THE 24TH INTERNATIONAL EXPERTS SYMPOSIUM
CRITICAL ISSUES
IN AORTIC ENDOGRAFTING

Thoracoabdominal aorta

How “shaggy” is too “shaggy” to treat ?

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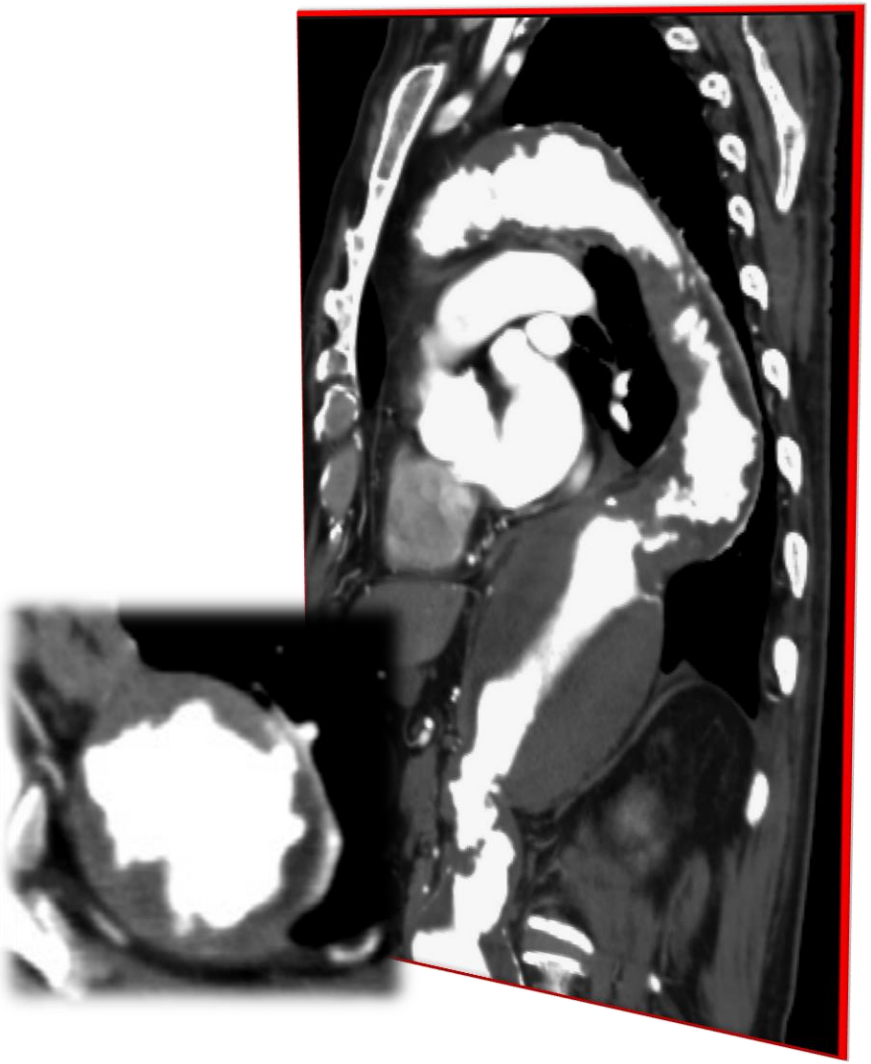
Disclosures

No conflict of interest relevant to this topic

Definitions

“Extensive atheromatous disease with diffuse ulcers associated with soft, loosely held debris and a paucity of actual thrombus.”
(Hollier LH, 1991)

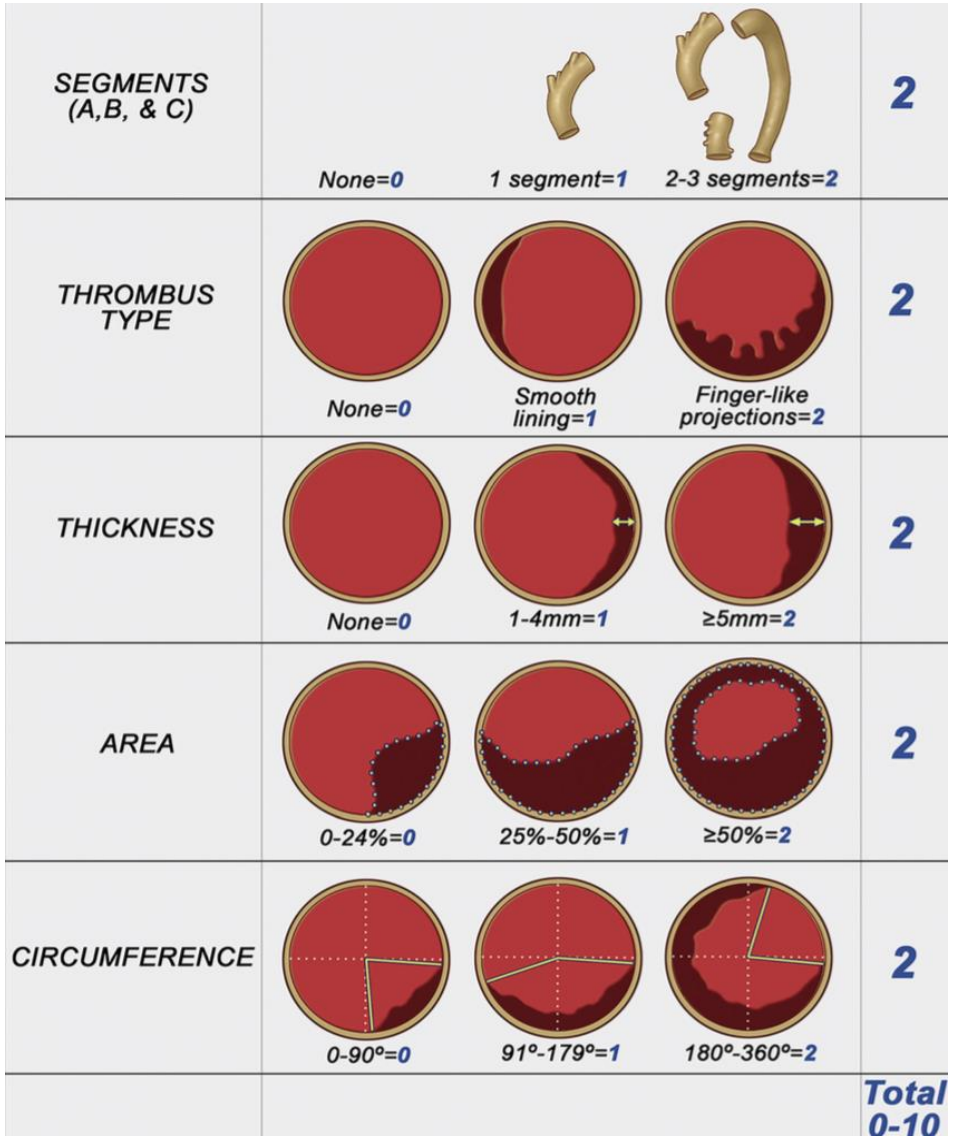
“Irregular atheroma surface with finger-like projections and thickness >5mm in non aneurysmal aortic segment.”
(Yokawa K, 2019)



Classification (Mayo)

AWT Aortic Wall Throumbus

“0 to 10 scale to score thrombus type, thickness, area of involvement, circumference, and number of affected segments.”



Ribeiro M, Oderich GS et al JVS

Severity (Mayo)

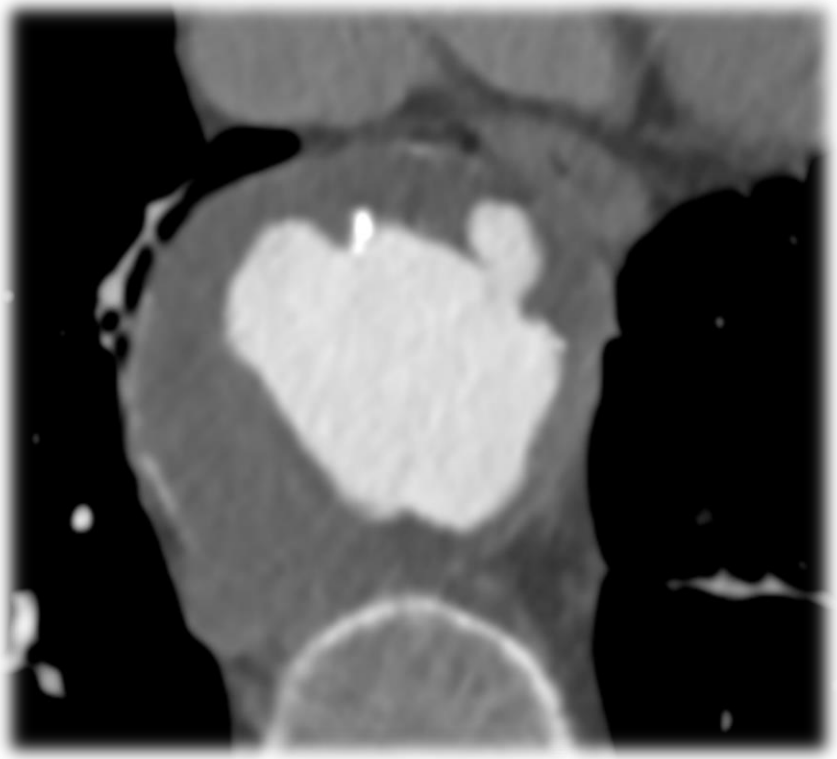
Ribeiro M, Oderich GS et al JVS

Shaggy score (Tokyo University)

Measurements are made every 5 mm,
In the ascending, descending and abdominal aorta, if …

- ulcer like thrombus
- thrombus thickness ≥ 5mm
- thrombus > 2/3 aortic circumference

1 “shaggy point” is added to the score

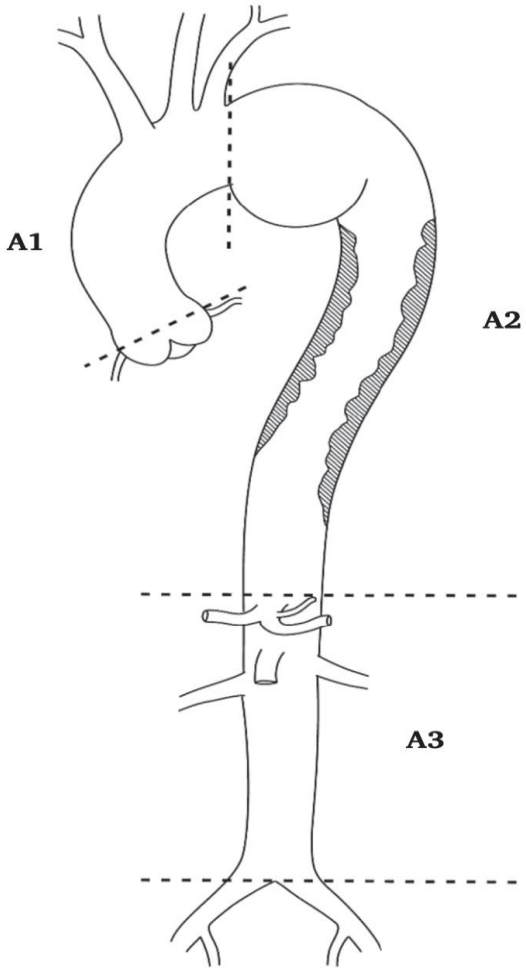


Maeda K et al EJVES 2020

Shaggy score (Tokyo University)

- A1 – Ascending
- \+
- A2 – Descending
- \+
- A3 – Abdominal

} ≥10 points



More embolic complications after TEVAR

Maeda K et al EJVES 2020

Embolization

- **Peripheral**
- Renal
- Visceral
- Brain
- Spinal cord

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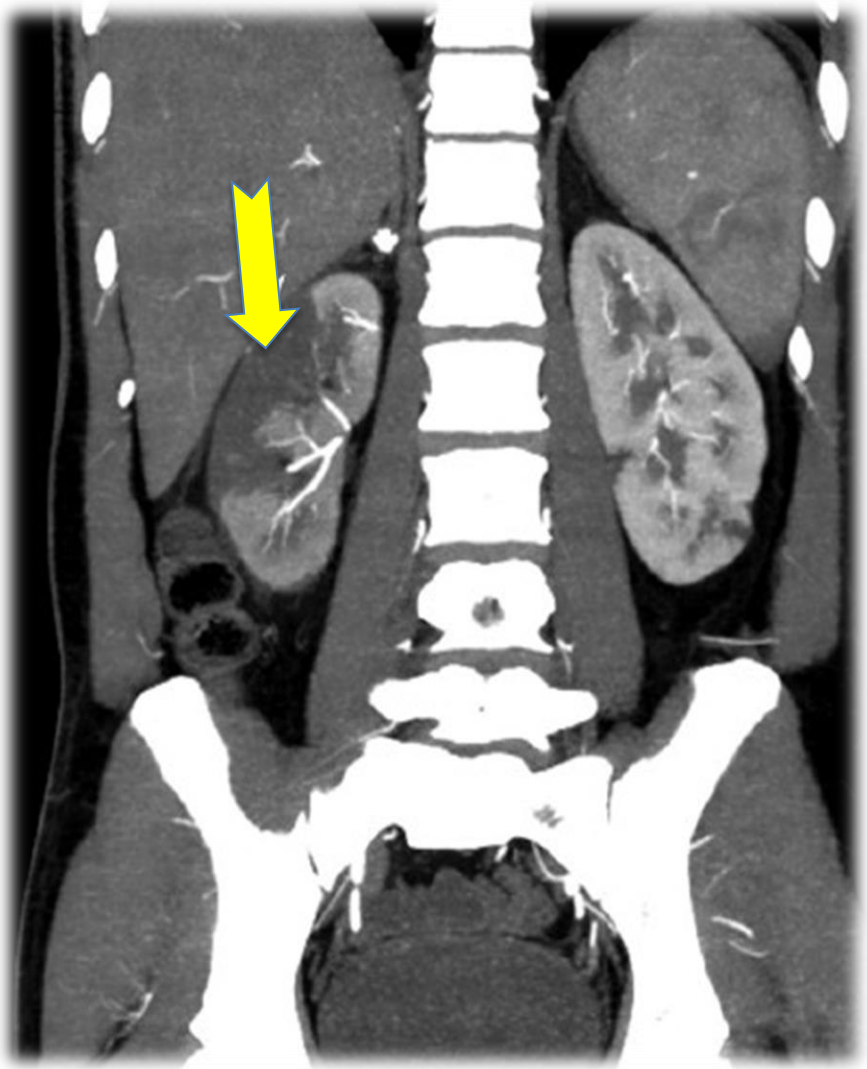
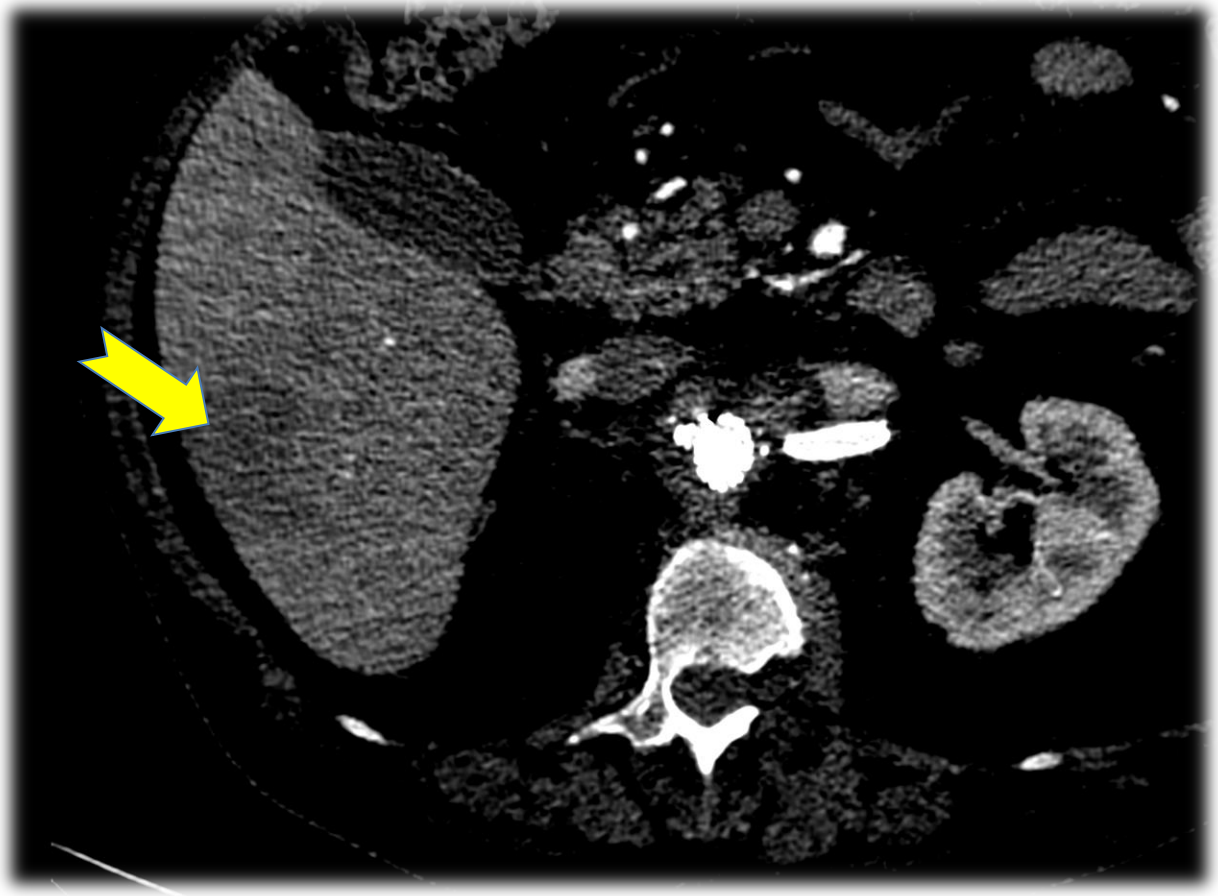


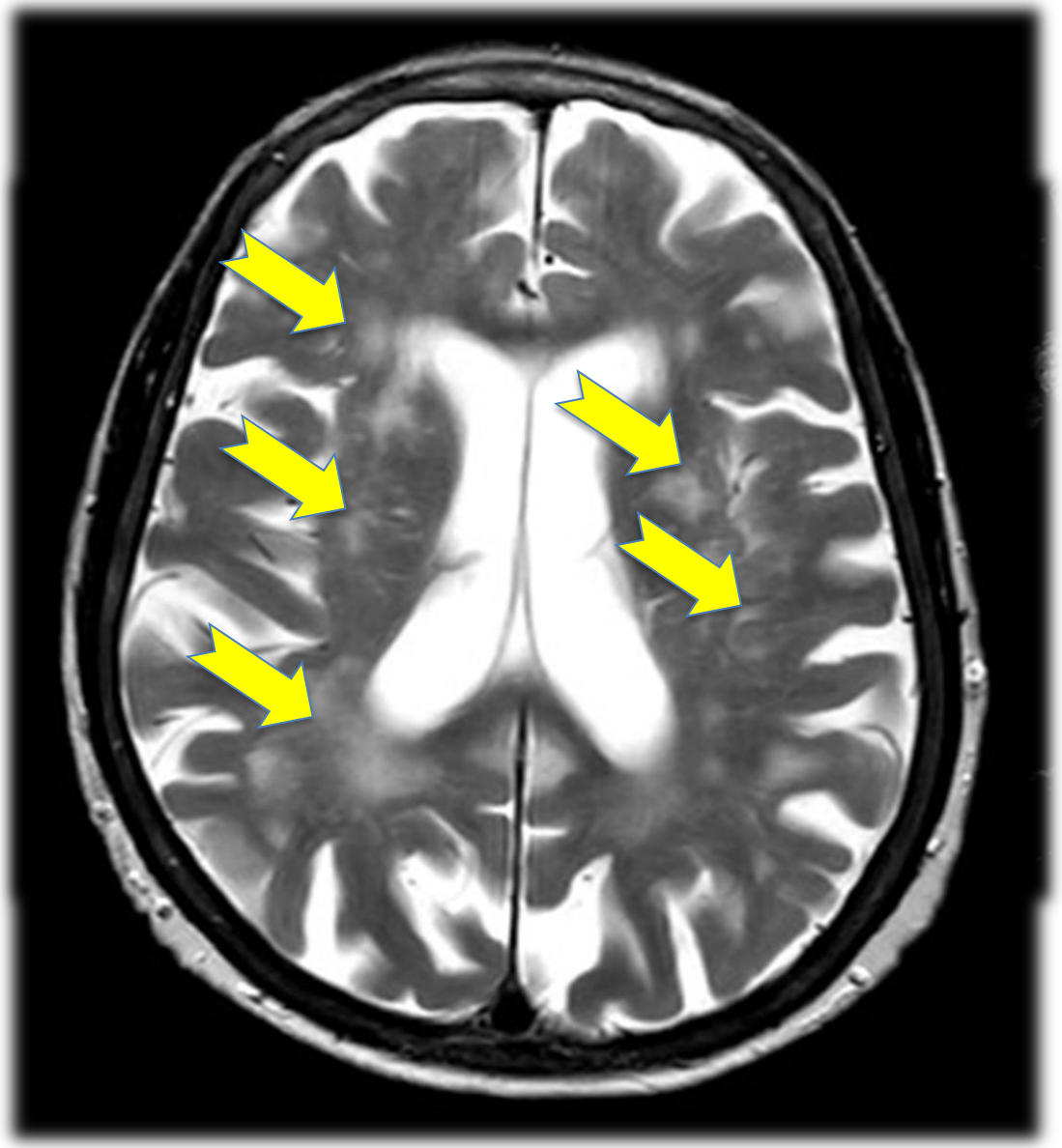
Embolization

- Peripheral
- Renal
- **Visceral**
- Brain
- Spinal cord



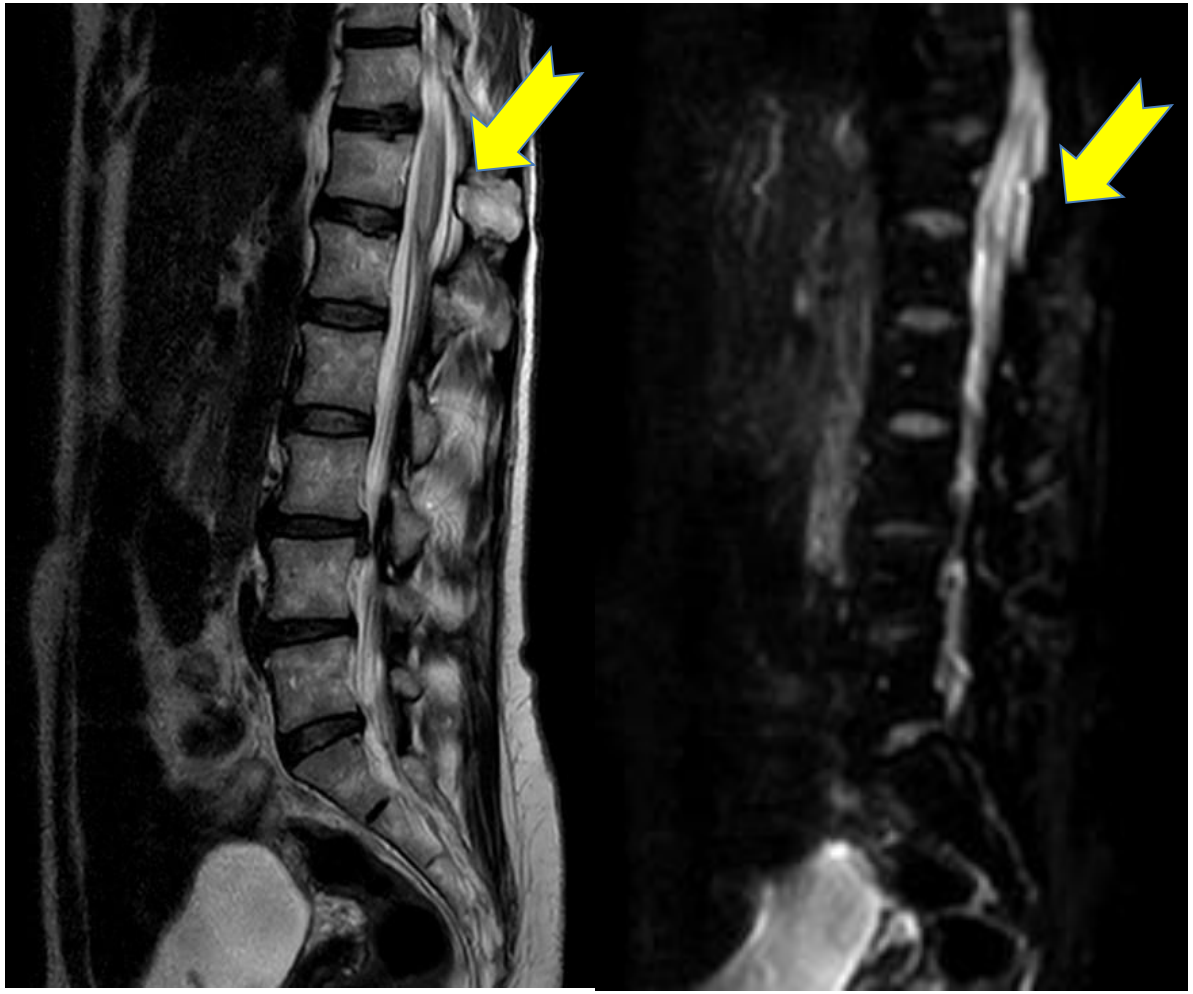
Embolization

- Peripheral
- Renal
- Visceral
- **Brain**
- Spinal cord



Embolization

- Peripheral
- Renal
- Visceral / MOF
- Brain
- **Spinal cord**



TEVAR Results @ Mayo

(Shaggy are only PRA and type IV TAAA)

	non–Shaggy* (185)	Moderate to Severe** (114)
Mortality	4.3	0.8
Stroke	2.7	2.6
SCI	3.2	2.6
Liver, Kidney, Spleen infarction	na	55.2
Bowel ischemia	2.7	2.6

*Oderich GS et al JTCVS 2016

**Ribeiro M, Oderich GS et al JVS 2017

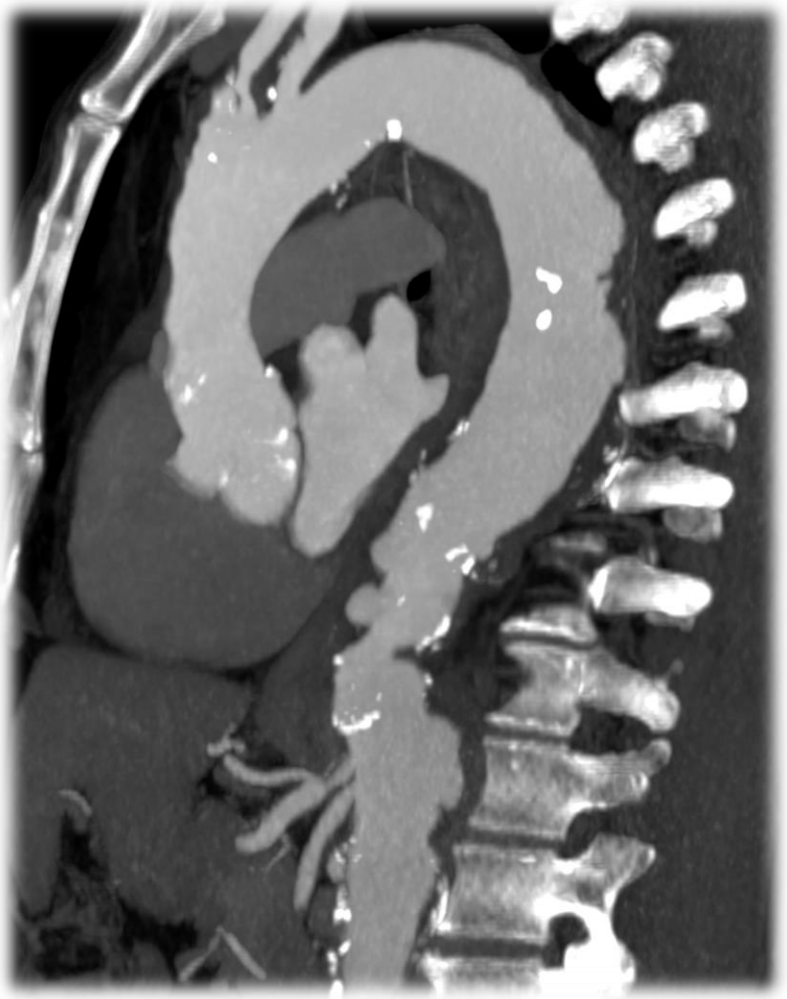
Open repair results @ Kobe

	Non-shaggy (76)	Shaggy (36)	p.
Mortality	5 (6.6)	12 (33.3)	<.001
SCI	5 (6.6)	10 (27.8)	.003
Stroke	4 (5.3)	1 (2.8)	.664
Acute renal failure	11 (13.9)	15 (41.7)	<.001
Composite outcome	15 (19.7)	20 (55.6)	<.001

Yokawa K et al JTCVS

Embolization prevention strategies

- Medical therapy
- During Endo repair
- During Open repair

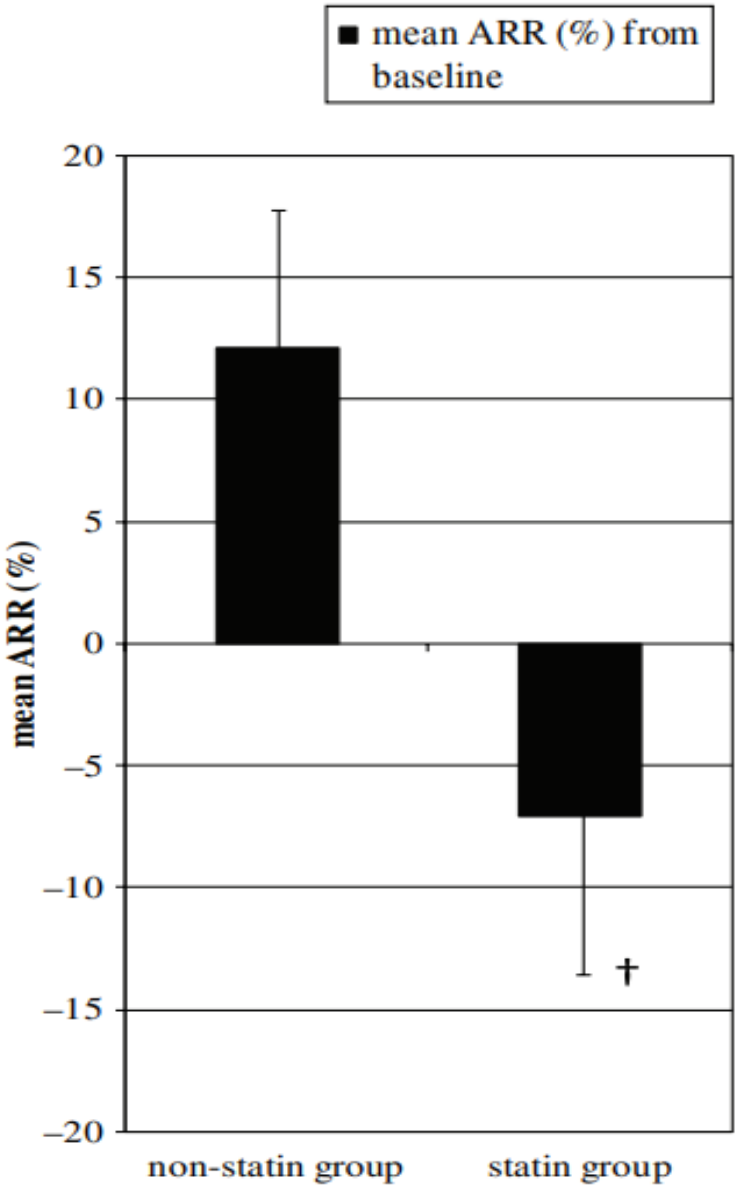


Medical therapy

Statins reduce aortic atheromas in pts. with shaggy aorta

Atheroma reduction ratio (ARR):

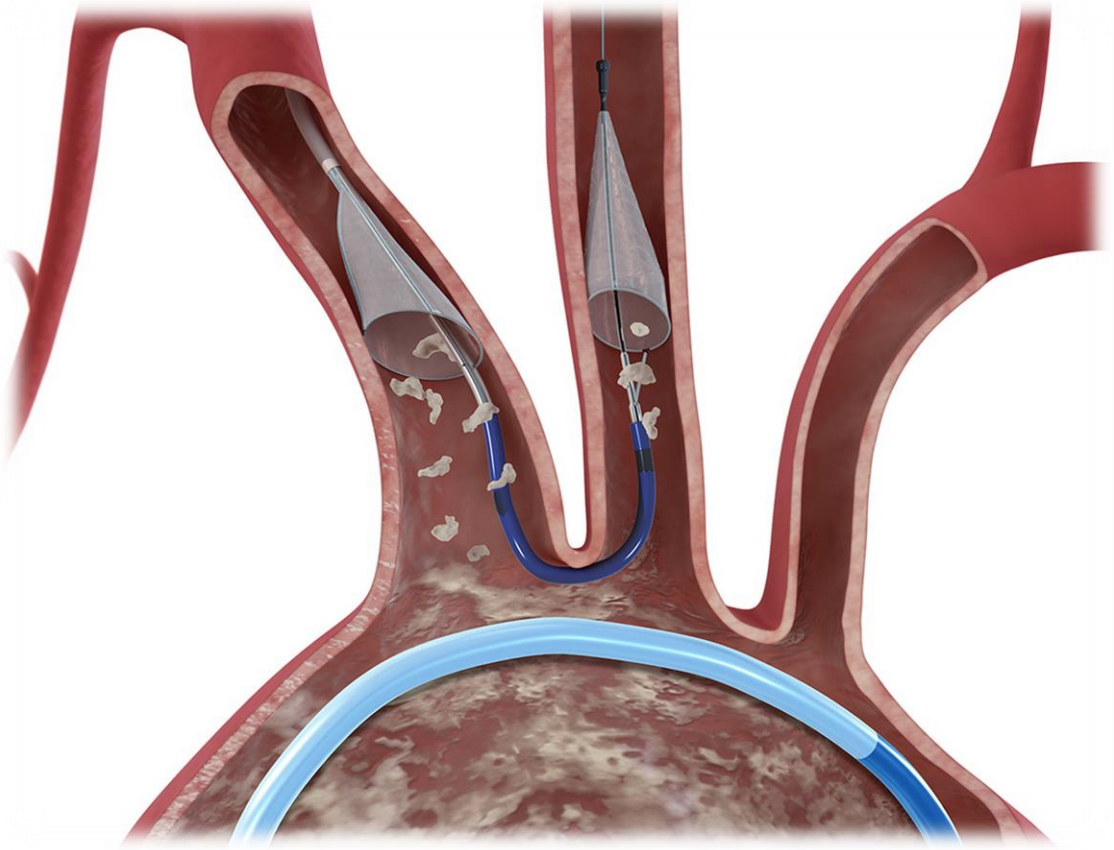
- non-statin group: +12.1%
- statin group: -7.1% (p<0.01)



Nemoto M et al Ann Vasc Dis 2013

Endo prevention strategies

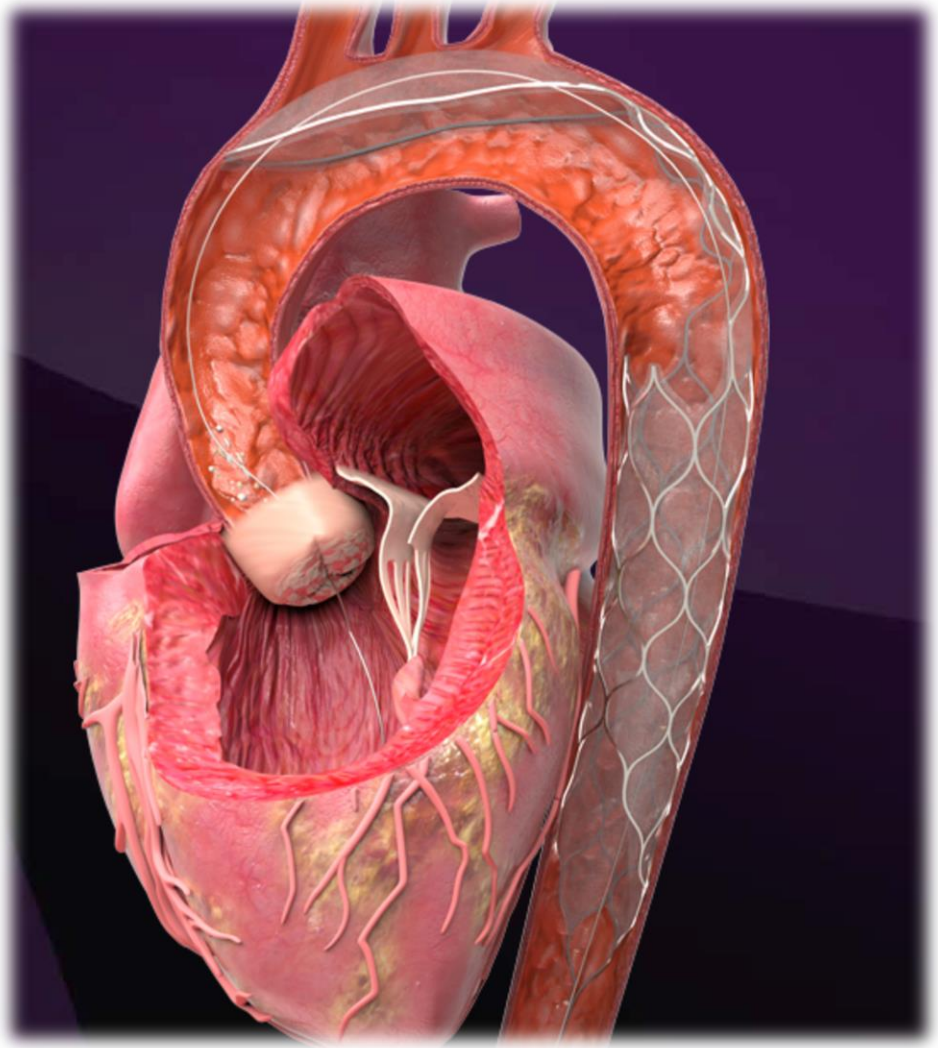
- Reduce manipulation
- SAT: filters
- Visceral: filters?
- Patients selection



SENTINEL by Boston Scientific – Cerebral protection system

Endo prevention strategies

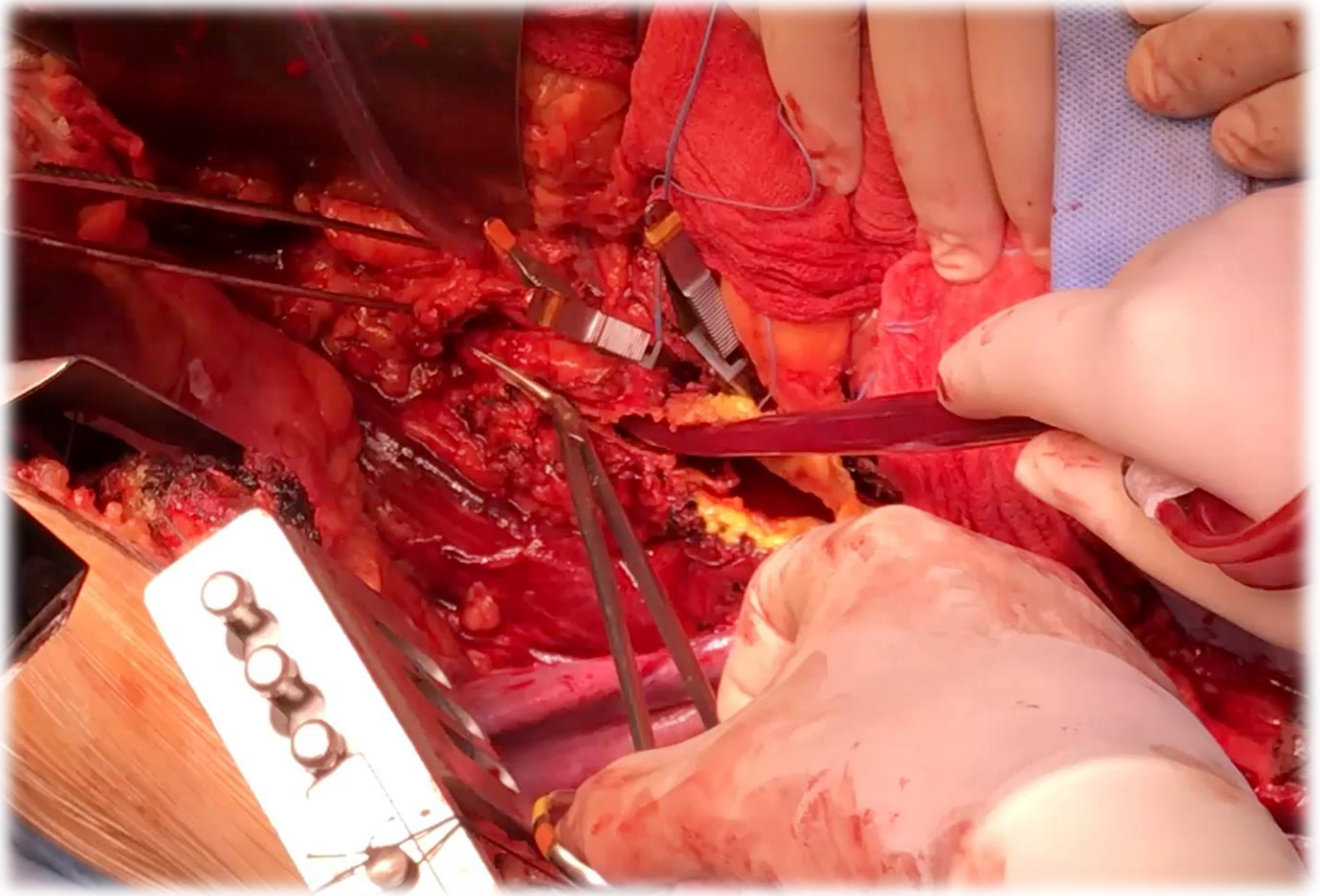
- Reduce manipulation
- SAT: filters
- Visceral: filters?
- Patients selection



CAPTIS by Filterlex – Full-body embolic protection system

Open prevention strategies

- No sequential clamping
- Visceral clamping
- LHBP after clamping
- Multibranched grafts
- Patients selection



Shaggy TAAA Open repair @ San Raffaele

2012-2021	Total 58 (%)
Mortality	12.1
SCI	10.3
Stroke	3.5
Acute renal failure (RIFLE stage 4-5)	13.8
Any embolization	27.6
Composite outcome*	39.7

*** Stroke + Bowel ischemia + Visceral embolization (CT) + AKI (Stage 4-5)**

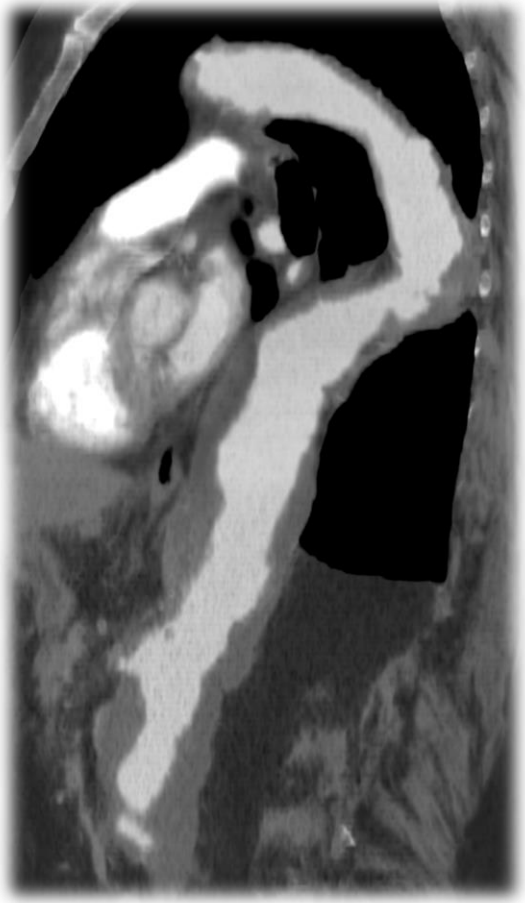
Shaggy vs non-Shaggy TAAA Open repair @ San Raffaele

	non-Shaggy 130 (%)	Shaggy 58 (%)	p.
Mortality	6.9	12.1	.26
SCI	7.7	10.3	.57
Stroke	3.8	3.5	1
Acute renal failure (RIFLE stage 4-5)	5.4	13.8	.07
Any embolization	9.2	27.6	.001
Composite outcome*	17.7	39.7	<.001

*** Stroke + Bowel ischemia + Visceral embolization (CT) + AKI (Stage 4-5)**

Propensity score matching

- Matching 1:1
- Matched for: Sex, Age, TAAA Extension
- 48 shaggy vs 48 non-shaggy



Propensity score matching

	non-Shaggy 48 (%)	Shaggy 48 (%)	p.
Mortality	2.1	10.4	<.001
SCI	8.3	8.3	1
Stroke	0	4.2	.25
Acute renal failure (RIFLE stage 4-5)	0	16.7	.002
Any embolization	8.3	25.0	.03
Composite outcome*	4.2	29.2	.02

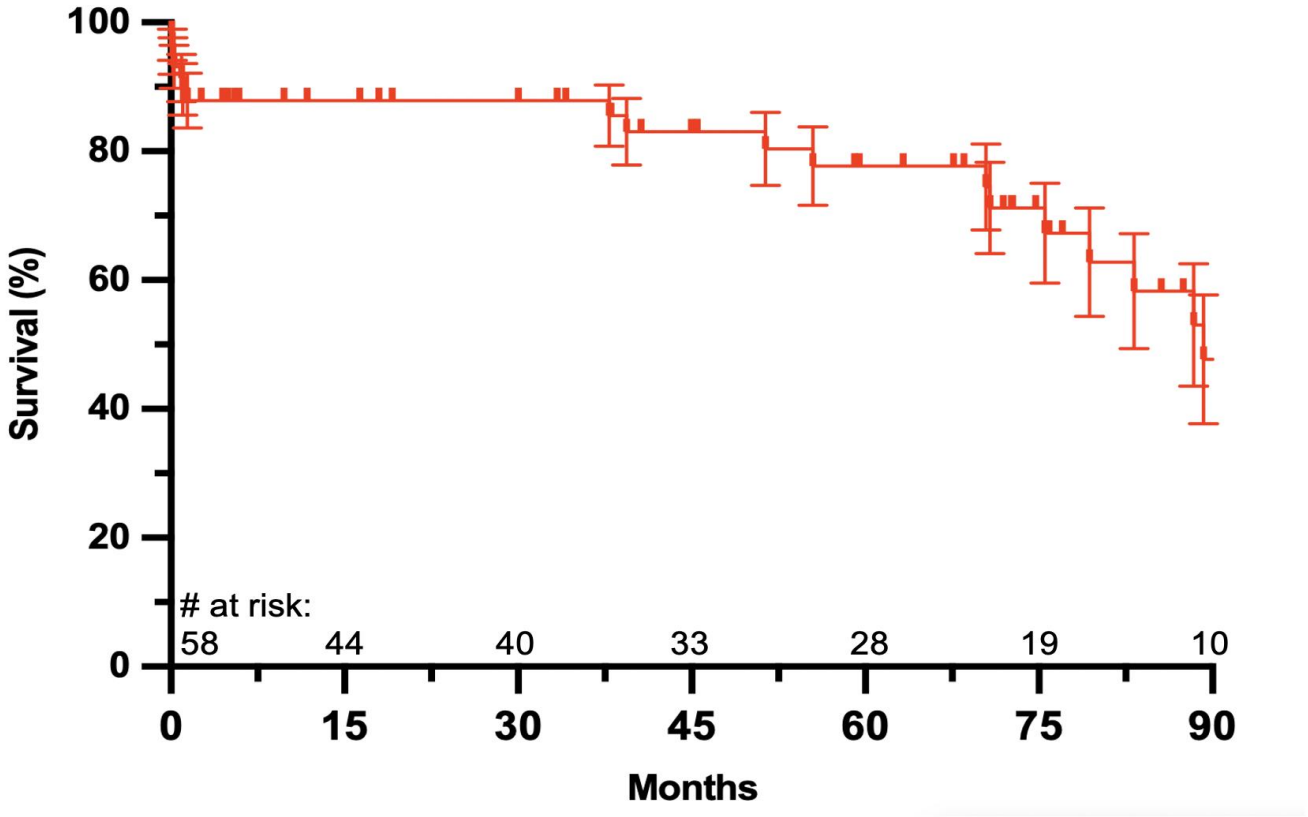
*** Stroke + Bowel ischemia + Visceral embolization (CT) + AKI (Grade 4-5)**

Impact of shaggy score in TAAA open repair

- 16 pts. with ≥ 1 end-organ embolization
- 42 pts. without end-organ embolization

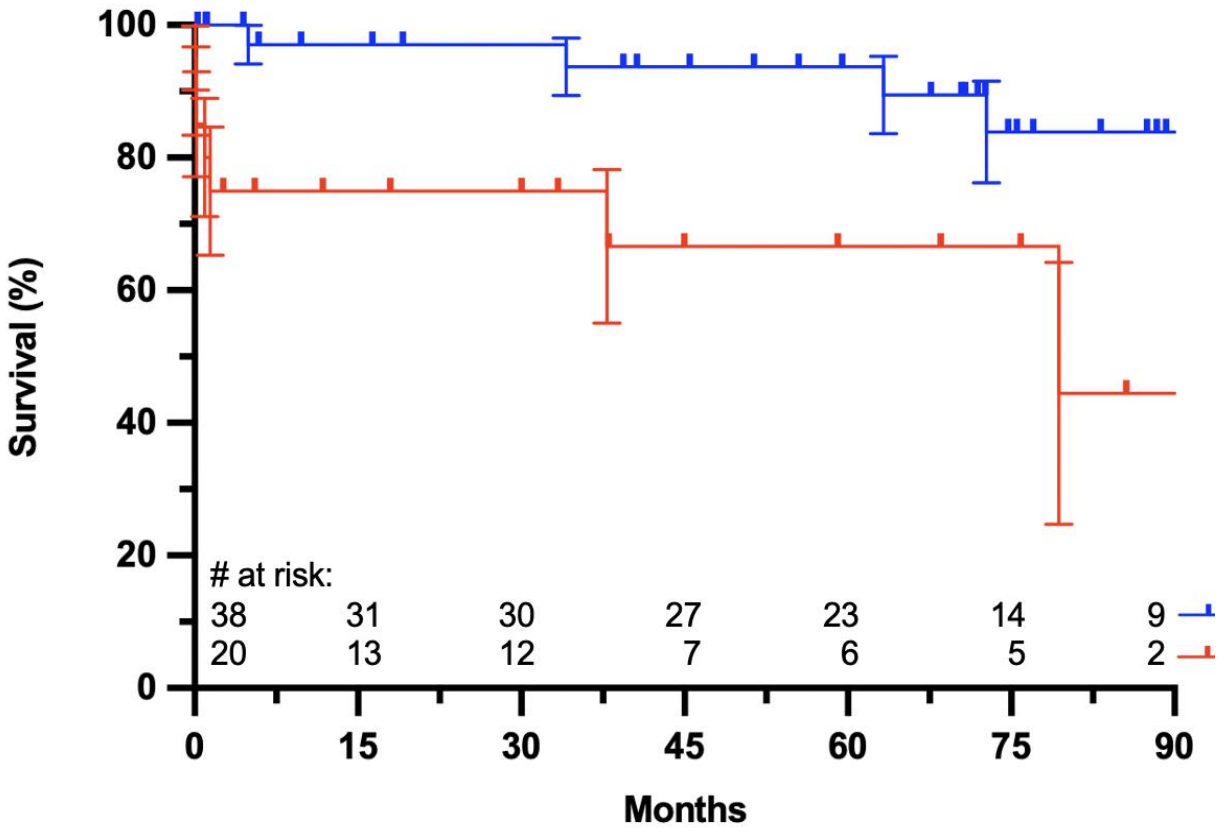
	Total 58	Pts with embolization 16	Pts without embolization 42	p.
Shaggy average score	12.63	13.75	12.21	0.546

Survival after TAAA open repair in pts with shaggy aorta



1 year – 88 %
5 year – 78 %
7 year – 58 %

Survival after TAAA open repair in pts with shaggy aorta



	with Embolization	without Embolization
5 year:	67 %	94 %
7 year:	44 %	84 %

Conclusions

- Shaggy is a risk factor for both open and endo TAAA repair
- Despite different prevention strategies the embolization rate is still relevant during open repair
- Embolization has an impact on early and mid-term survival
- Better strategies and cautious patients selection are needed

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