



AORTIC VALVE SPARING OPERATIONS IN MARFAN SYNDROME

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Aortic valve sparing operations

■ BENTALL

Durability

Excellent results

But... Chronic anticoagulation

■ VALVE SPARING

Durability ?

Learning curve

But... No anticoagulation



Is the change
acceptable ?

In what patients?

Marfan syndrome

Connective tissue disorder

Mutation in the fibrillin 1 gene on chromosome 15

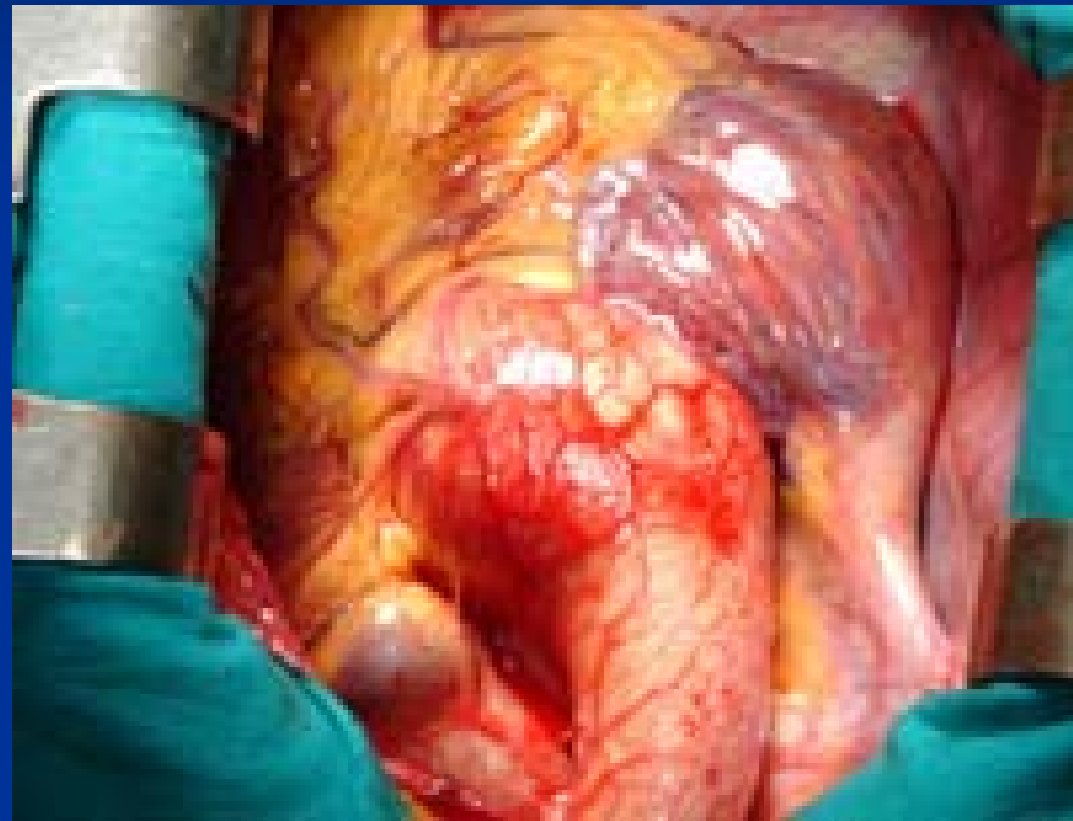
Incidence 1 in 5000-10000

Cardiovascular system

Eyes

Skeleton

Marfan syndrome. Life expectancy



Mean age at death

32 y (1972)

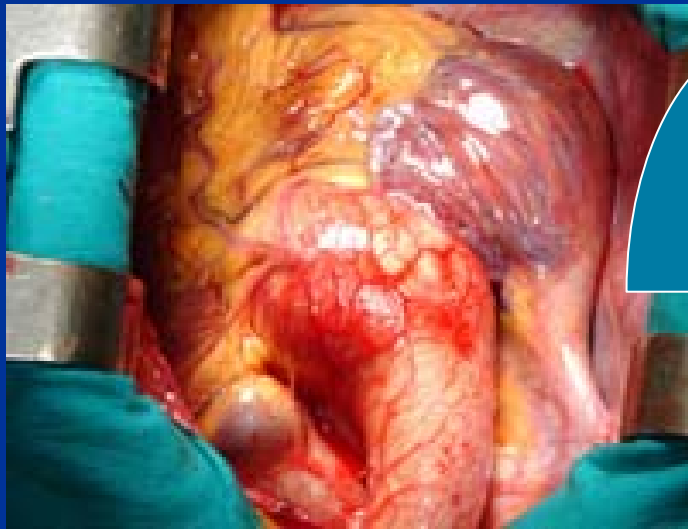


45 y (1998)

Gray et al. Life expectancy in British Marfan syndrome population. Clin Genet 1998;54:124-8

How much time should we wait ?

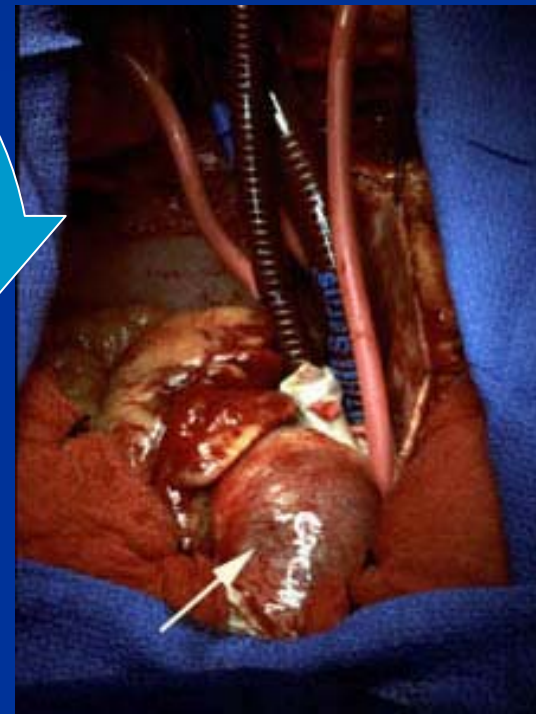
Root aneurysm



Mortality 1 -5 %

Aortic valve sparing operations

Aortic dissection

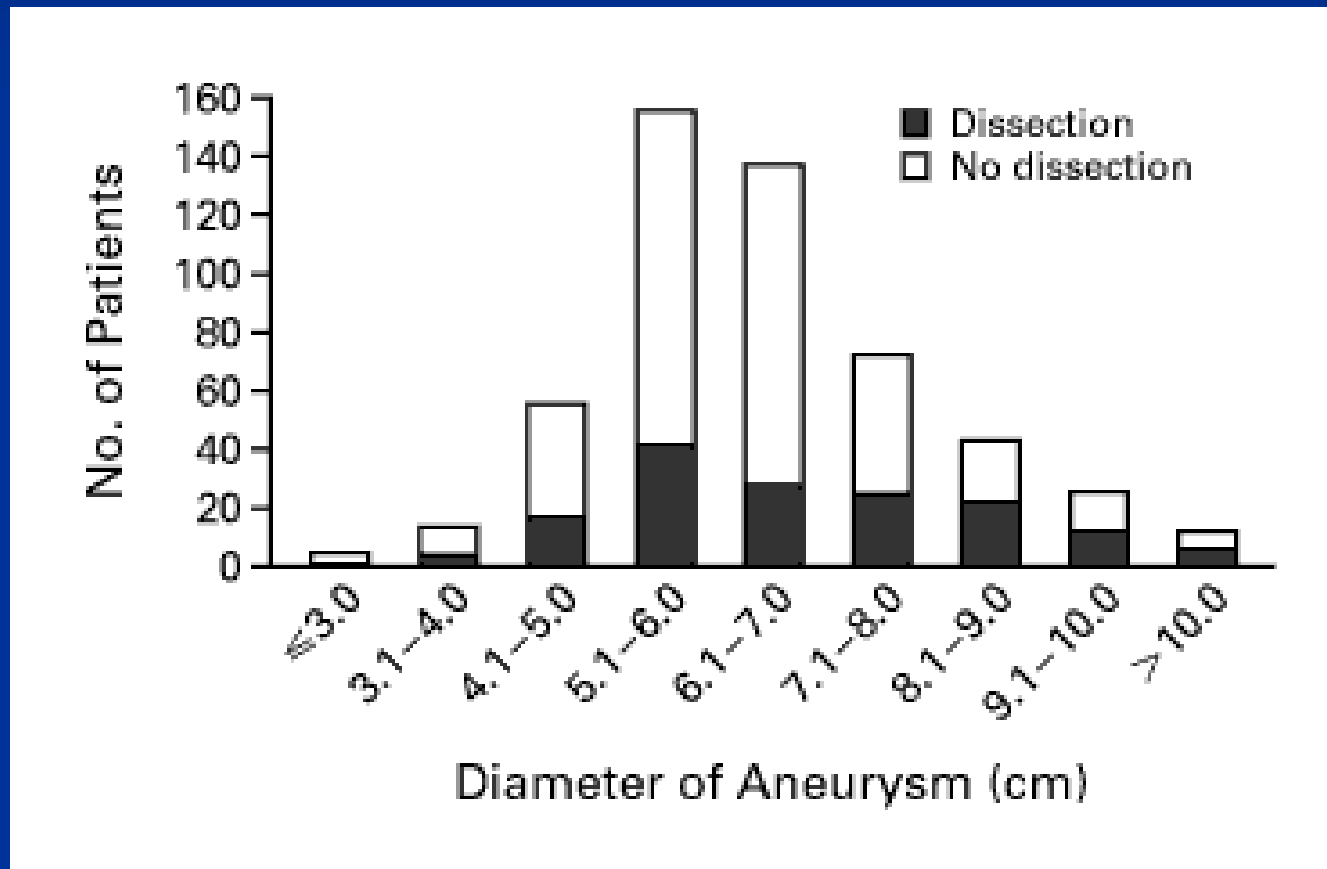


Mortality 11 – 30%

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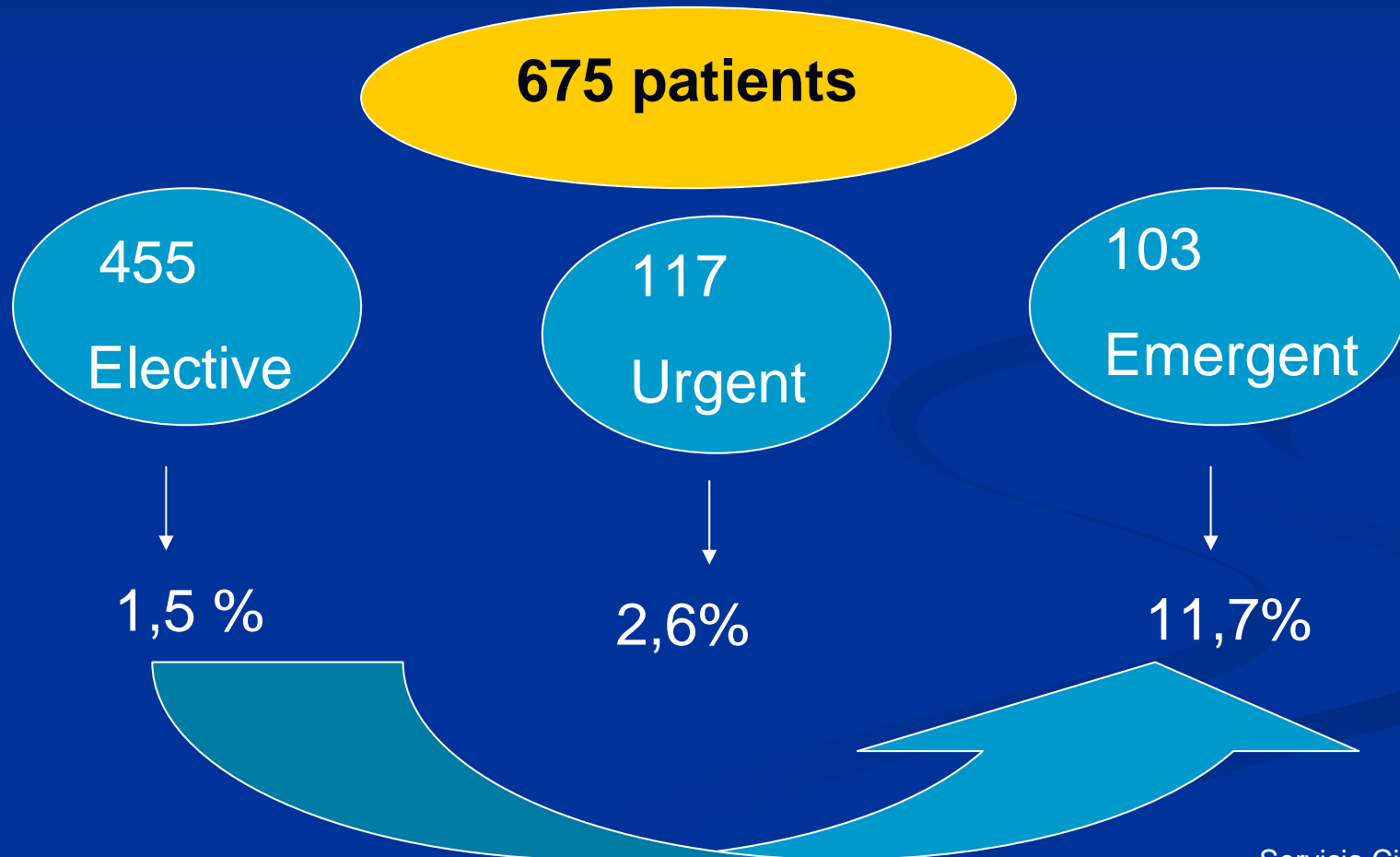
Diameter of Aneurysm - Dissection

V.Gott. NEJM 1999



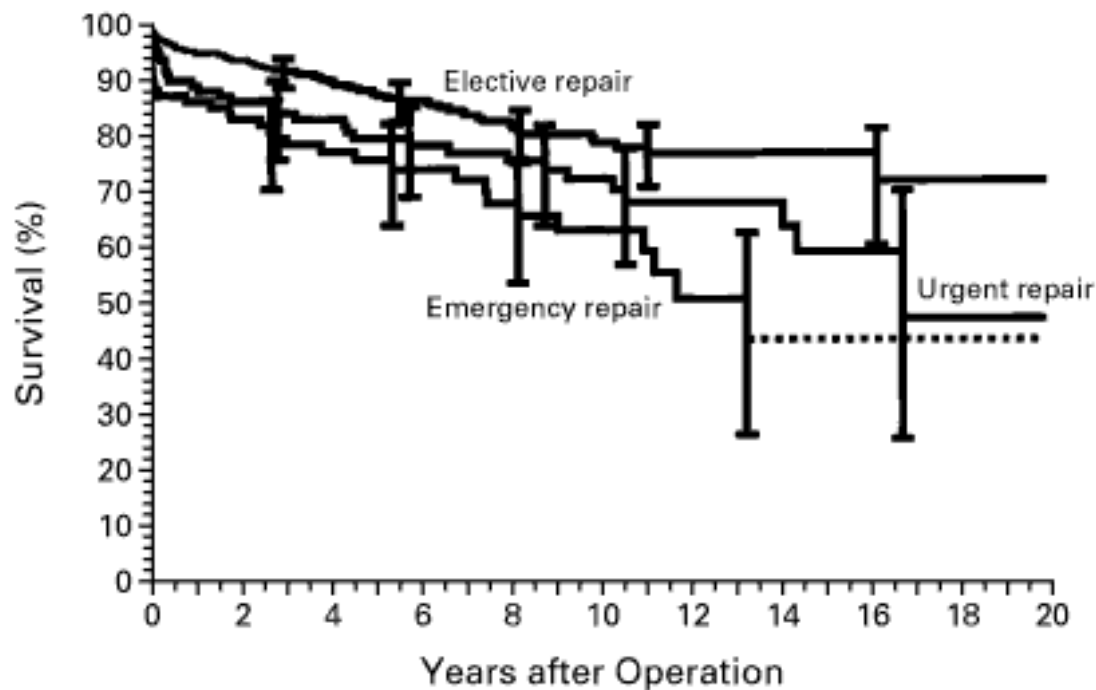
Hospital mortality in aortic root surgery

V.Gott et al. Replacement of the aortic root in patients with Marfan's syndrome (N Engl J Med 1999; 340: 1307-13)



Actuarial Survival after aortic root surgery

V.Gott et al. Replacement of the aortic root in patients with Marfan's syndrome (N Engl J Med 1999; 340: 1307-13)



No. AT RISK

Elective repair	455	381	294	204	141	97	64	42	17	4	1
Urgent repair	117	88	74	62	53	41	23	16	8	4	3
Emergency repair	103	73	57	41	31	21	10	4	3	2	0

Timing of Surgery

Grade Aortic Regurgitation	0 I II	III IV
1985	6,5	6
1995	5,5	5
2005	5 cm	4,5 cm
2010	?	?

Timing of Surgery

Management of Aortic Disease in Marfan Syndrome (Arch Intern Med.2005;165:749-755)

Markov decision analysis

CONCLUSION

> 3 cm



**PROPHYLACTIC
AORTIC SURGERY**

Timing of Surgery

7 th International research symposium on the Marfan Syndrome (Ghent september 2005)

> 5 cm

> 4 cm + moderate aortic insufficiency

4,5 – 5 cm surgery if valve could be preserved

> 2mm / year

History

Dr. Hugh Bentall (1966, London)

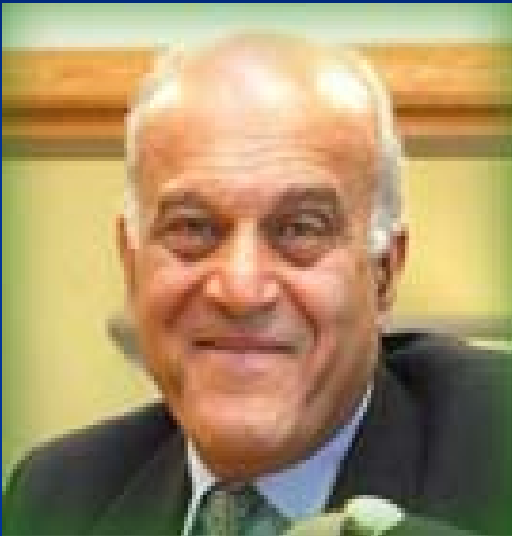


This operation has saved
thousand of patients' lives

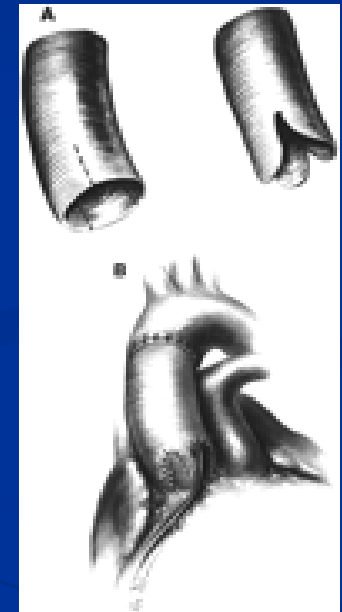
Gold standard

History

Professor Sir Magdic Yacoub



Remodeling technique

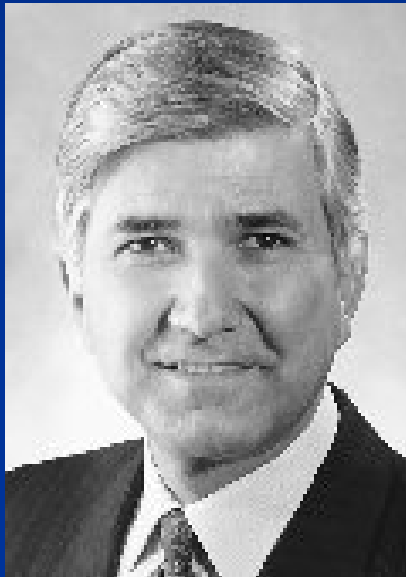


1983 : first to describe technique *Circulation* 1983; 68:III-321

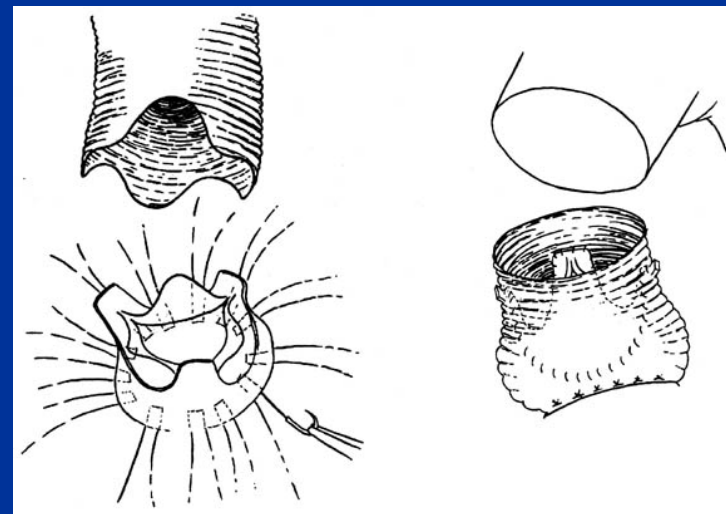
1993: *Remodeling of the aortic annulus. JTCS* 1993;105:435-8

History

Dr. Tirone David



Reimplantation technique



An aortic valve-sparing operation for patients with aortic incompetence and aneurysm of the ascending aorta. JTCS 1992;103:617-22

Confusion

What should I
choose in this
patient ?



Bentall
Remodeling
David I
David II
David III
David IV
David V
David VI
Valsalva graft



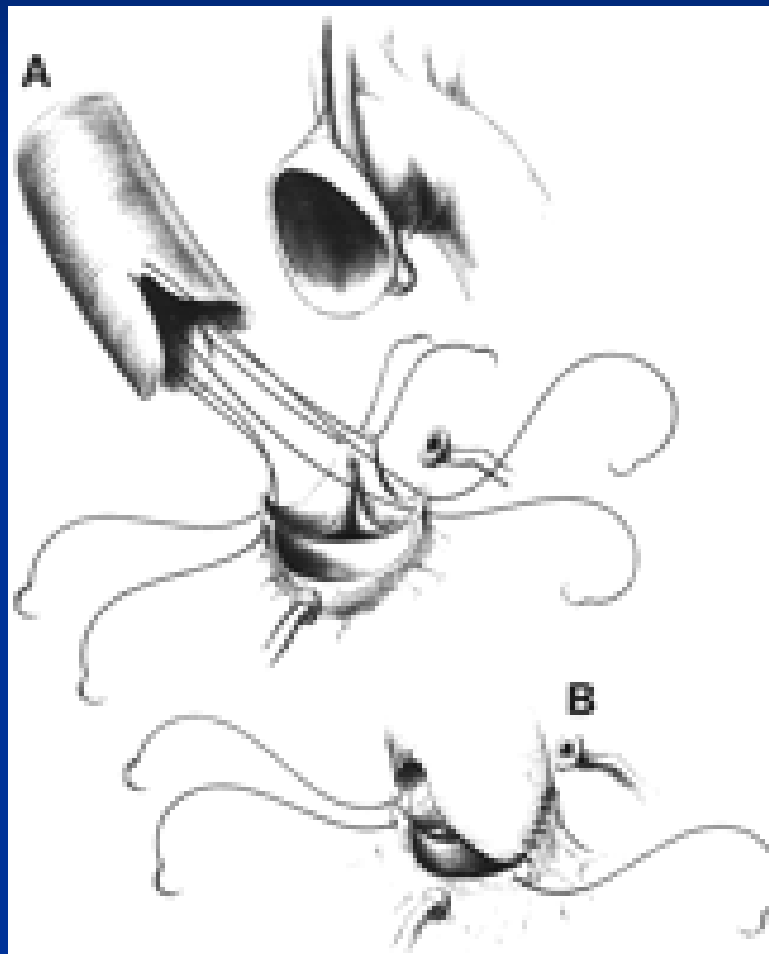
...maybe the best for this patient is to call other surgeon...

Nomenclature ????

- **David I** cylindrical graft
- **David II** = Yacoub
- **David III** = Yacoub + annuloplasty
- **David IV** cylindrical graft 2-4 mm larger
- **David V** cylindrical graft 4-6 mm larger
- **David VI** (Stanford modification) two grafts
- **David** De Paulis graft

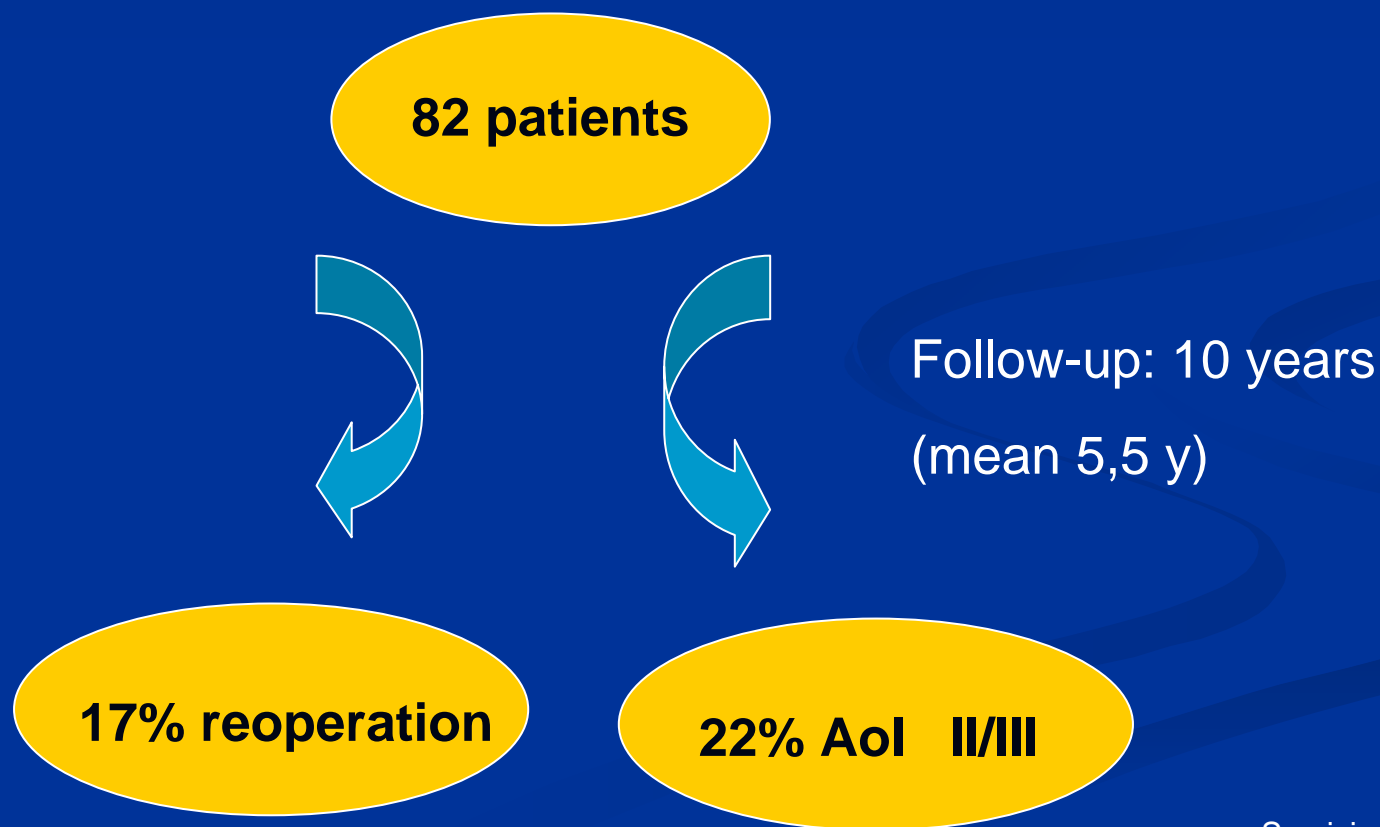


Remodeling technique



Remodeling technique

*Yacoub et al. Early and long term results of a valve sparing operation for Marfan syndrome.
Circulation.1999; 100 II-29-35*



Reimplantation technique. David's experience

Aortic valve sparing operations in patients with aneurysms of the Aortic root or ascending
2002; 74: 1758-61

230 patients (151 root aneurysms)

94 reimplantation technique

Hospital mortality	2 patients
Survival	83%
No reoperation	97%
No Ao regurgitation	90% (reimplante) 55% (remodeling)



Follow up
8 years

Reimplantation technique. Impact of preoperative aortic insufficiency

Kallenbach et al ATS 02;74:S1765-8

158 aortic root aneurysms

Regurgitation	(83 p) III/IV	vs.	(71 p) I/II
Mortality	3.6%		4.2%
Reop.	3.8%		4.4%
AoI mean	0.43+/-0.58		0.42+/-0.62
No Ao	98%		89%
Regurgitation III/IV (8 years)			

Reimplantation technique. Impact of preoperative aortic root diameter

Kallenbach et al (Circulation 2003; 108 II 285-90)

168 patients aortic root aneurysms

Aortic root	47 (>60 mm)	58 (50-60)	18 (<50)
Survival	98%	100%	100%
No reop	98%	96%	63%
No AoI >II	100%	96%	94%
mean follow up 3 years			

Management of pediatric aortic disease in Marfan syndrome

(Cameron et al. 7th International Research symposium on the Marfan Syndrome. Ghent Sept 2005)

Timing of surgery

Sinuses > 5 cm
> 1 cm / year

Progressive aortic regurgitation

Other valvular surgery + moderate sinuses dilatation

Aortic dissection very rare under 12 years

Management of pediatric aortic disease in Marfan syndrome *(Cameron et al. 7th International Research symposium on the Marfan Syndrome. Ghent Sept 2005)*

n = 61 mean age 13 mean diameter 5.6 cm

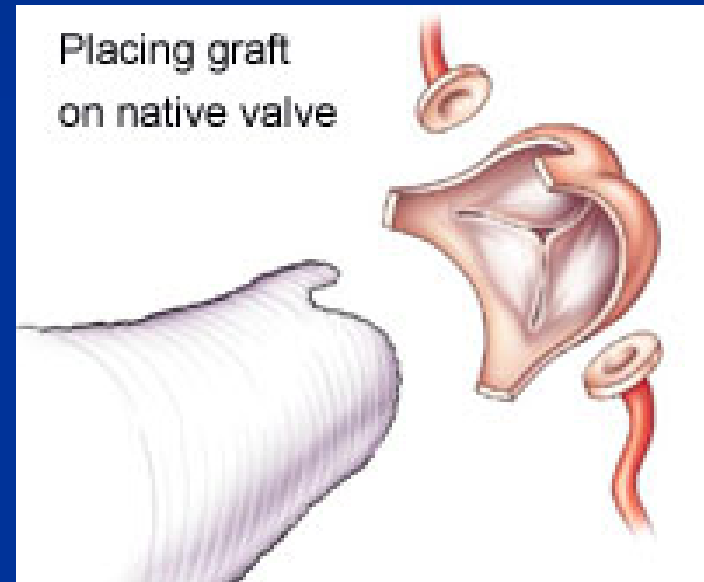
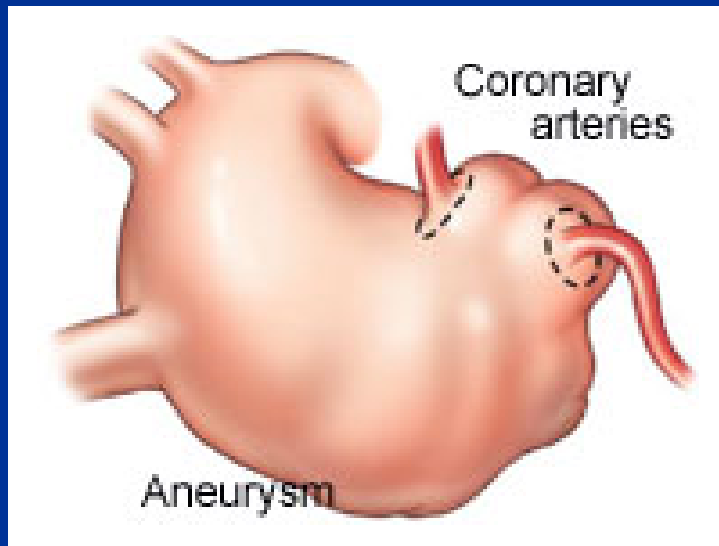
72% root an. 16% mitral valve, 10% dissection, 2% aortic insuff.

No hospital mortality

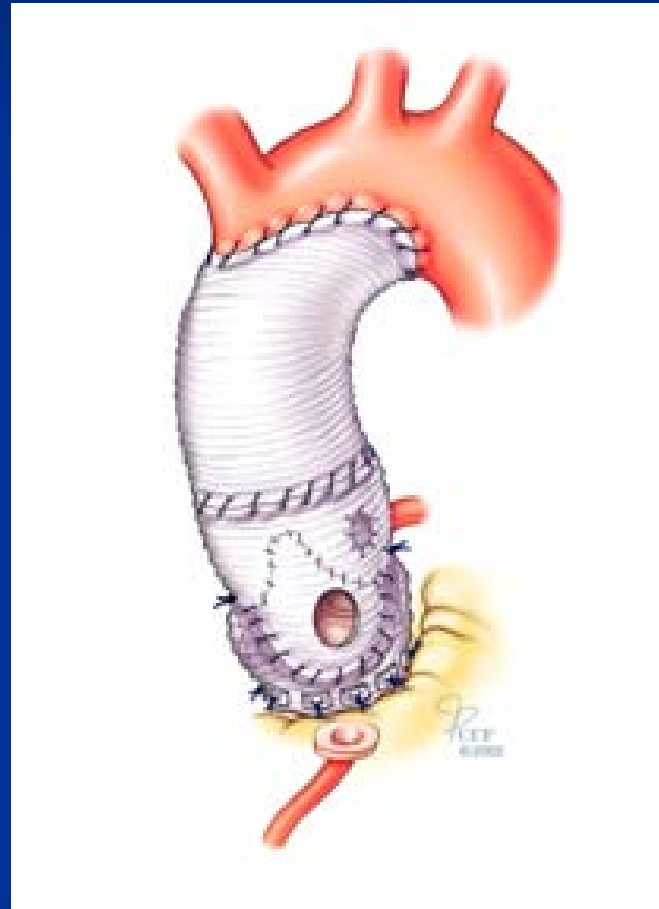
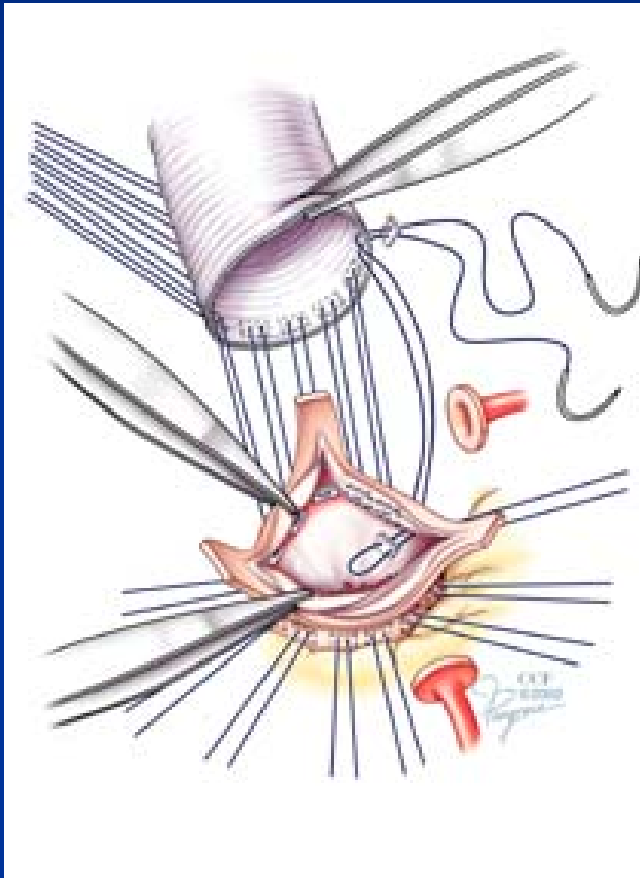
		Late mortality	Late Results
Bentall	29	10%	No morbidity, 3 dead
Sparing	22	0%	2 reoperations (Yacoub)
Homograft	10	30%	4 reoperations

Election procedure: David with Valsalva graft

Reimplantation technique



Reimplantation technique



Hospital 12 de Octubre experience

- From march 2004 –sept 2005: **23 patients**
- Mean age: 53 years
- **Seven patients: Marfan syndrome**
- Mean aortic root diameter: 55,4 mm

- **Preop. aortic insufficiency**

IV	(11)
III	(6)
I	(6)

- **Other associated surgery**

coronary revascularization	(3)
mitral – tricuspid – Closure IAC	(2)
closure IAC	(1)

Hospital 12 de Octubre experience

- David I: 1
- Valsalva graft: 17
- David VI (Stanford): 5

**Reimplantation
technique**

Mean bypass time 207 '

Mean clamp time 170 '

Hospital 12 de Octubre experience

Results

- Two patients: Ao I > II → reconversion to mechanical prosthesis
 - No hospital mortality
 - One AMI , one permanent pacemaker
 - No other major complications
 - Mean follow up 8 months
- | | | |
|------|---|----|
| Ao I | 0 | 13 |
| I | | 5 |
| II | | 1 |
- One dead at 9 months: abdominal aneurysm rupture

Reflections

- Marfan patients have increased his life span since Bentall procedure developed in 1966.
- Gold standard : Bentall operation
- But... chronic anticoagulation and prostheses related complications

Reflections

Valve sparing operations

- Avoid chronic anticoagulation
- Decrease thromboembolic and haemorrhagic complications.
- Decrease endocarditis
- Improve quality of life in a very young population

Reflections

Durability ?

- How many years without warfarin will the valve last before a second operation might become necessary ?
- The key question is not if the valve can be spared, but will the preserved aortic valve function well for 10 years, if no longer ?

More complicated operation
Learning curve

Reflections



Remember that
not only surgery
save lives !