. Fortschr Röntgenstr 2015
**** Marchiori et al. J Endovasc Ther 2011
Embolization of IMA prior EVAR

- 79 pat. -> 40 IMA embolized (*)
  - 25 % T2EL vs. 59 % T2EL
  - No embolization of lumbar arteries

- 74 pat. -> 31 IMA embolized with AVP 4 (**)
  - 0 % T2EL vs. 25,6 % T2EL

- 266 pat. -> 108 IMA coiled (***)
  - 34,3 % T2EL vs. 49,4 % T2EL

* Navala et al. J Vasc Interv Radiol 2010
** Müller-Wille et al. Cardiovasc Intervent Radiol 2014
Combined Embolization of ASB II

- 23 pat. 100 % IMA-, 65 % LA-Embolization (*)
  - 4,5 % T2EL w/o sac expansion

- 124 pat. -> 60 ASB embolized; 64 w/o Embolization (**)  
  - 3,6 % T2EL vs. 47,8 % T2EL

- 50 pat. 13/16 IMA coiled, 8/13 LA embolized (***)  
  - 0 % T2EL (Embo) vs. 62 % T2EL (non-Embo)

* Bonvini et al. J Endovasc Ther 2003  
** Alceri et al. J Endovasc Ther Oct 2013  
Conclusion

Embolization of (3rd and 4th) Lumbar arteries if ≥ 2 mm and the inferior mesenteric artery ≥ 3,8 mm

- prevents the occurrences of relevant Type II Endoleaks
- splits the EVAR procedure into two interventions and therefore also the procedure time, radiation exposure and amount of contrast medium used
Thank you for your attention
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