

September 15-17

2016

Crowne Plaza Hotel
Liège, Belgium

5th International Meeting on Aortic Diseases

New insights into an old problem CHU Liège, APF

www.chuliege-ima.be

Therapeutic Pathway In Acute Aortic Dissection

Speaker: Cesare Quarto

Consultant Cardiac Surgeon

Royal Brompton Hospital, London UK





Disclosure of Interest

Speaker name: Cesare Quarto

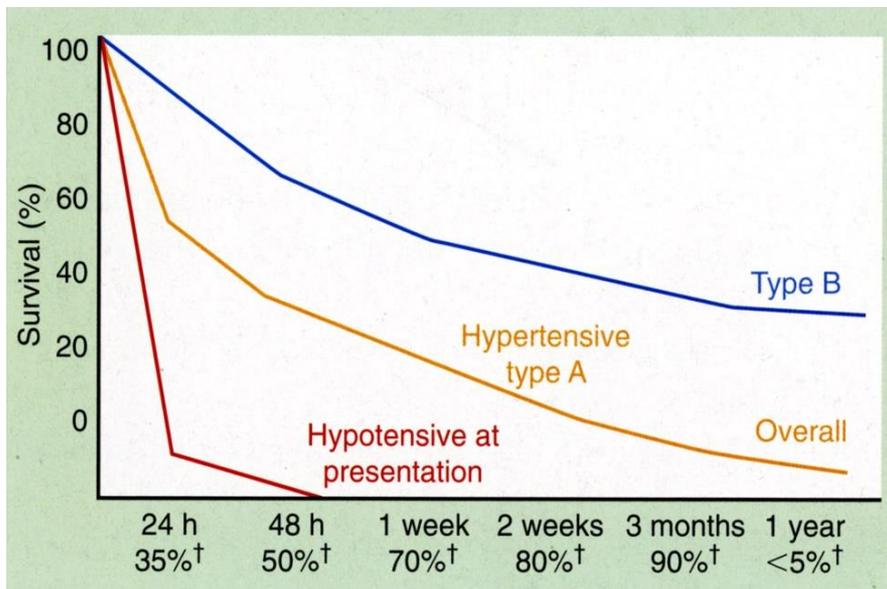
- I do not have any potential conflict of interest

Definition

- **Aortic dissection** is the separation of the aortic media from the adventitia by pulsatile blood or by an intramural haematoma
- It can be associated with a very poor outcome, and **rapid diagnosis and decision making are crucial** (Nienaber C.A etal. Primer; vol 2, 2016.1)

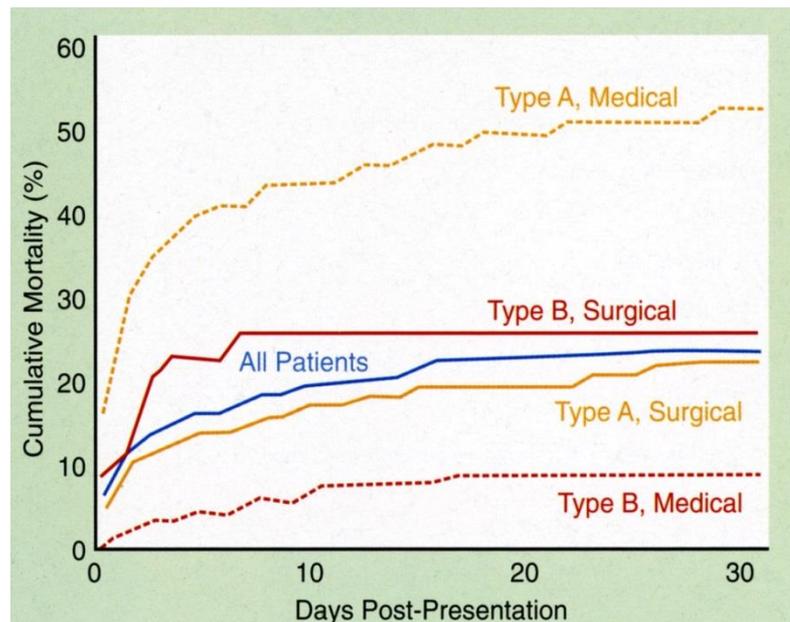
Acute Aortic Dissection

[Isselbacher EM. JAMA 2000; 283: 897-903]



NATURAL HISTORY

Without treatment
the mortality within 24h is 50%



MANAGEMENT: 30 DAY MORTALITY

While a type A Aortic dissection surgically
treated has a 30 day survival of 80%

Classification

STANFORD

Type A

Type B

DEBAKEY

Type I

Type II

Type III

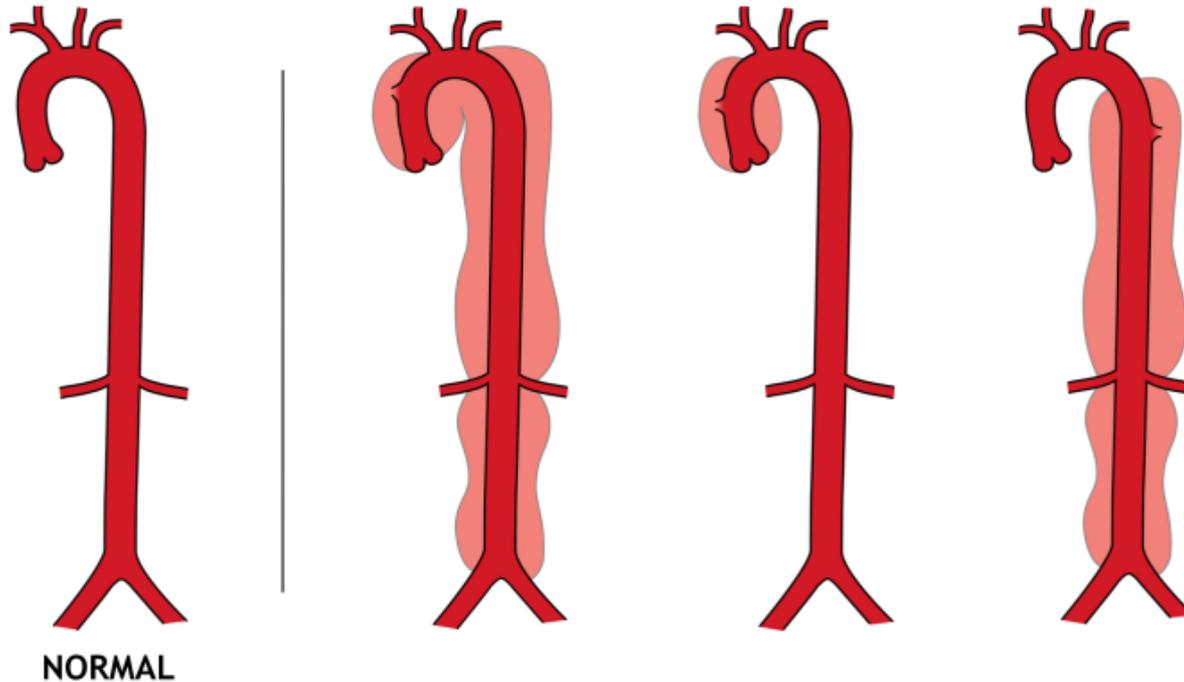
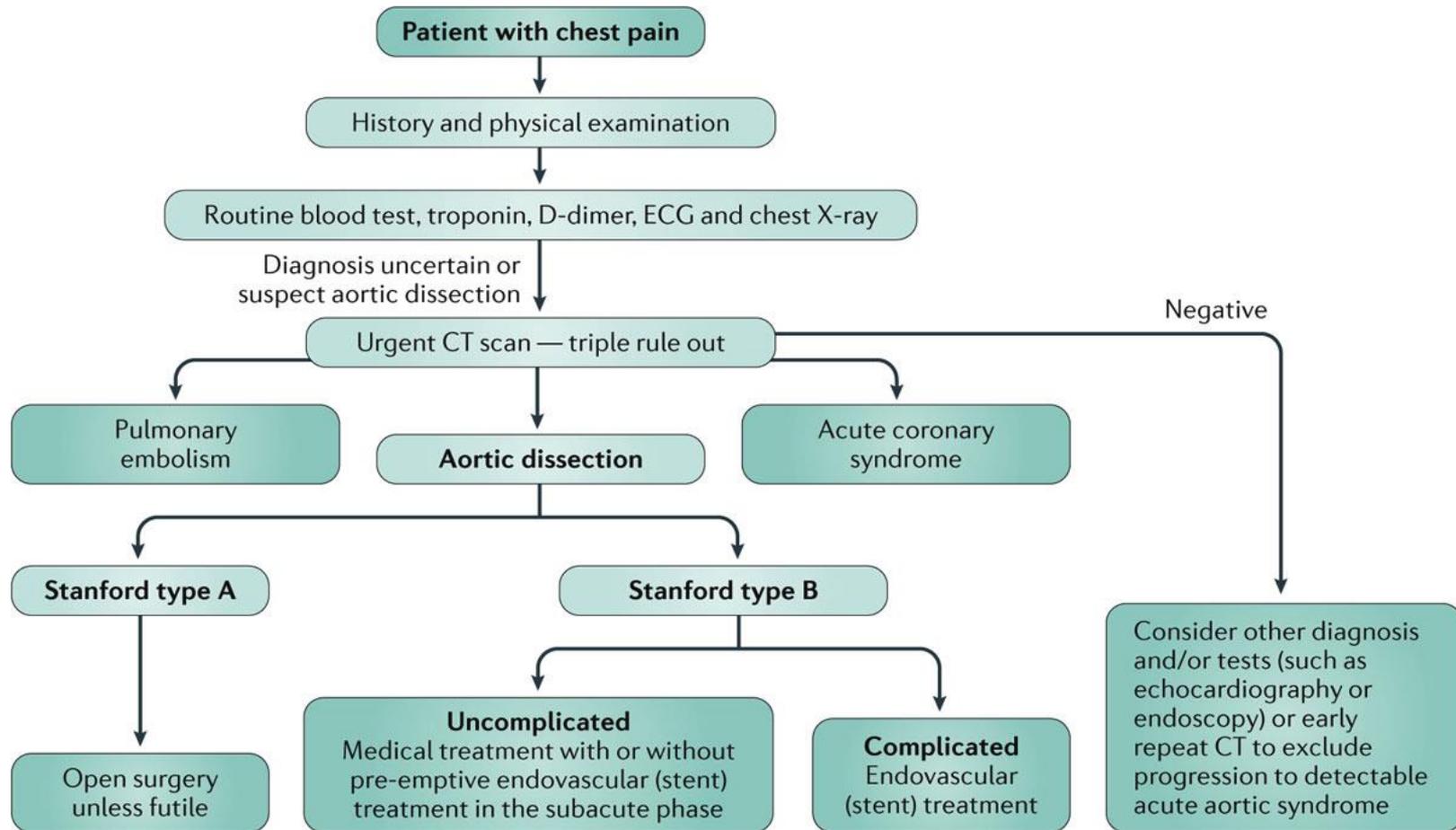


Image source: Thoracic Aortic Dissection Author: Matthew P. Borloz, et al, Department of Emergency Medicine, Virginia Tech , Last Updated: 2016

An algorithm for the identification and treatment of aortic dissection in patients presenting with chest pain

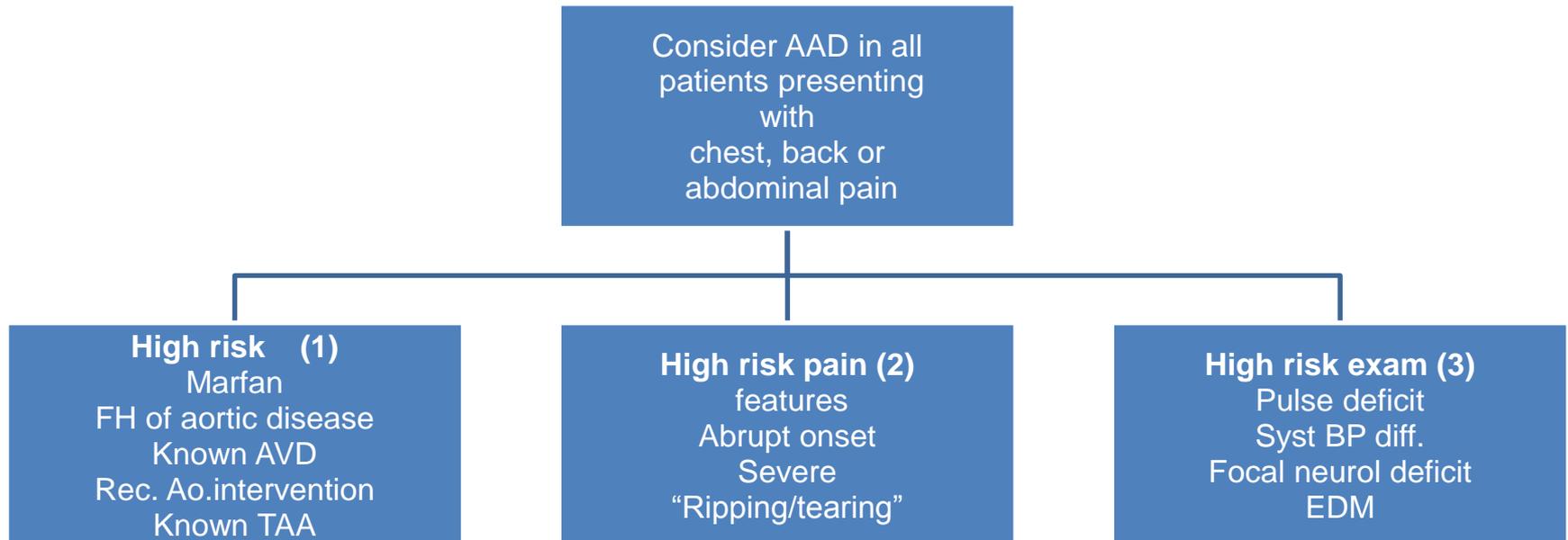


Nature Reviews | Disease Primers

Nienaber, C. A. *et al.* (2016) Aortic dissection
Nat. Rev. Dis. Primers doi:10.1038/nrdp.2016.53

Acute Aortic Dissection (AAD)

- Diagnosis is missed on initial evaluation in 38% of patients. (Spitell PC. Mayo Clinic Proc.1993;68:642-651)



Novel Tests (Biochemical Markers)

- Inflammatory
 - ↑ C reactive protein
 - ↑ IL-6
- Smooth muscle damage
 - ↑ Smooth muscle myosin heavy chain
 - ↑ Calponin
- Thrombosis/ Fibrinolysis
 - ↑ D- dimer
- Cardiac Stress/Damage
 - ↑ Cardiac troponins
 - ↑ Creatinine kinase
 - ↑ Pro-brain natriuretic peptide
- Extracellular Matrix damage
 - ↑ MMPs
 - ↑ Soluble elastin fragments

Imaging options

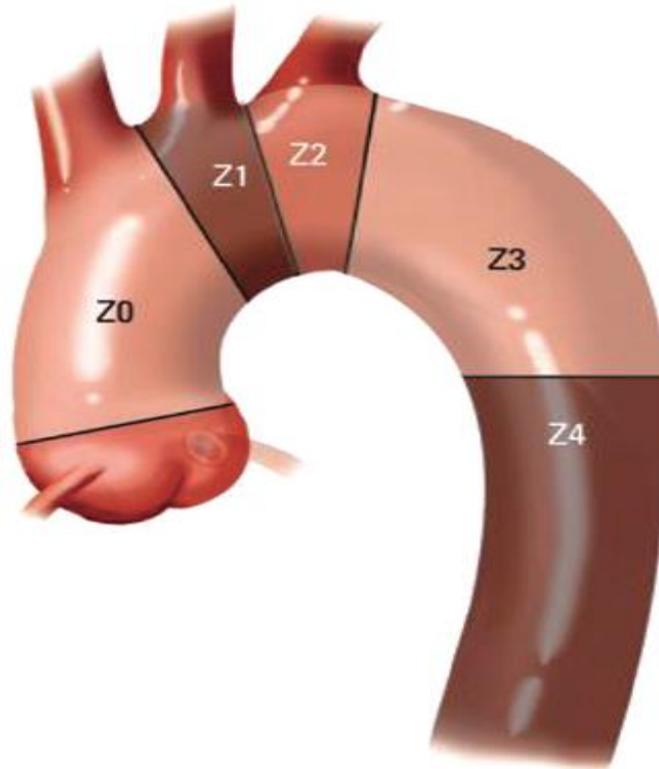
- **Computed tomography (CT)**, gold standard . If it is ECG gates it is even better.
- **MRI** equally reliable for the confirmation or exclusion of the diagnosis of AAD, but not always available and takes a long time
- **TOE using colour flow Doppler** (always do in OR) very helpful in the unstable patient for the diagnose of Type A AAD and is used to monitor changes in the operating theatre and in postoperative intensive care

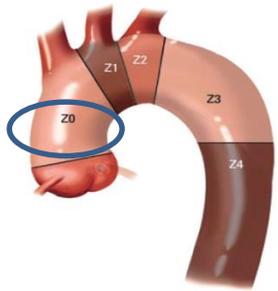
Criado Zonation 2005

The Aortic can be broken down into **zones** in order to help with the treatment strategy

Type A: The tear can be located in Z0, Z1 and Z2.

Type B: Z3





Type A: open surgery is the gold standard

Treatment
Type A

Important steps

Always Cool the Patient

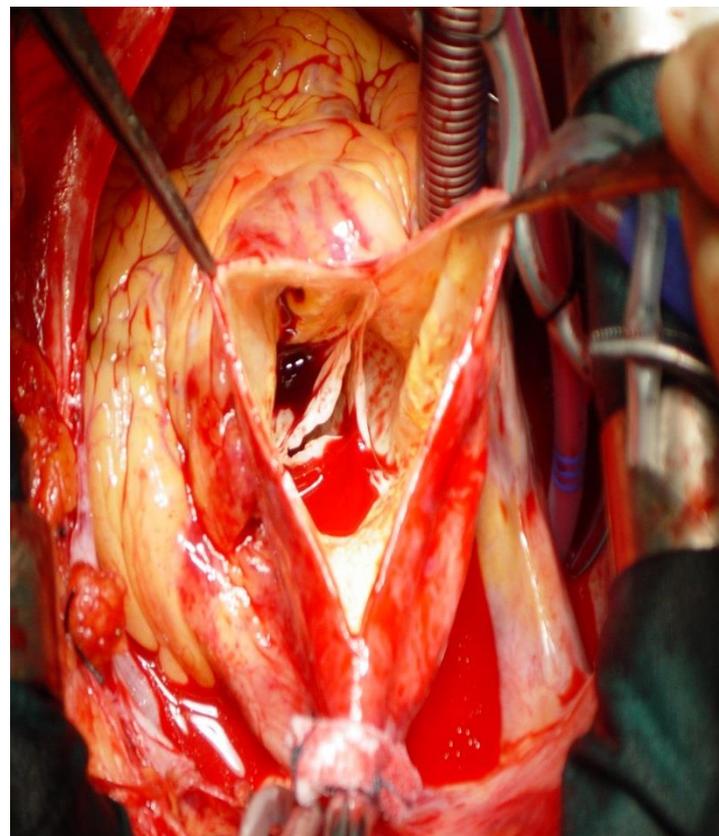
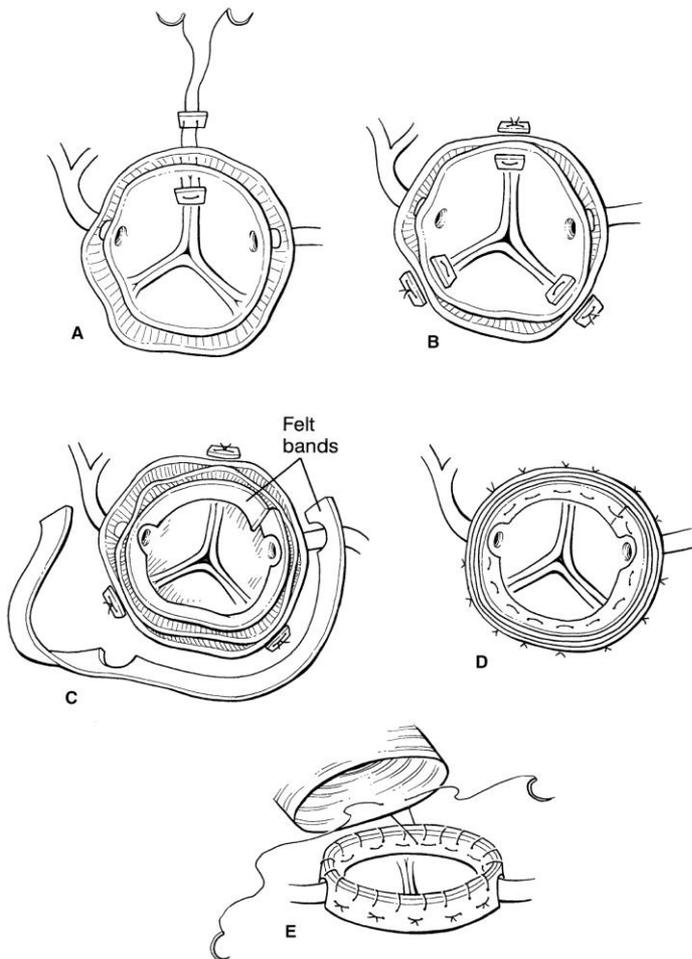
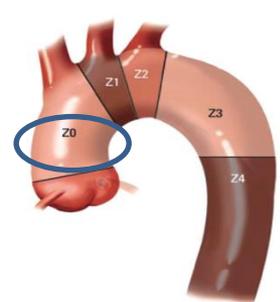
DHCA with selective cerebral perfusion

Always look in the Arch



Zone 0 proximal anastomosis

If you can spare the root,
perform an Aortic Valve resuspension

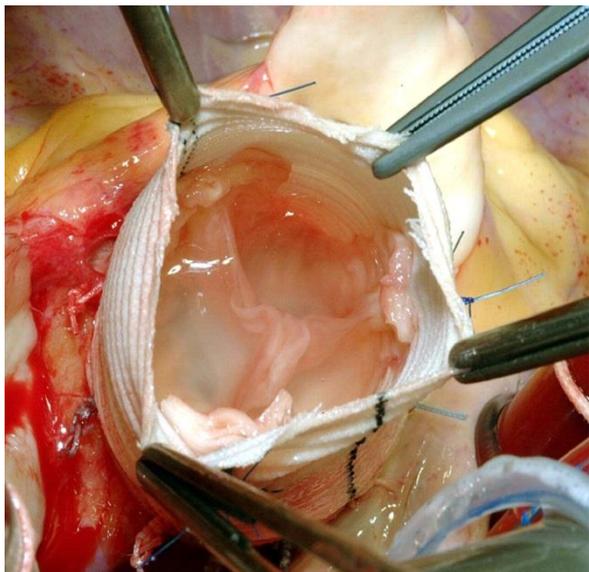


Zone 0 – proximal anastomosis

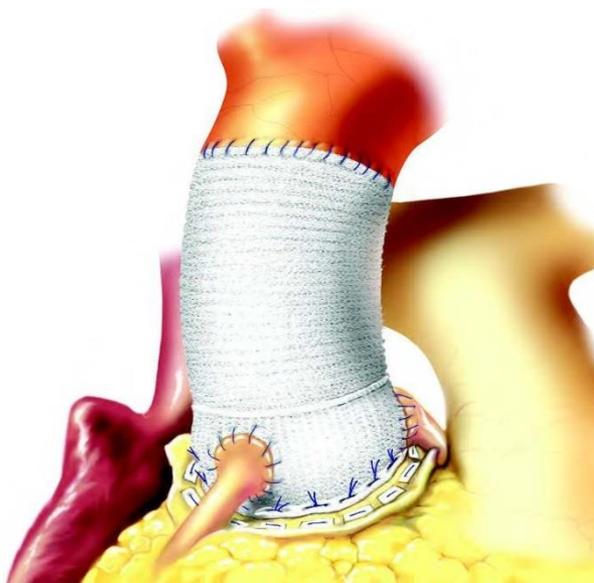
If the root is torn or dilated then replace root

Surgical Options to Manage aortic root

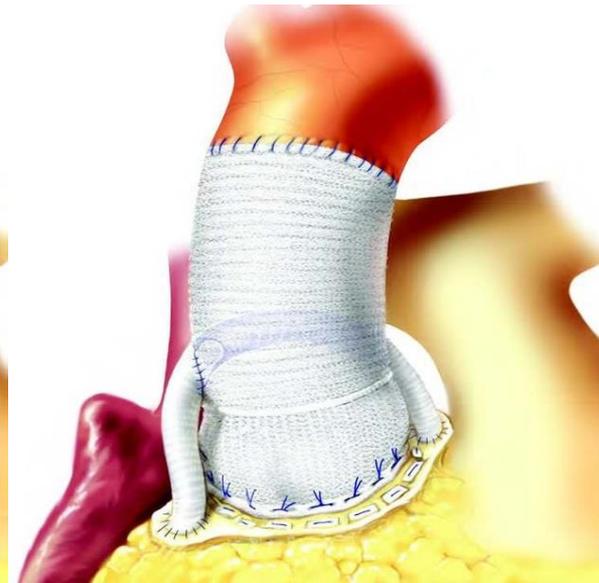
Valve sparing aortic root
replacement



Bentall



Modified Cabrol



Aortic root surgery was not associated with increased in hospital mortality, but decreased the likelihood of re-intervention due to late aortic root intervention (Di Eusanio M et al. Ann Thorac Surg 2014;98:2078–85)

Zone 0 – distal anastomosis

The Arch: To Do or Not to Do?

Ascending aortic replacement or hemi-arch alone is easier and effectively closes the entry site, but can leave a part of the diseased aorta untreated

OR

If you replace the arch the mortality is higher (Proximal Aortic repair versus extensive aortic repair in the treatment of acute type A Aortic dissection: a meta analysis. Yan Y et al Eur J Cardiothorac Surg 2016 May; 49(5) 1392-401)

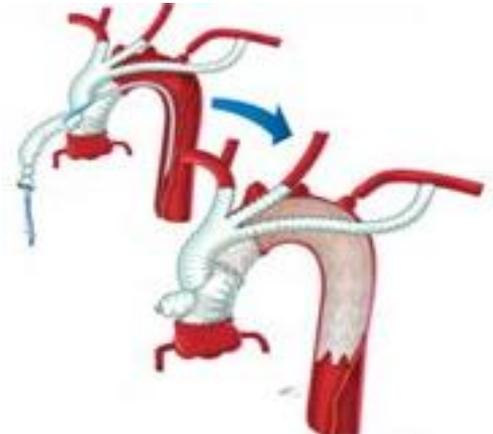
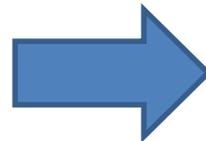
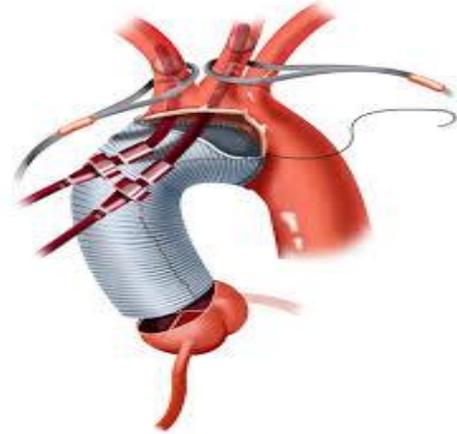
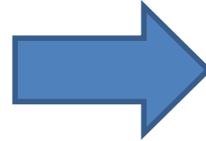
This is further illustrated in the German Registry for Type A AAD

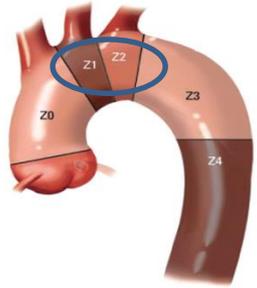
	Classic(518)	Total Arch 140	P-value
Stroke	13.6%	12.5%	0.78
Mortality	18.7%	25.7%	0.07

Thorac Cardiovasc Surg. 2012 Sep;144(3):617-23. Easo J et al, GERAADA study group

My preferred pathway

- No Arch Tear
 - Only Hemiarch replacement
- In young patients and patients with collagenopathy also debranch the arch to prepare for stenting if needed in the future



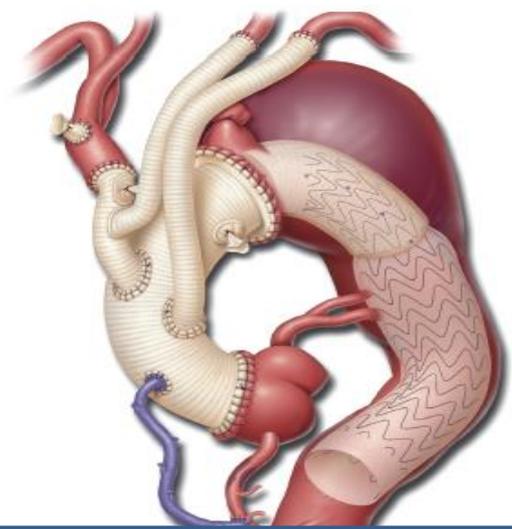


Zone 1 or 2

If a tear is in Zone 1 or 2 you need to replace the Arch

Elephant Trunk

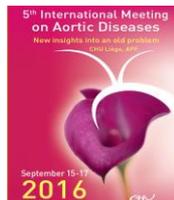
Frozen Elephant Trunk (FET)

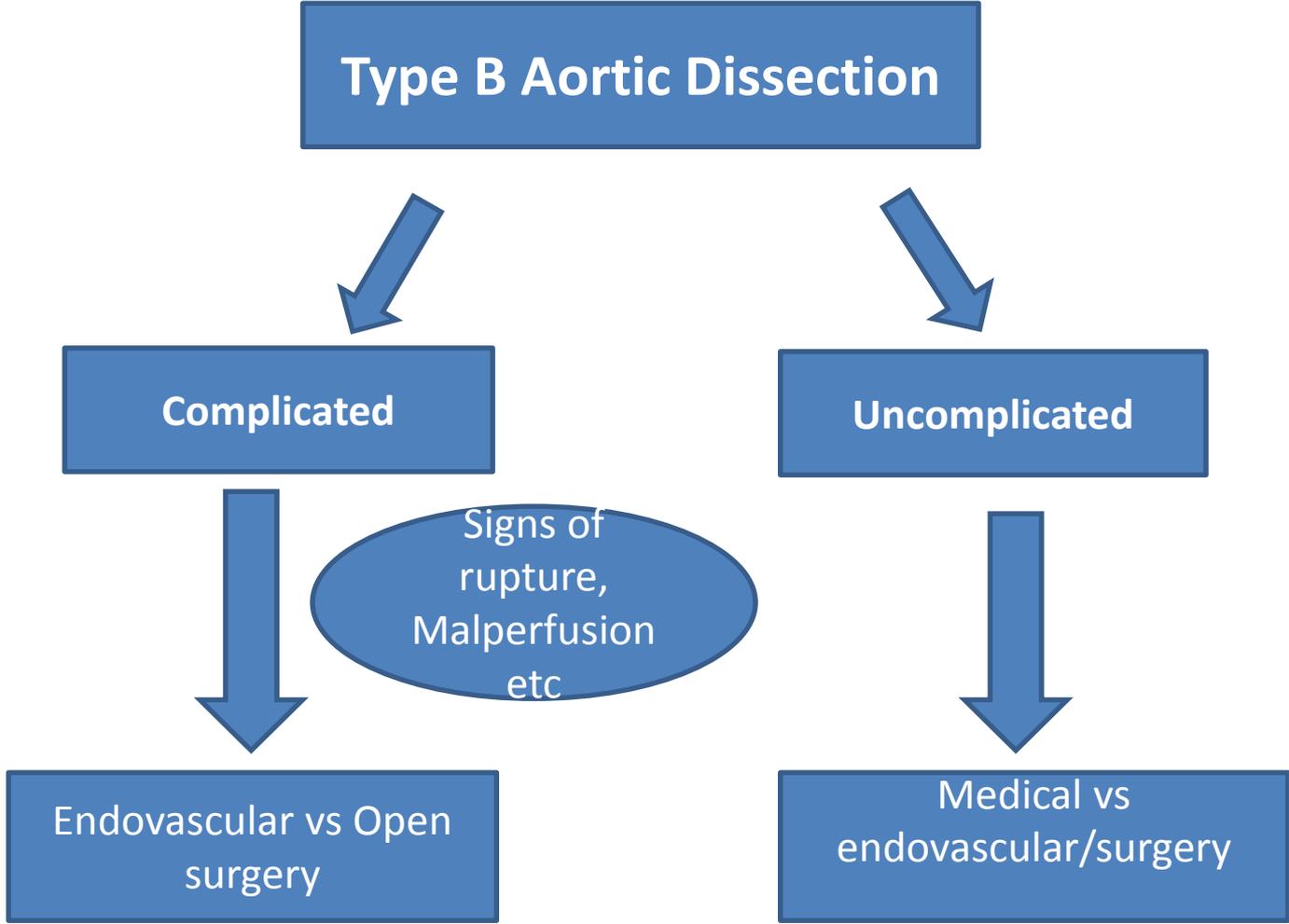


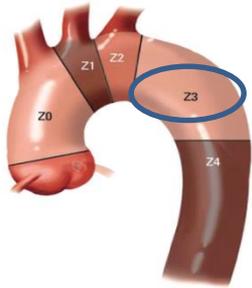
Elephant trunk technique for replacement of the aortic arch was advocated by Miyamoto S. et.al (Ann Thorac Cardiovasc Surg. 2006;12:412-6.)

FET combines conventional surgical replacement of the ascending aorta and the aortic arch with endovascular repair of the descending aorta.

Associated with similar satisfactory early and mid-term outcomes. Leads to single-stage treatment in a significant number of patients aortic disease. Facilitates endovascular second-stage treatment in patients with residual DTA disease (Di Eusanio M. Ann Thorac Surg 2015;100: 88–94.)





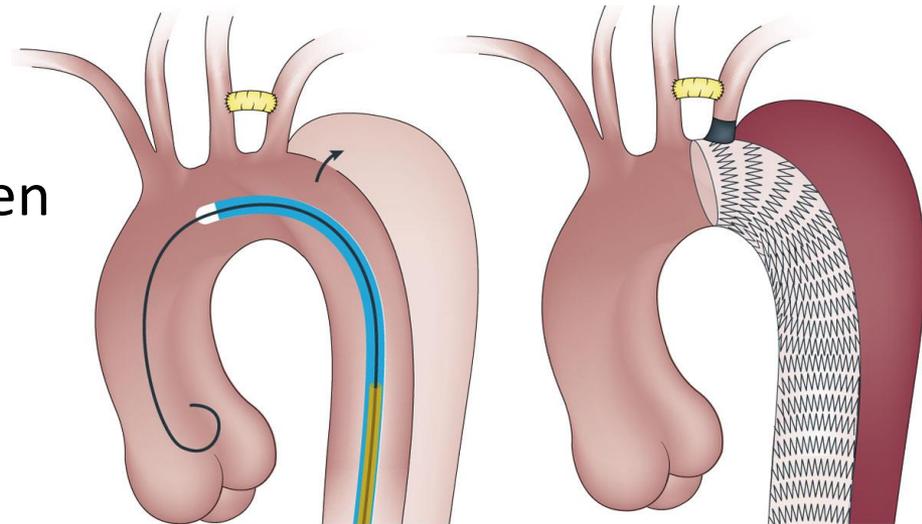


Type B Complicated: TEVAR is gold standard

TEVAR revolutionized Management of type B aortic dissection since it's inception in 1999

Principle

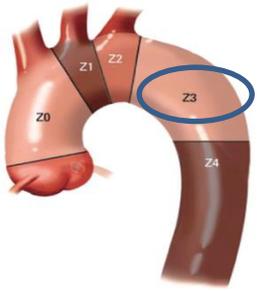
- Cover entry tear
- decompression of false lumen
- expansion of true lumen
- induces aortic remodelling
- prevents late complications



Nature Reviews | Disease Primers

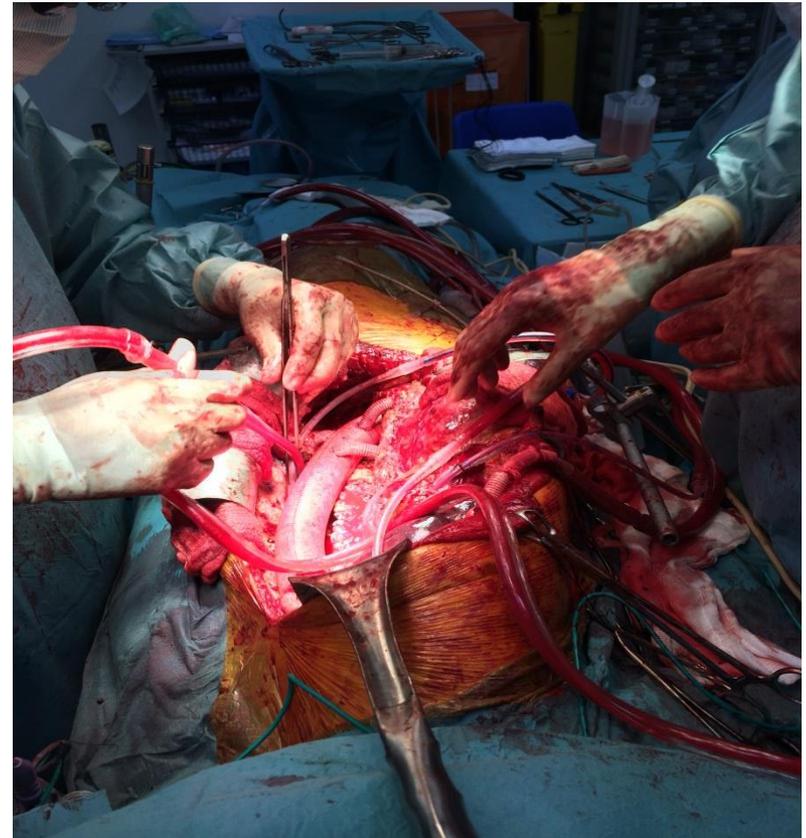
Most of the large registries report a 30 day mortality rates of approx 7-10%

Type B Complicated: Open surgery



- Open surgery (where patients not suitable for TEVAR) performed.
 - It involves the replacement of the dissected Aortic segment and re-implantation of the visceral, renal, and sometime Intercostal arteries.
- With the exception of patients with Marfan's syndrome where it seems surgery is the preferred options.

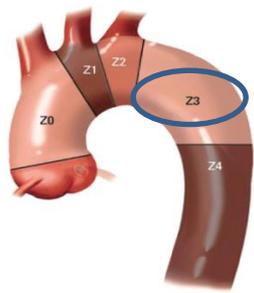
Parisi et al. Diseases 2015. 3,159-166. Metanalysis of patients with MFS treated with TEVAR vs surgery



TEVAR vs Open Surgery for Complicated Type B AD

Complicated Type B	TEVAR	OSR
Mortality (30 days)	7.3%	19%
Cerebrovascular events	3.3%	6.8%
Spinal Cord Ischaemia	3.1%	3.3%

Konstantinos et al. *annals of Cardio Surg.* May 2014. Metanalysis 2006-2013



Treatment
Type B Uncomplicated

Type B uncomplicated: Medical management is preferred in acute phase

Dissection of the descending aorta is less frequently lethal compared to Type A and medical management of uncomplicated type B dissection results in approximately 90% survival to hospital discharge

Acosta S. Ann Vasc Surg. 2007;21(4):415-22

TEVAR vs Medical Mgt

BUT the INSTEAD XL Trial recently showed that in in the long term, 5 years, patients having TEVAR had a better survival rate compared to the patients with Medical management.

INSTEAD Trial

- No superior survival ($p = 0.15$)
- Improved Remodelling 91.3 % vs 19.4% in favor of TEVAR ($p < .001$)

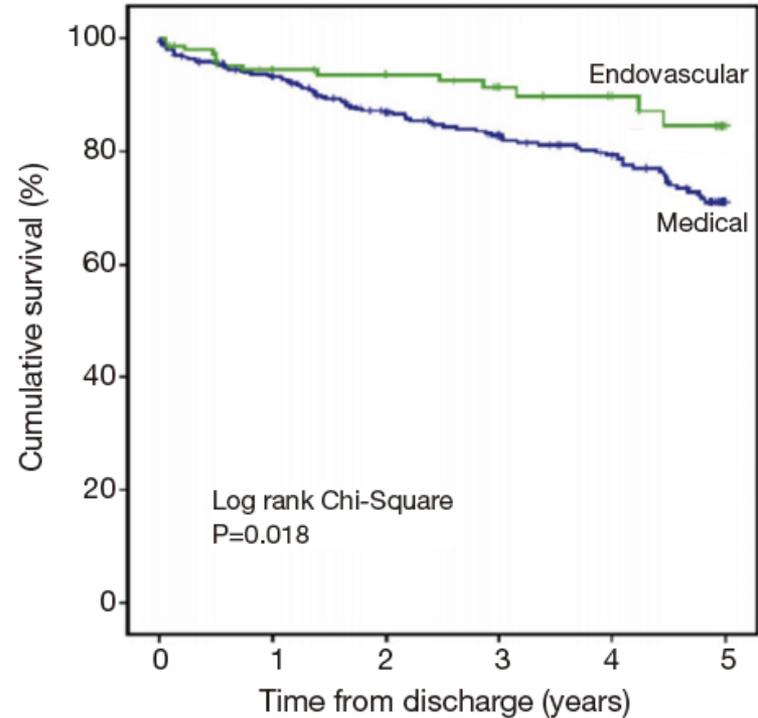
INSTEAD XL Trial

- TEVAR has better aorta related mortality (6.9% vs 19.3 % $p=0.004$)
- TEVAR associated with less disease progression (27% vs 46.1% $p=0.004$)

INSTEAD TRIAL, Nienaber et al.: Circulation 2009, 120:2519-2528. Trial 140 pts with stable type B aortic dissection randomized to TEVAR + medical mgt vs optimal Medical mgt.

TEVAR vs Medical Mgt

This study by Patel has a similar findings, better long term survival with Endovascular treatment.



No. at risk	0	1	2	3	4	5
Endovascular	146	129	107	78	53	25
Medical	434	384	284	218	177	78

Patel et al. Ann Card Surg.2014 doi:10.3978/j.issn.2225319X.2014.07.06

TEVAR vs Open Surgery for uncomplicated Type B AD

Paterson B et al. Endovascular Today, 2014, 54-57

TABLE 2. COMPOSITE ADVERSE EVENT RATE			
Adverse Events	TEVAR (n = 495)	OSR (n = 353)	OR (95% CI); P Value
30-day death	10 (2%)	30 (9%)	4.5 (2.1–10); P < .001
30-day spinal cord ischemia	30 (6%)	48 (14%)	2.4 (1.5–4); P < .001
30-day stroke	21 (4%)	23 (7%)	1.6 (0.8–3); P = .158

Abbreviations: CI, confidence interval; OR, odds ratio.

In conclusion.....

Type A



is best served by Surgery

Type B complicated



TEVAR unless patients with collagenopathy

Type B uncomplicated



Medical management followed by TEVAR in sub-acute phase

BUT regardless of the treatment path
the key is early detection and identification of patients at risk

September 15-17

2016

Crowne Plaza Hotel
Liège, Belgium

5th International Meeting on Aortic Diseases

New insights into an old problem CHU Liège, APF

www.chuliege-ima.be

Thank you

