

MRI Features of Aneurysm Walls and Intraluminal Thrombus Associated with Sac Shrinkage after EVAR



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Nippon Medical School Chiba Hokusoh Hospital, since 1994

Advantages of MRI Over CT

Sensitive EL Detection

Gd-MRI offers higher sensitivity for detecting ELs

Thrombus Staging

evaluation of temporal thrombus evolution

Wall Visualization

Hyper contrast resolution allows clear delineation of Aneurysm Wall



Question

Can MRI predict whether the aneurysm sac will shrink or expand after EVAR?

Materials and Methods

Methods: Study Design

50 patients

(40 men, 10 women; median age 77.2 years)
underwent **Gd-enhanced MRI** before
and 6 months after EVAR
between April 2019 and January 2026.



3T GE Discovery 750 with 3 sequences:

- **TIWI Black-Blood, T2WI (SSFSE)**
— thrombus signal analysis
- **Gd-enhanced Fast TOF SPGR**
— EL detection, AWT

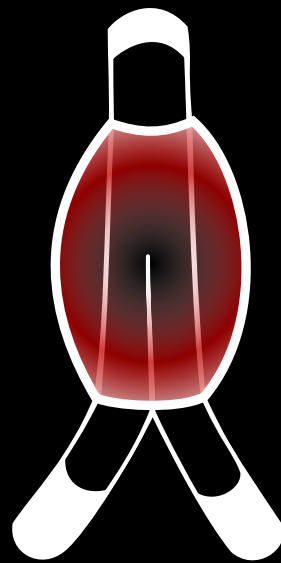
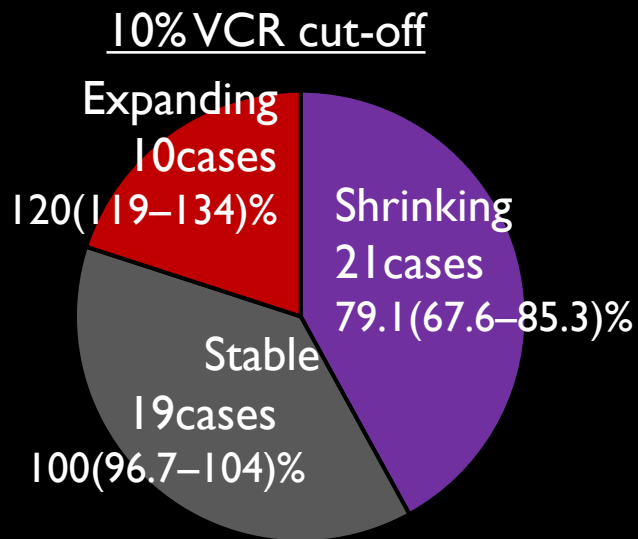
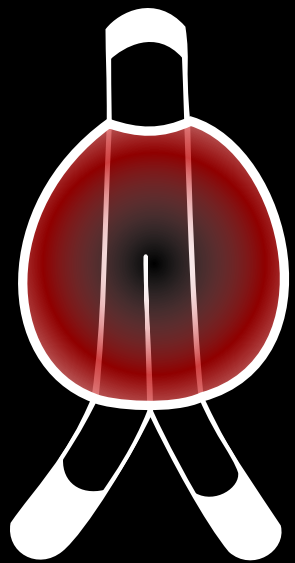
Our standard follow-up schedule

Pre to 1y after EVAR



1-yr AAA VCR (Volume Change Ratio)

Assessment using CT volumetry



1-yr AAA VCR (Volume Change Ratio)

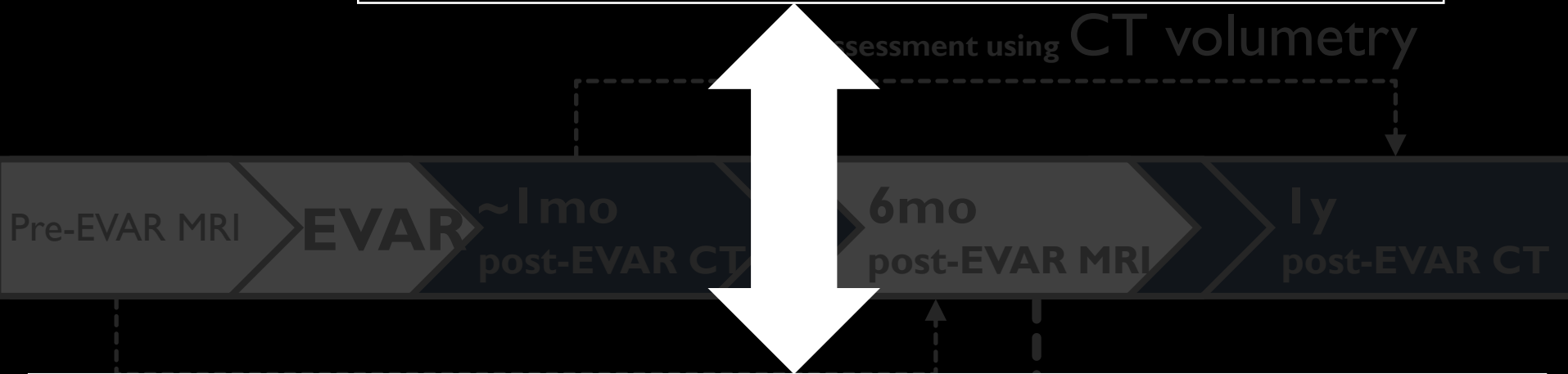
Assessment using CT volumetry



3. Aneurysm Wall Thickness

1. EL Shape
2. MR-Signal of IAT

1-yr AAA VCR (Volume Change Ratio)



3. Aneurysm Wall Thickness

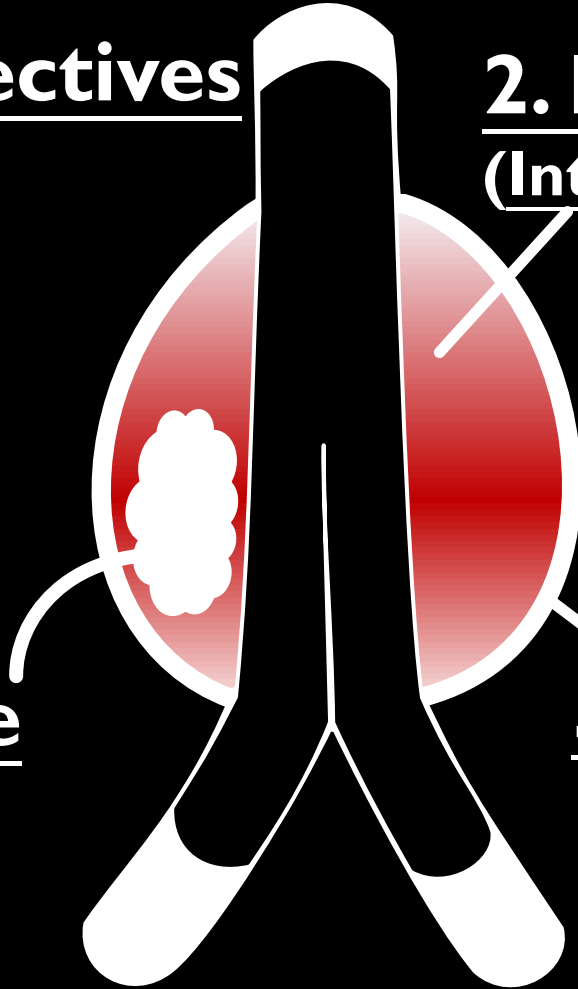
- 1. EL Shape**
- 2. MR-Signal of IAT**

Three Objectives

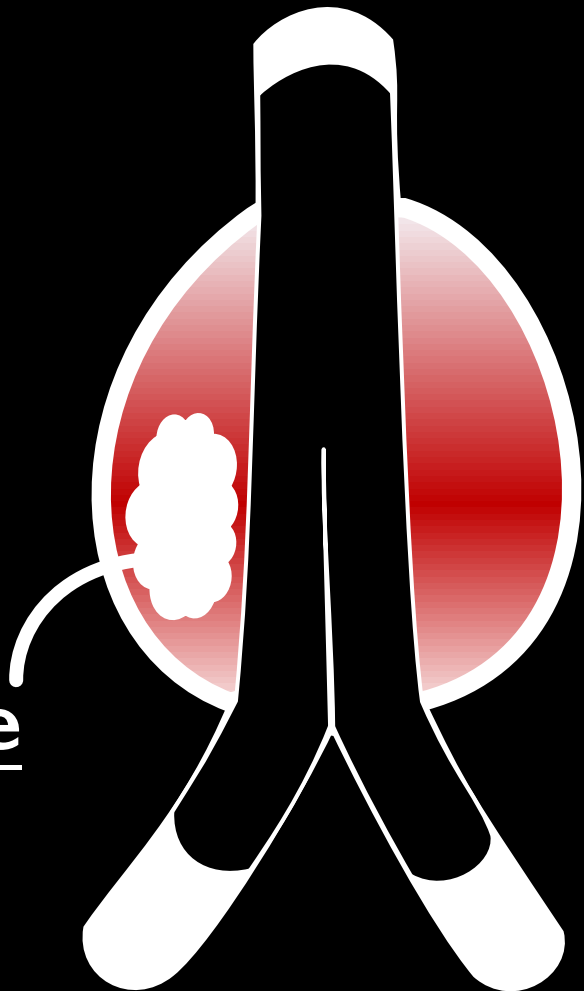
2. MR-Signal of IAT (Intra Aneurysmal Thrombus)

1. EL Shape

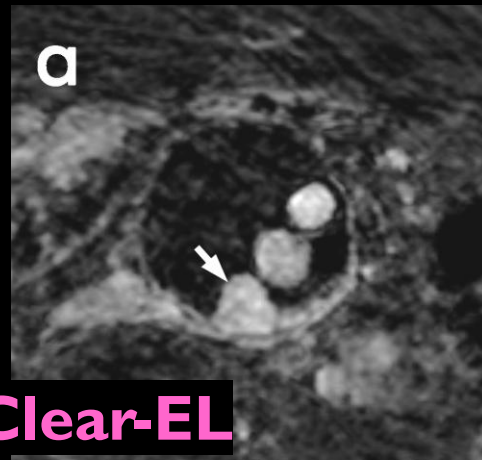
3. Aneurysm Wall Thickness



I. EL Shape

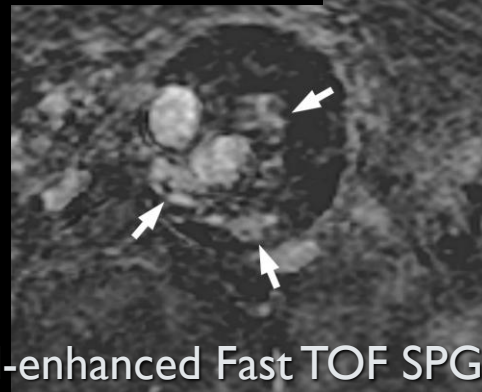


i. Non-EL



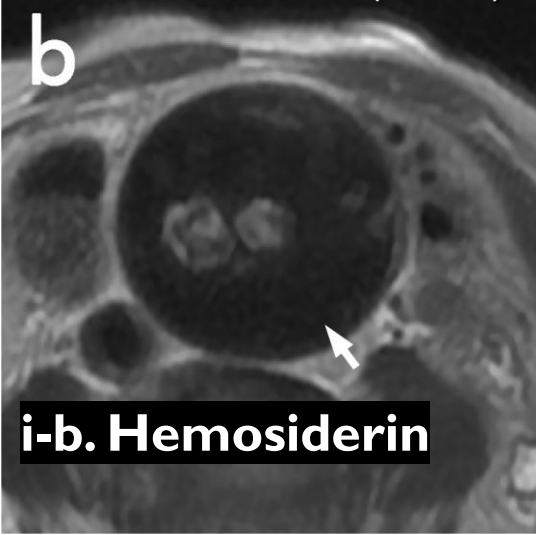
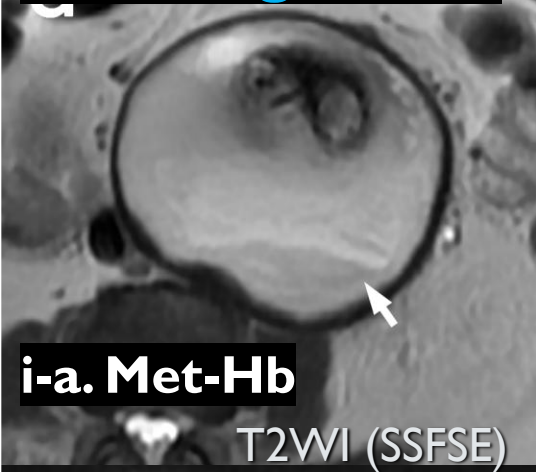
ii. Clear-EL

iii. Unclear-EL



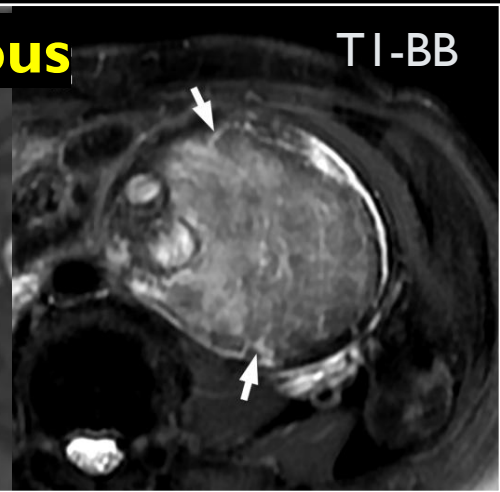
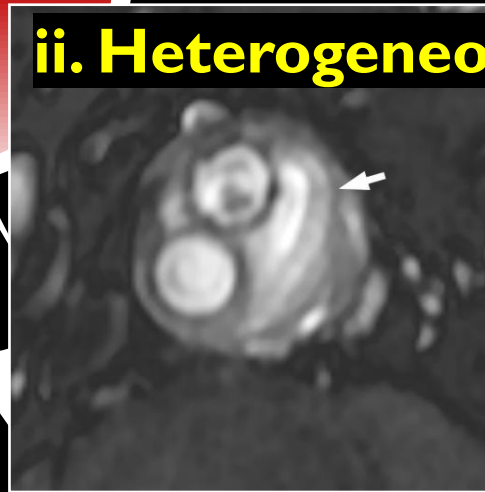
Gd-enhanced Fast TOF SPGR

i. Homogeneous



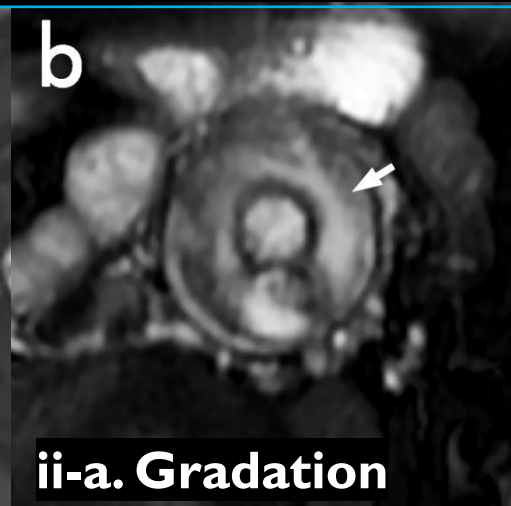
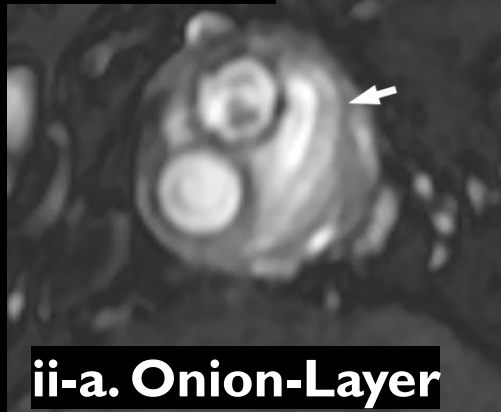
2. MR-Signal of IAT

ii. Heterogeneous

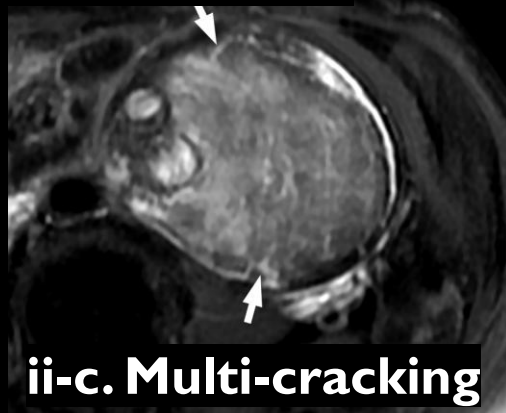


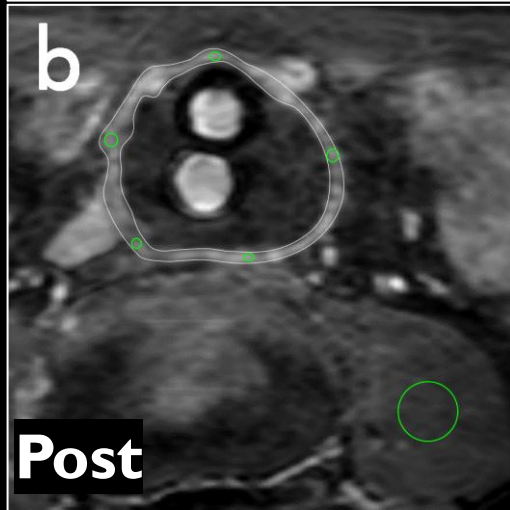
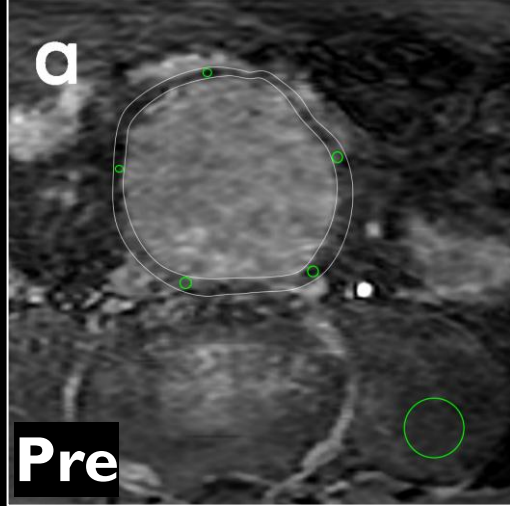
ii. Heterogeneous

Concentric-IAT

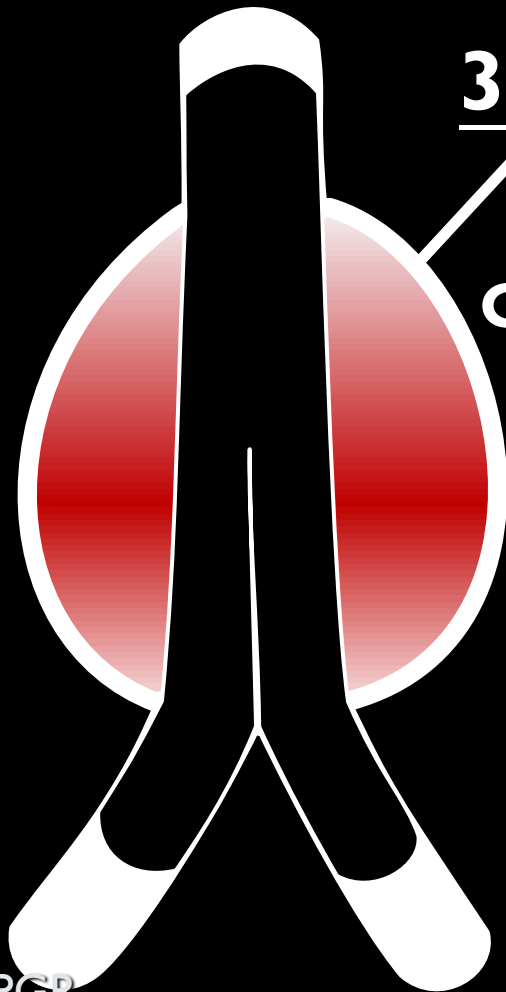


Non-concentric-IAT





Gd-enhanced Fast TOF SPGR



3. Aneurysm Wall

Change (post/pre value) in

Aneurysm **W**all
Thickness (**AWT**)

Results

I. EL Shape

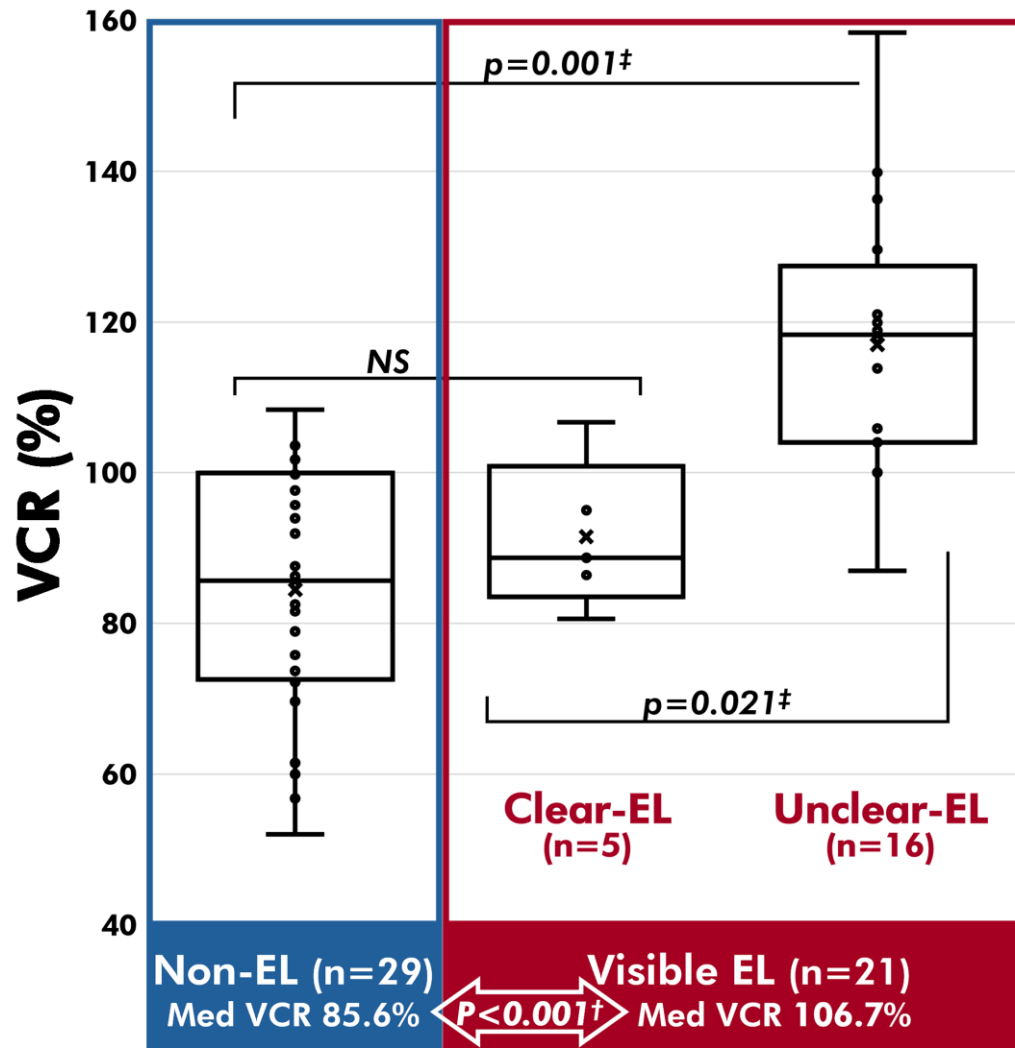
i. Non-EL, 29cases

ii. Clear-EL, 5cases

4: single feeder T2EL
1: multi-feeder T2EL

iii. Unclear-EL, 16cases

1: single feeder T2EL
13: multi-feeder T2EL
2: T3bEL

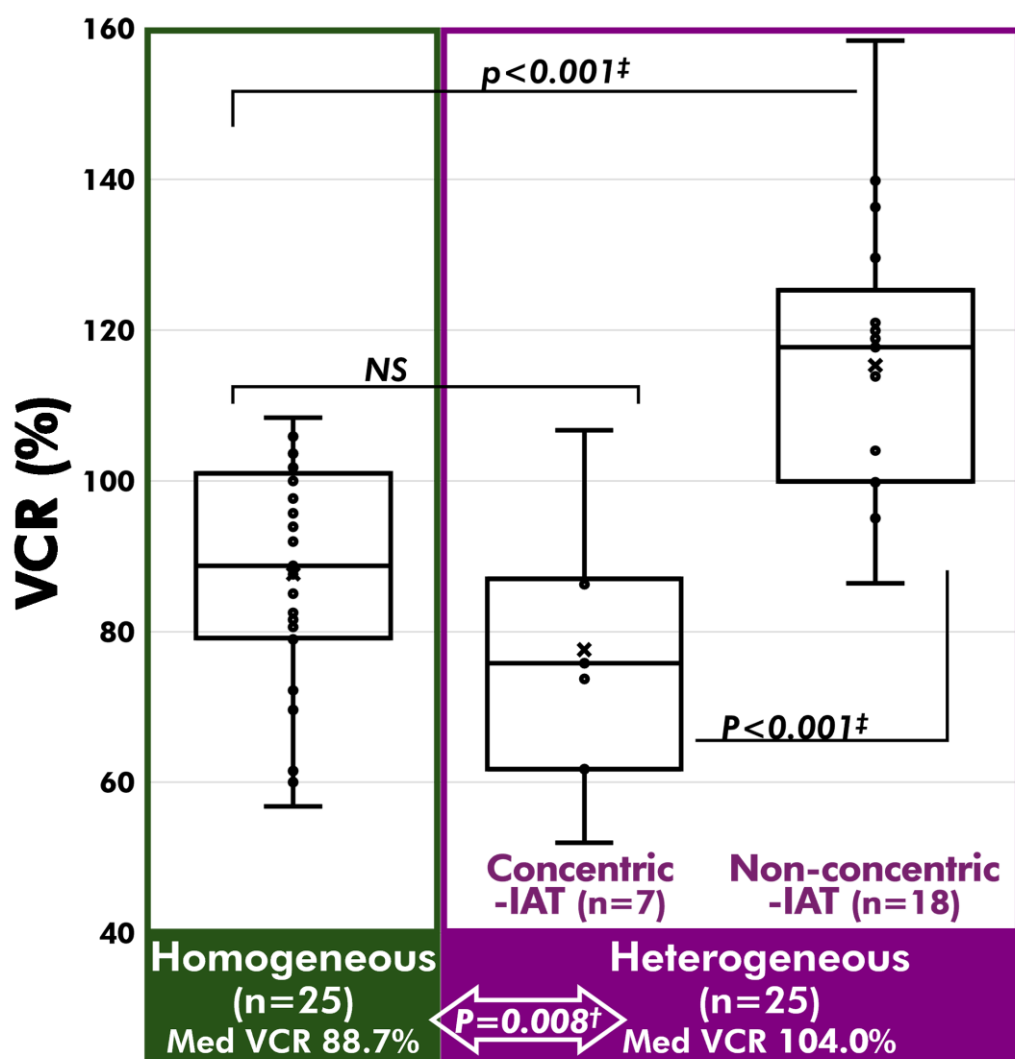
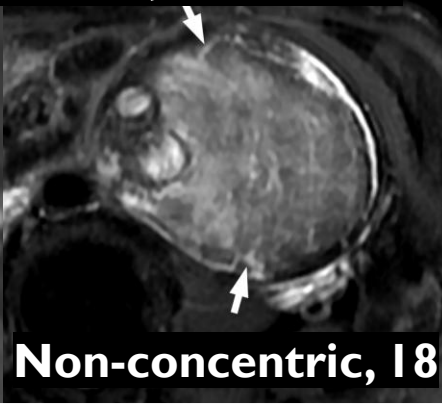
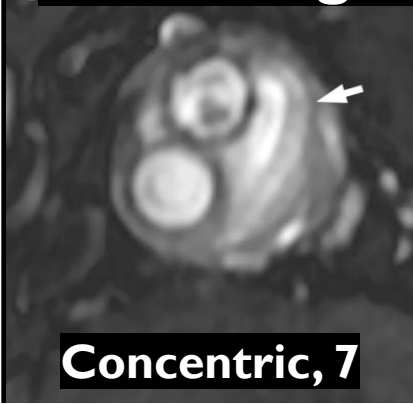


2. MR-Signal of IAT

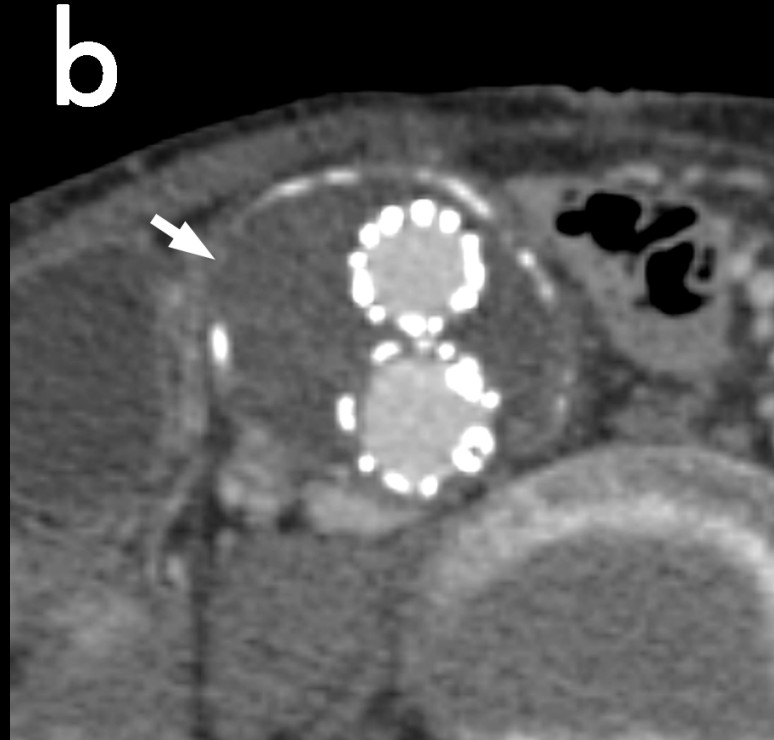
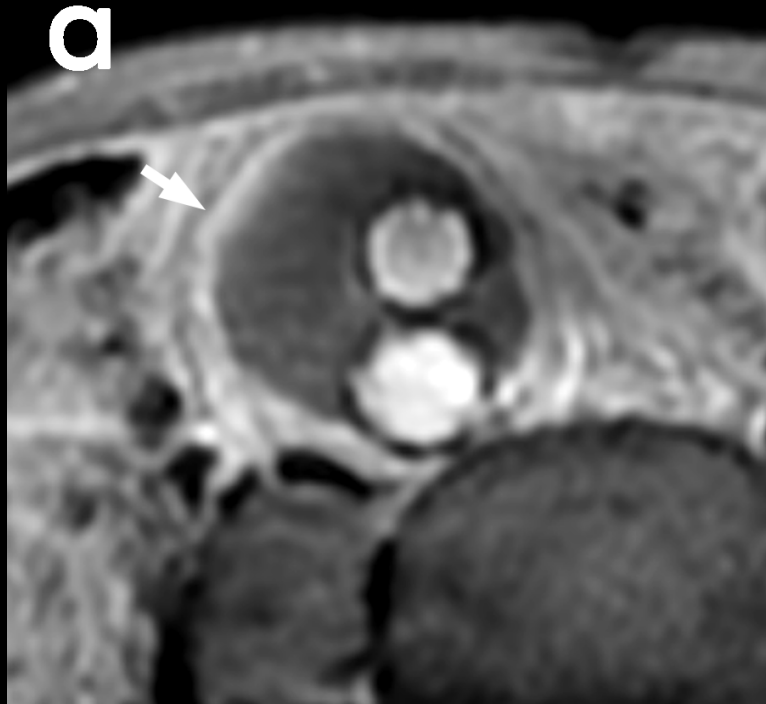
i. Homogeneous, 25cases



cii. Heterogeneous, 25cases



3. Aneurysm Wall Thickness (AWT)



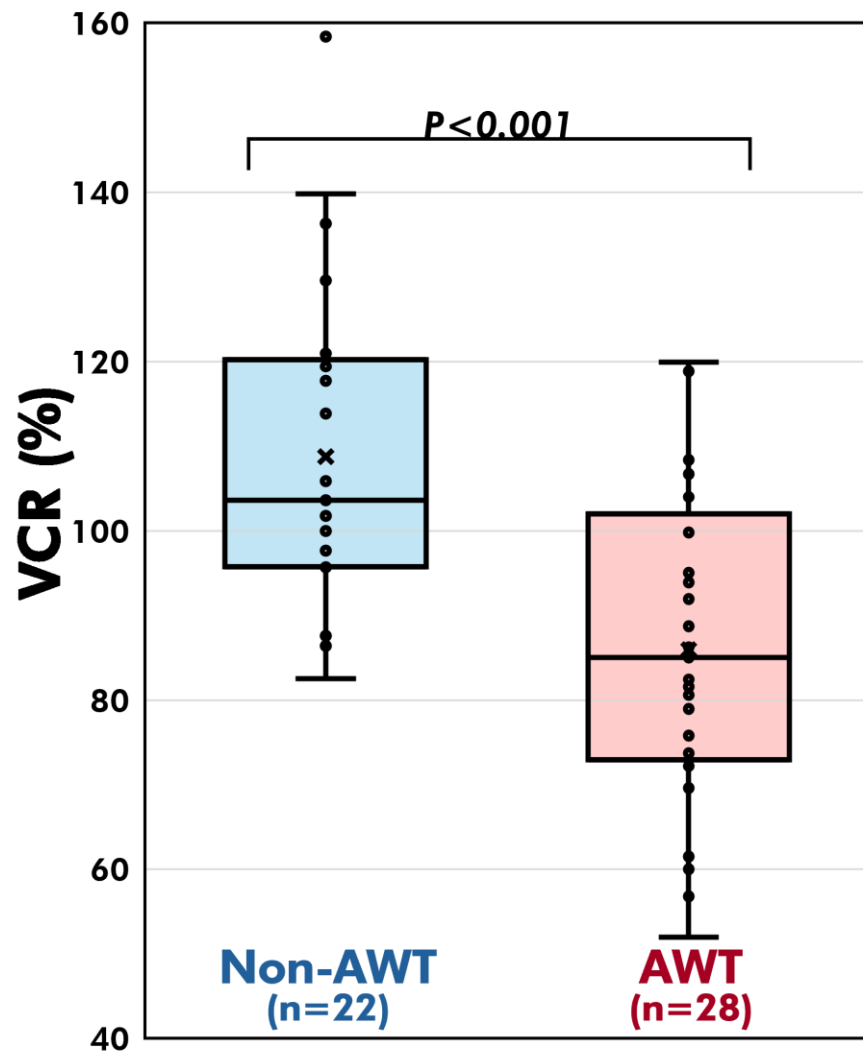
i. Aneurysm Wall
Thickness (AWT)

Post/Pre Ratio

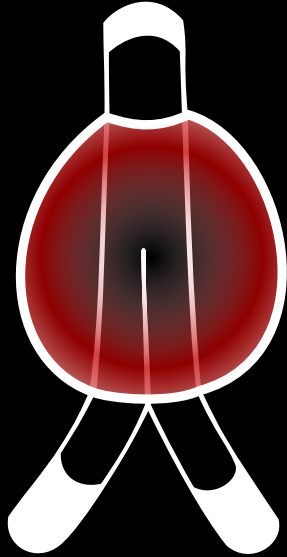
1.32x

Ratio < 1.10: Non-AWT

Ratio $\geq$ 1.10: AWT



Unclear-EL



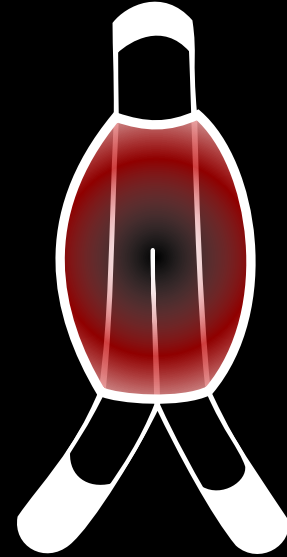
Heterogeneous-IAT

Non-concentric-IAT

Concentric-IAT

Clear-EL

Non-EL



Homogeneous-IAT

AWT

Expansion

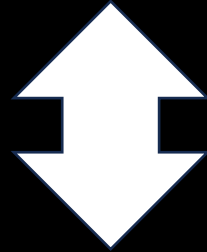


Shrinkage

Mechanistic Interpretation: AWT & Vasa Vasorum

EVAR facilitates intimal hypoxia and inflammation
>> hyper development of vasa vasorum.

Favorable Remodeling ?



Excessive development of vasa vasorum may contribute to persistent ELs and sac enlargement.

Thank you !!

