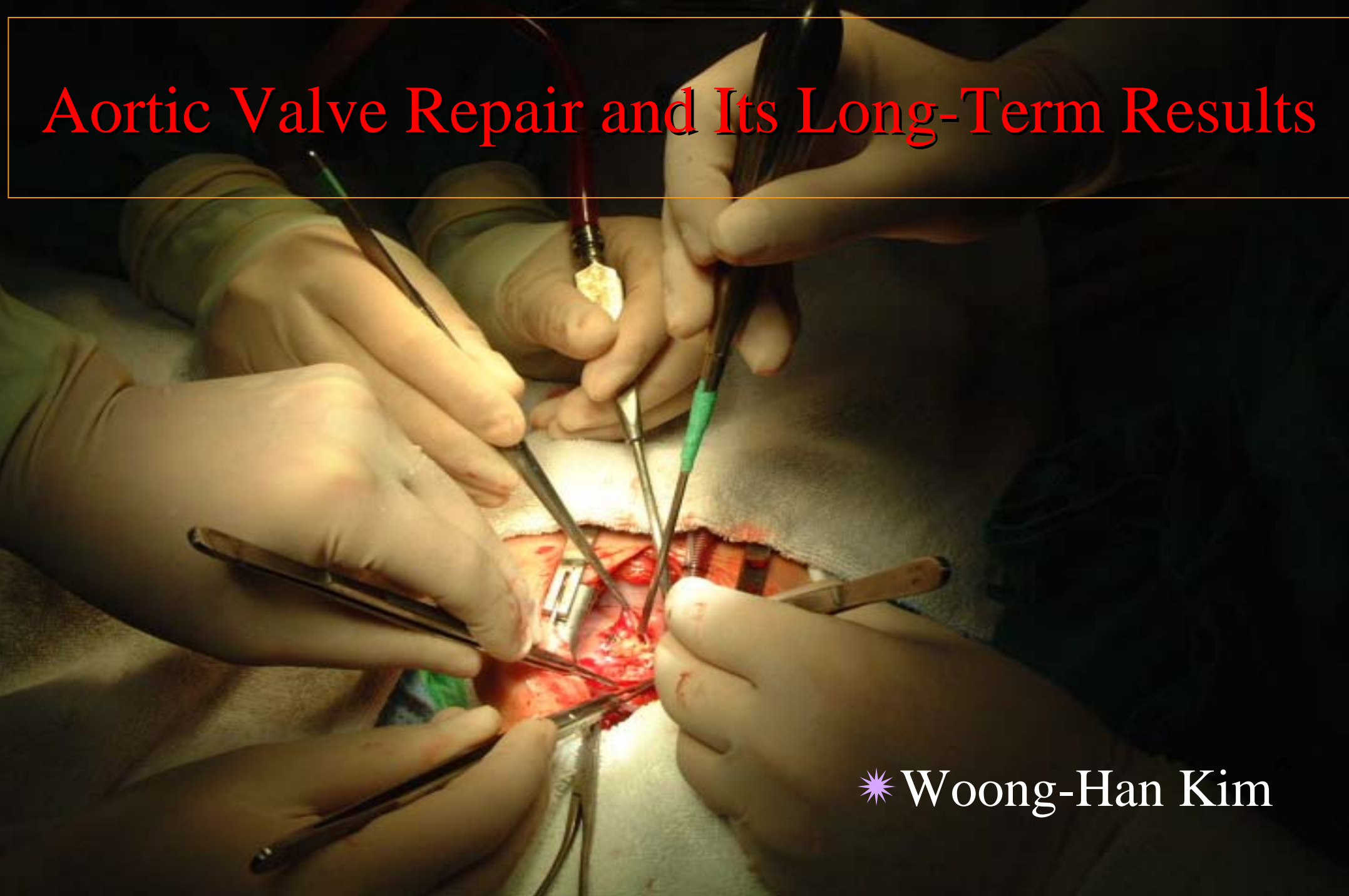
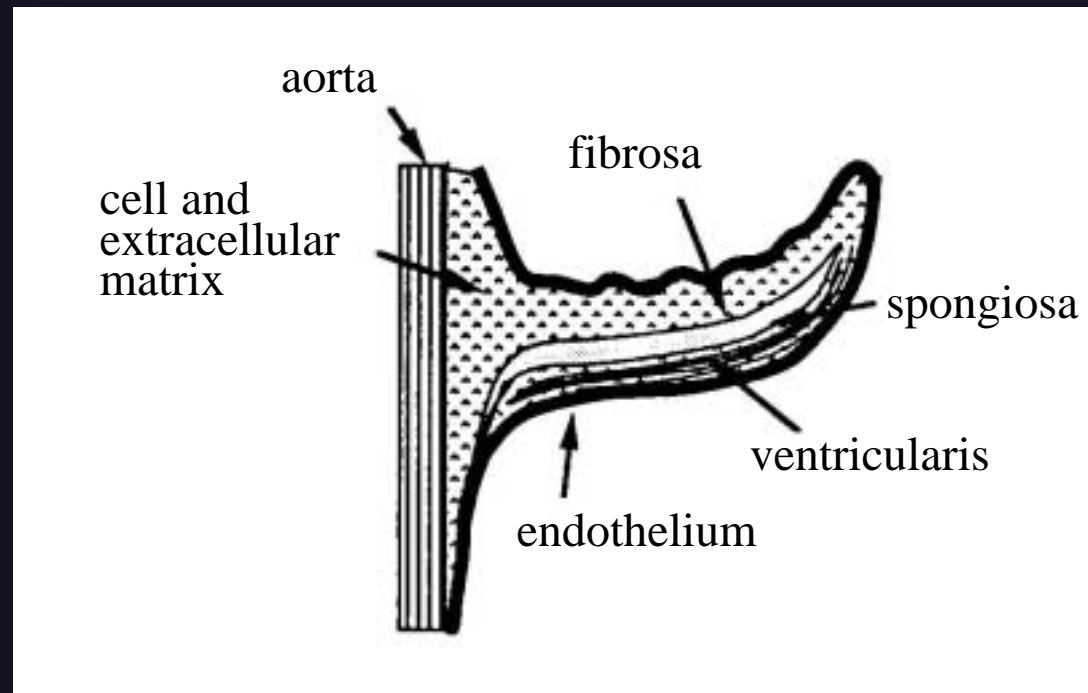


Aortic Valve Repair and Its Long-Term Results

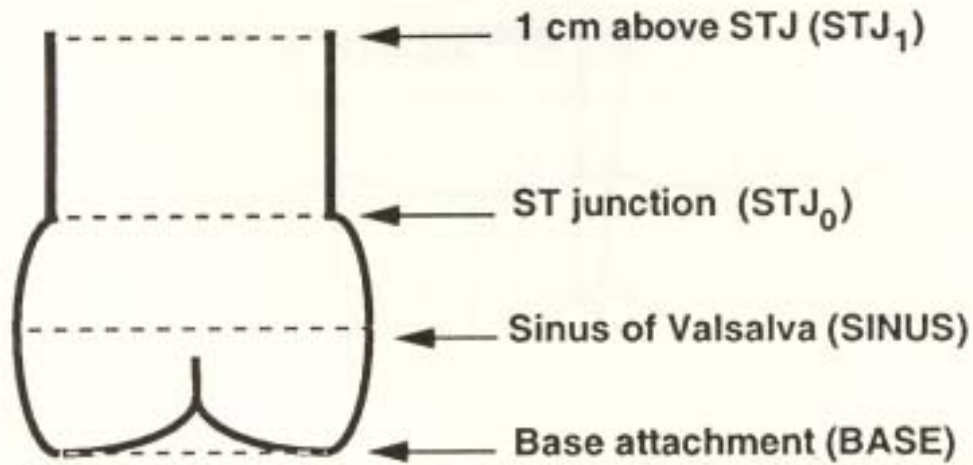


✦ Woong-Han Kim

Aortic Valve



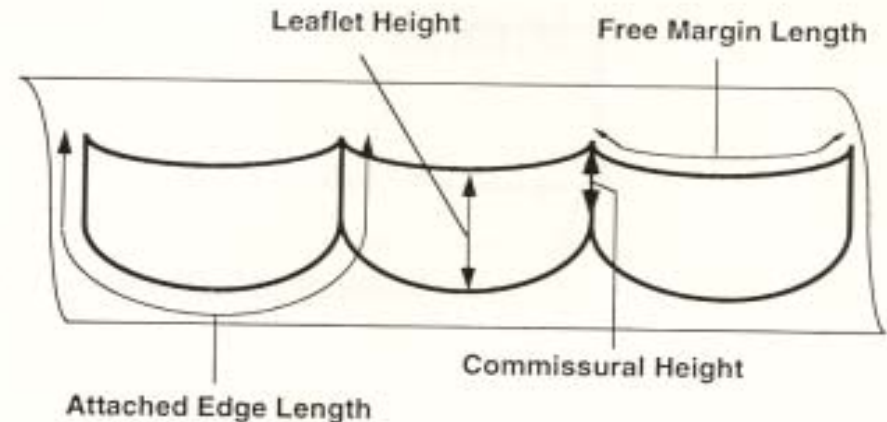
Aortic Root and Leaflets



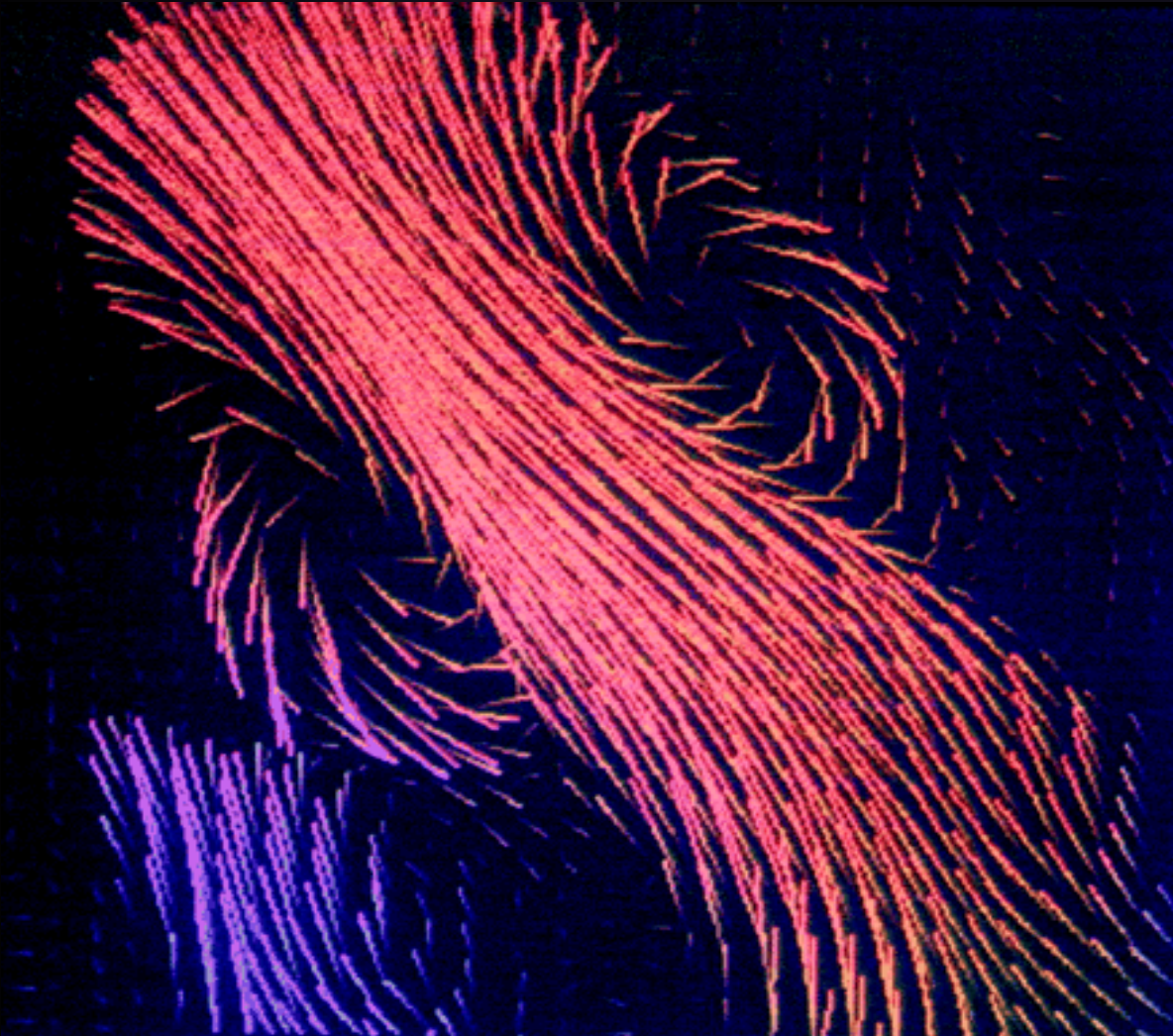
Aortic annulus	(Ratio; 0.97)
Sinus of Valsalva	(Ratio; 1)
ST junction	(Ratio; 0.81)

Aortic cusp & commissure

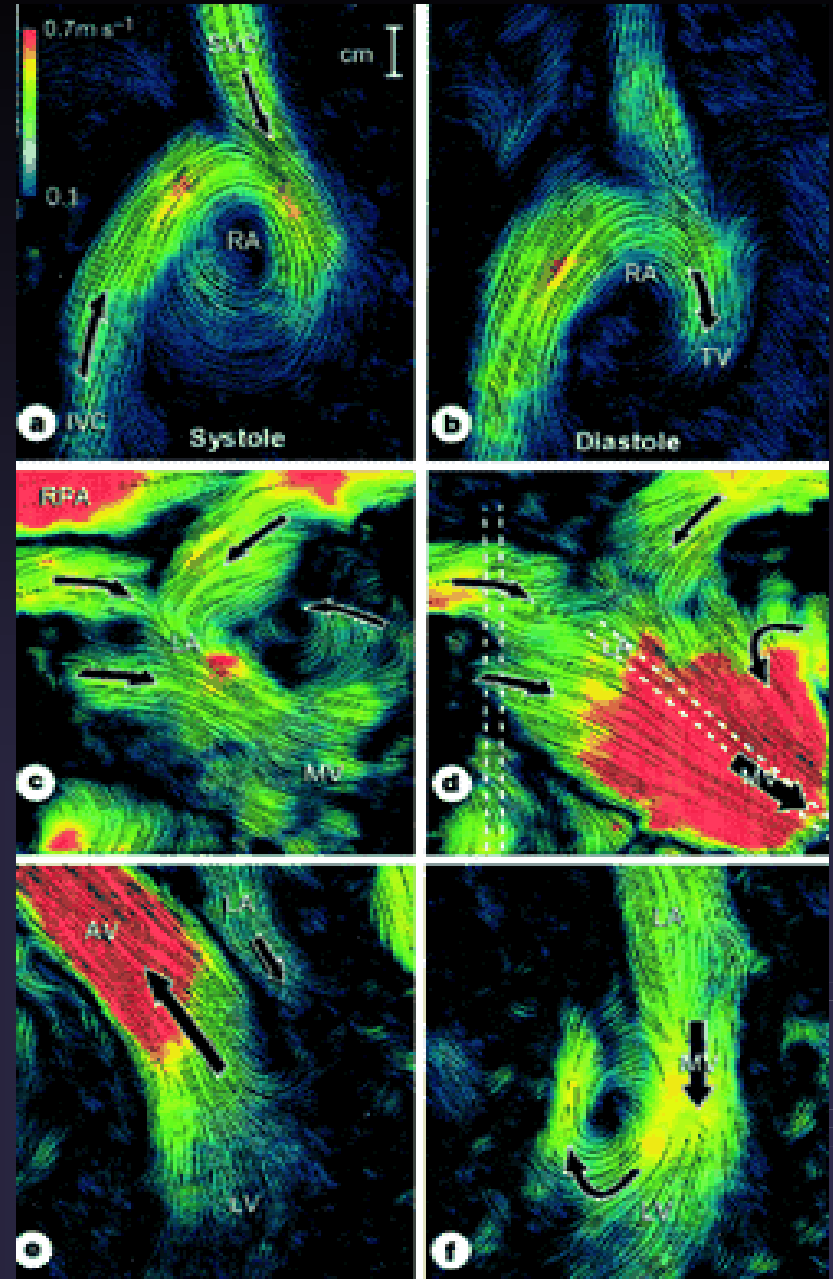
Base of leaflet = 1.5 x free margin



3-Directional MR Velocity Mapping

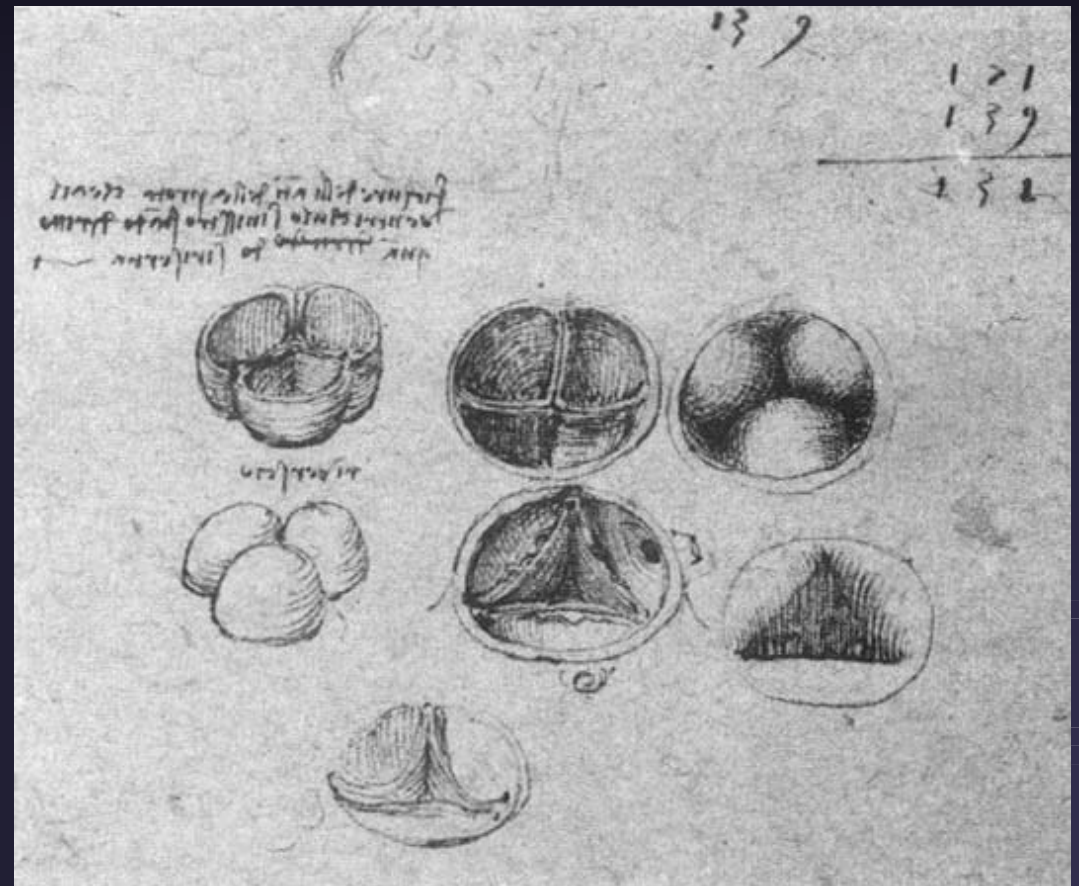


Circulation 1993;88:2235-47



Nature 2000;404:759-61

Leonardo da Vinci



Handwritten text in a cursive script, likely a medical or anatomical treatise. The text is arranged in columns, with some sections starting with 'W. V. R.' and 'W. V. R. S.'. The text is interspersed with various anatomical drawings.

The drawings include:

- Top left: A circular diagram with internal lines, possibly representing a cross-section of a vessel or organ.
- Middle left: A cylindrical structure with internal rings, possibly a stomach or intestine.
- Bottom left: A more complex cylindrical structure with internal details.
- Top center: A small circular diagram with a central point.
- Top right: A large, detailed drawing of a human torso from the front, showing the chest and abdominal regions. A circular structure is highlighted in the chest area.
- Center: A large, detailed drawing of a human torso from the front, showing the chest and abdominal regions. A circular structure is highlighted in the chest area.
- Bottom center: A detailed drawing of a human torso from the front, showing the chest and abdominal regions. A circular structure is highlighted in the chest area.

Handwritten text in a cursive script, likely a medical or anatomical treatise. The text is arranged in columns, with some sections starting with 'W. V. R.' and 'W. V. R. S.'. The text is interspersed with various anatomical drawings.

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- Bottom center: A detailed drawing of a human torso from the front, showing the chest and abdominal regions. A circular structure is highlighted in the chest area.

Initial Management of Critical AS

(Neonates and Infants)

* At the current time

1. Open surgical valvotomy
2. Transcatheter balloon valvuloplasty
3. Ross procedure

Surgical Valvotomy vs. Balloon Valvuloplasty

- * Achieves approximately **equal results** in terms of
 1. relief of LVOTO
 2. residual obstruction
 3. creation of AR

F/U (surgical valvotomy or balloon valvuloplasty)

* Follow-up hemodynamic data

; significant residual lesions are quite common

→ **Palliative procedure**

Moore, J Am Coll Cardiol;1996;1257-63

Mosca, J Thorac Cardiovasc Surg 1995;109:147-54

Gildein, Am Heart J 1996;131:754-9

Shaddy, J Am Coll Cardiol 1990;16:451-6

Sholler, Circulation 1988;78:351-60

Zeevi, Circulation 1989;80:831-9

Egito, J Am Coll Cardiol 1997;29:442-7

McCrinkle, Am J Cardiol 1996;77:286-93

Kasten-Sportes, J Am Coll Cardiol 1989;13:1101-5

Bu'Lock, Br Heart J 1993;70:546-53

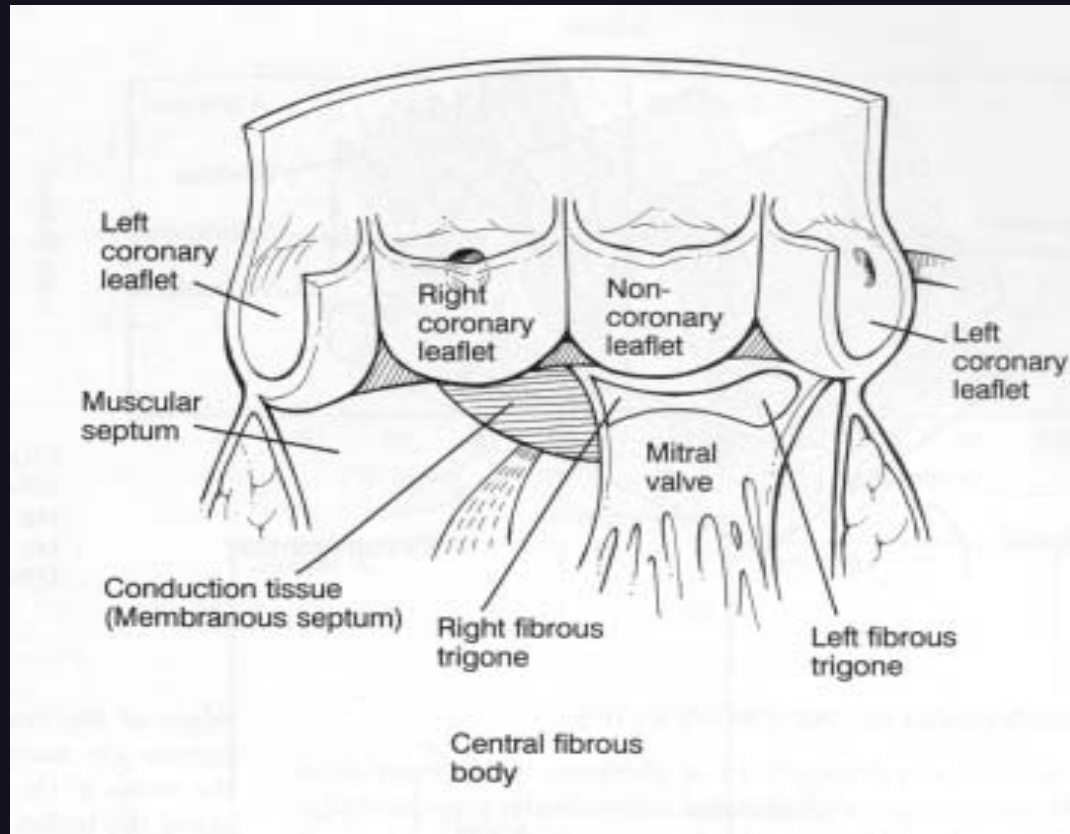
Vogel, Pediatr Cardiol 1992;13:5-9

Congenital AR : difficult to Repair

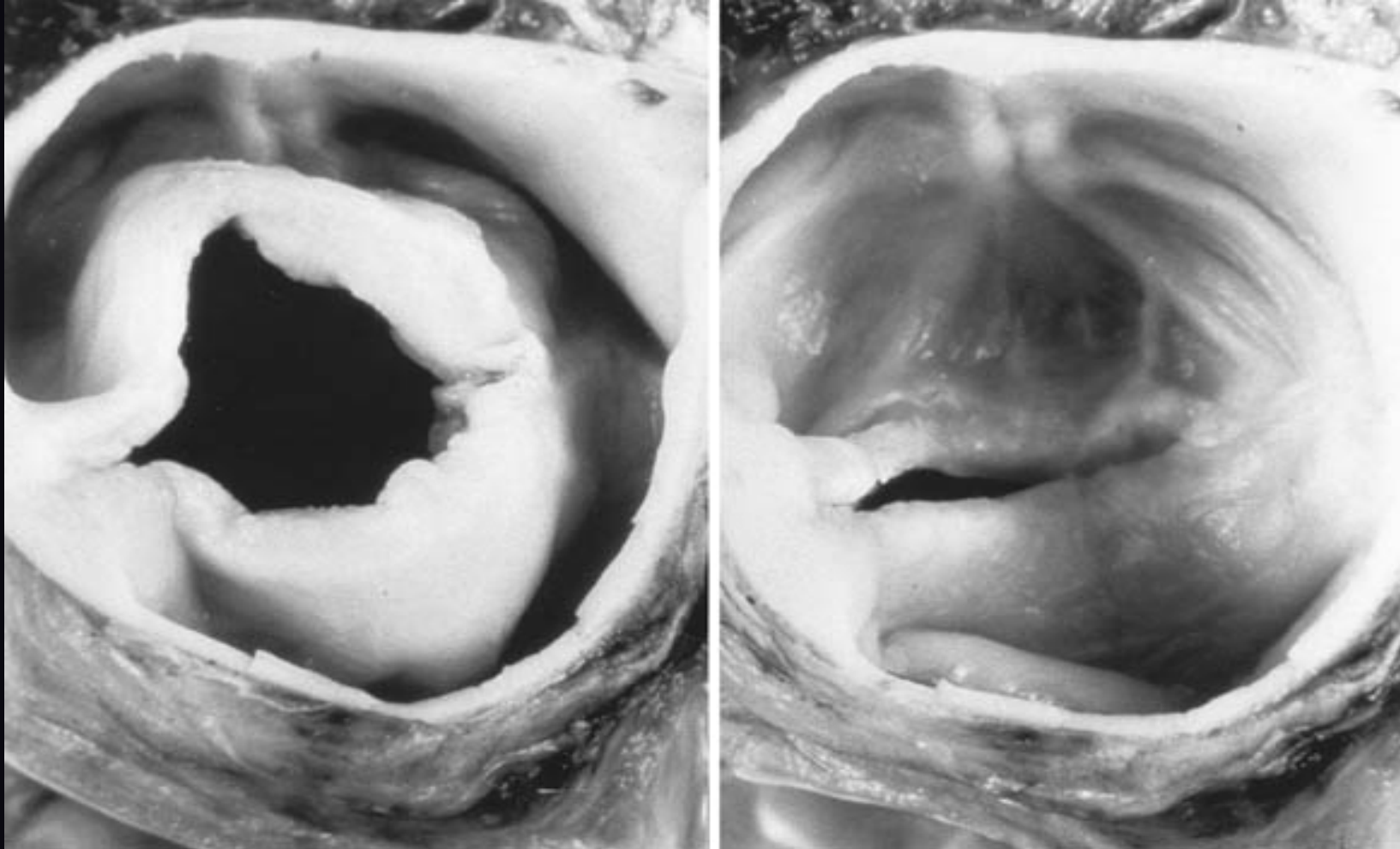
1. Important geometric features

- Bicuspid or dysplastic leaflets
- Subvalve tethering by membranous attachment
- Annular ectasia
- Poorly developed sinuses

Aortic Root Anatomy



Bicuspid Aortic Valve



Bicuspid Aortic Valve with Raphe



Congenital AR : difficult to Repair

2. Dominant AR

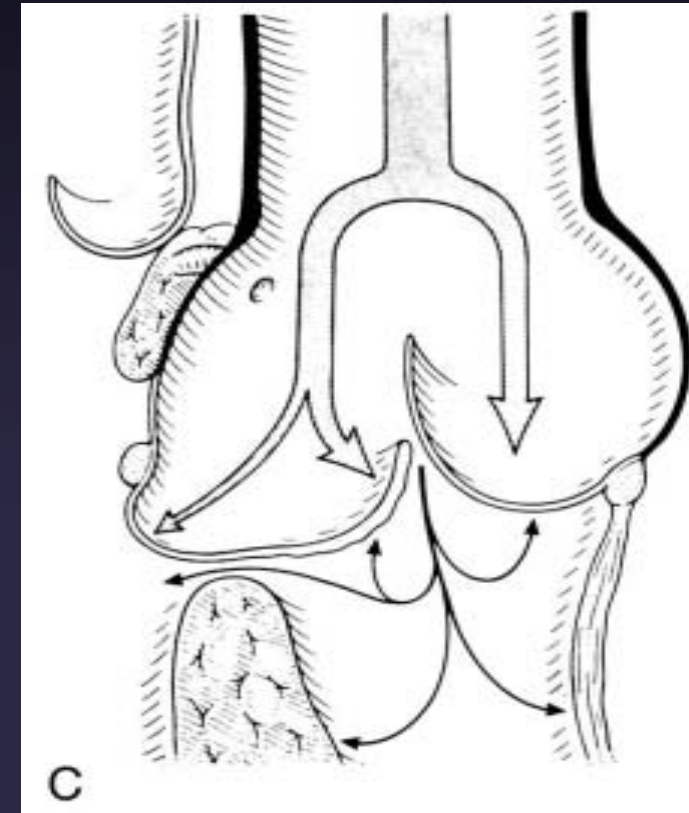
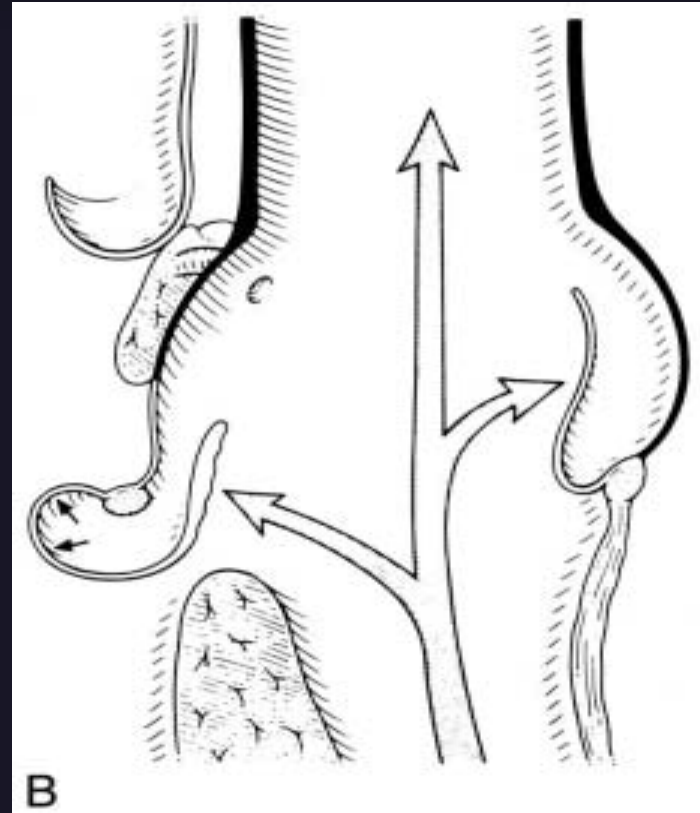
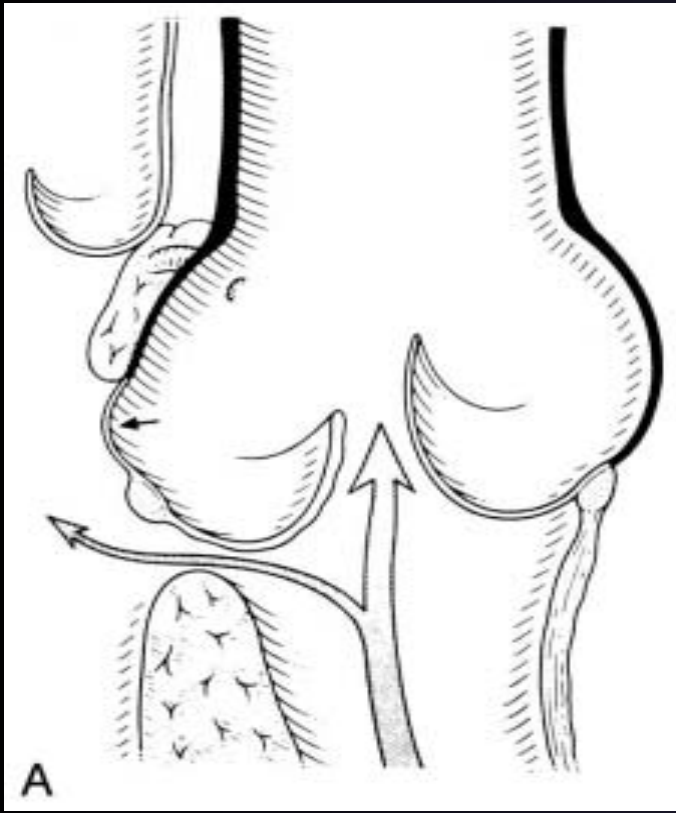
- Frequently an element of real or potential stenosis

Congenital AR : difficult to Repair

3. Prolapsed AV leaflets

- Related to VSD
- Stretched and elongated cusp will never again be entirely normal

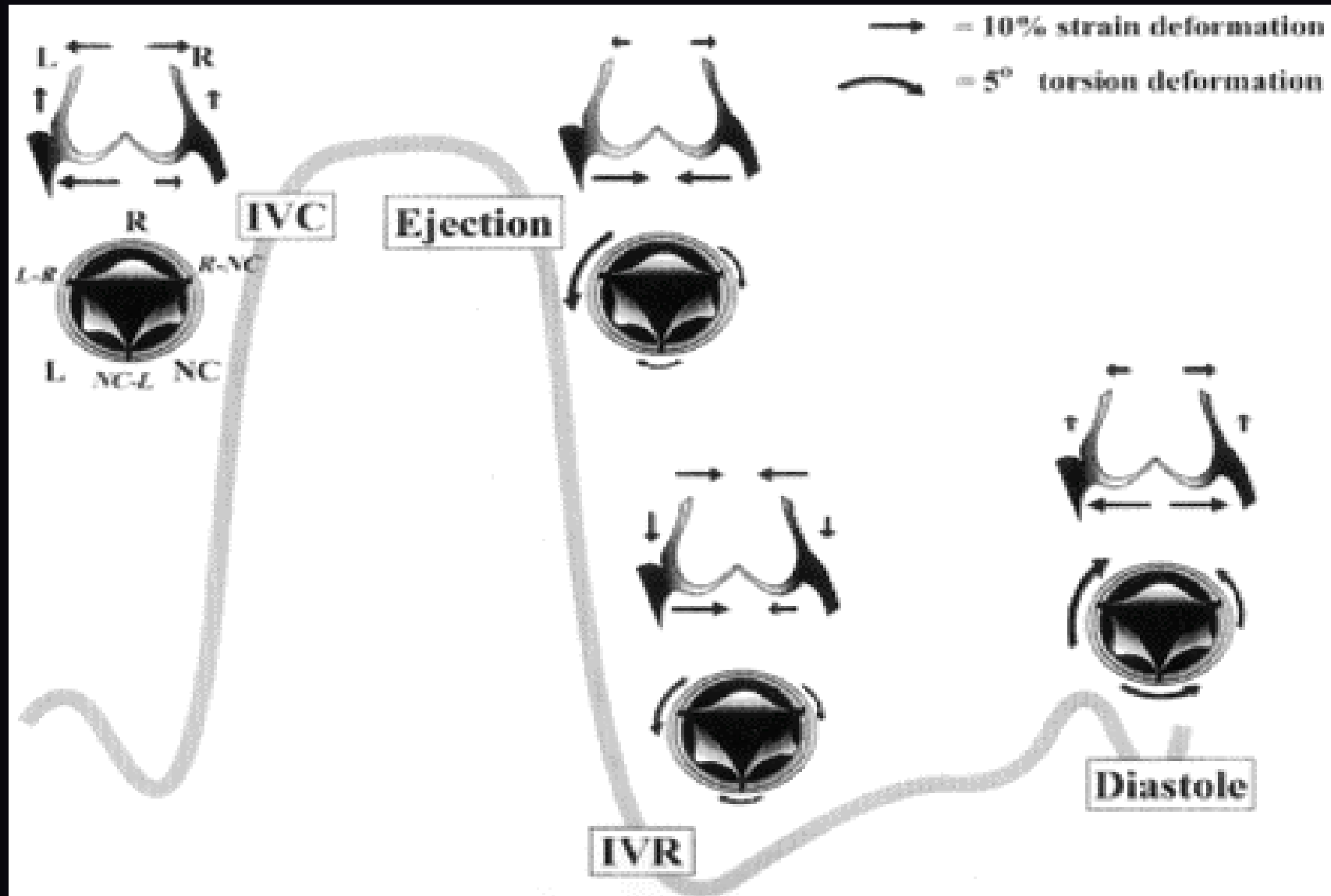
VSD & Aortic Incompetence



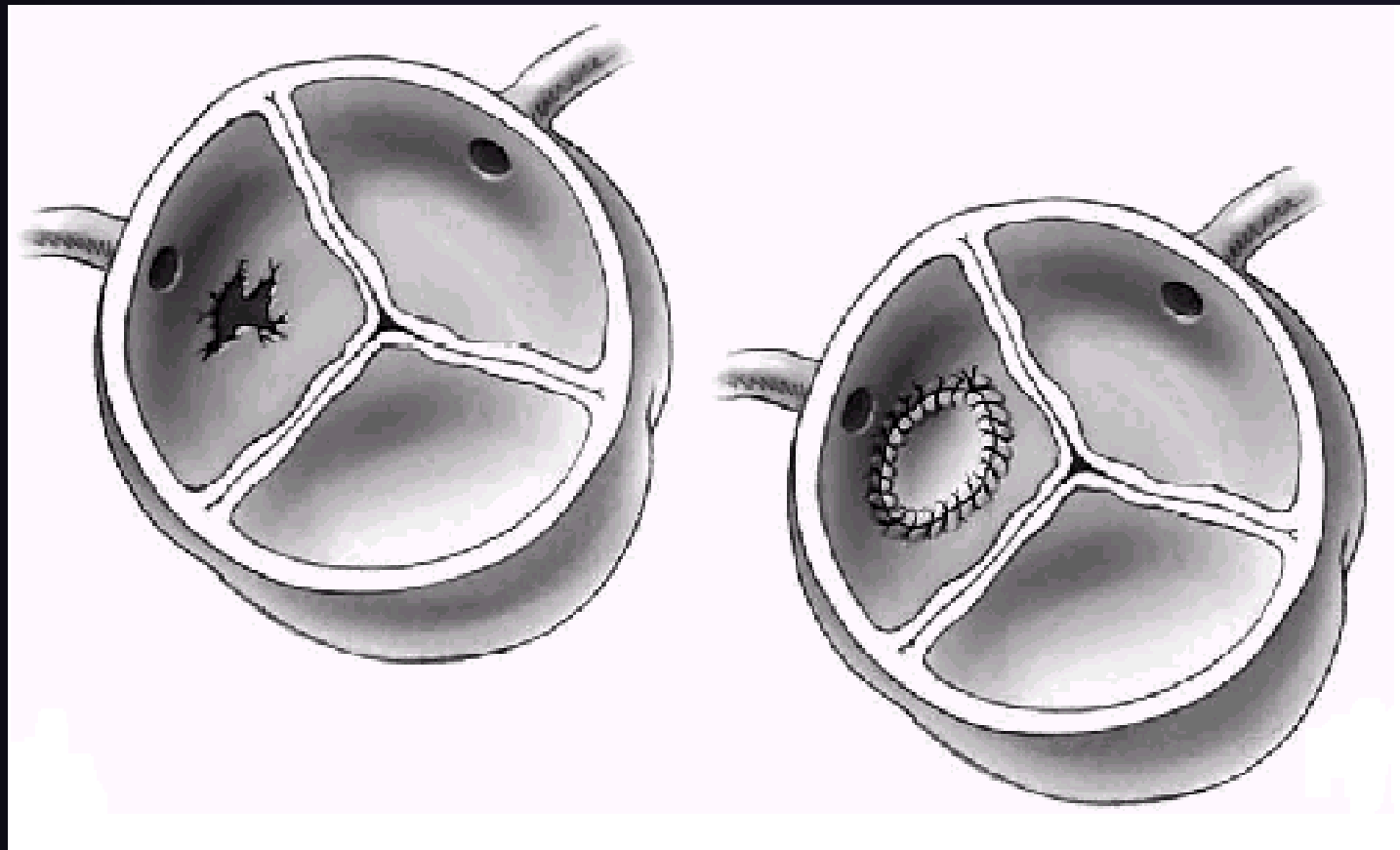
Congenital AR : difficult to Repair

- * Significant challenge to durable surgical repair
- * May fail miserably with time

Aortic annular deformation throughout cardiac cycle

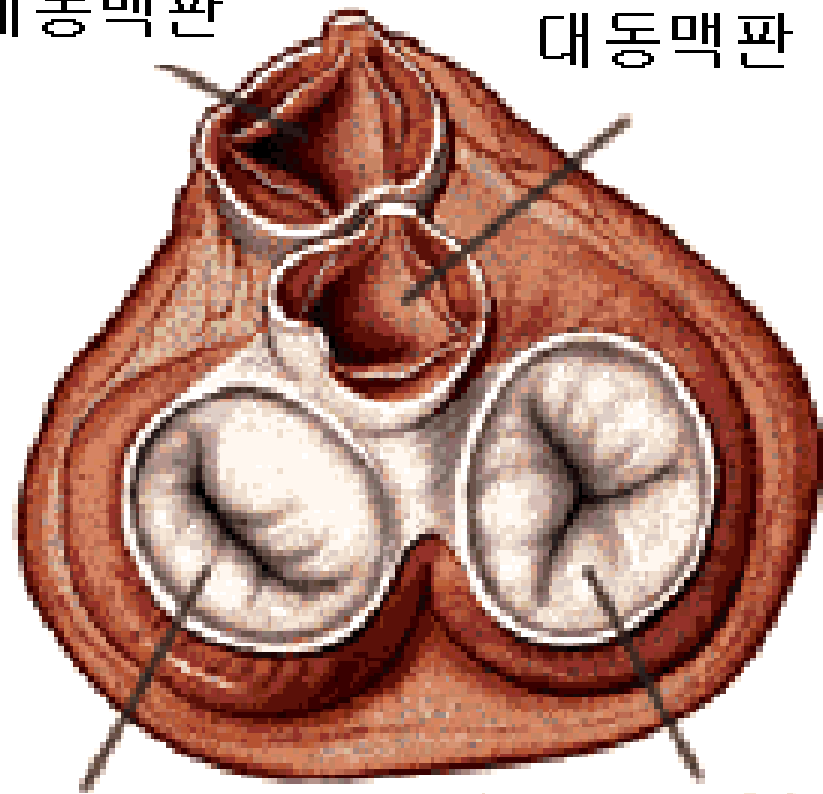


Patch Closure of Cusp Perforation



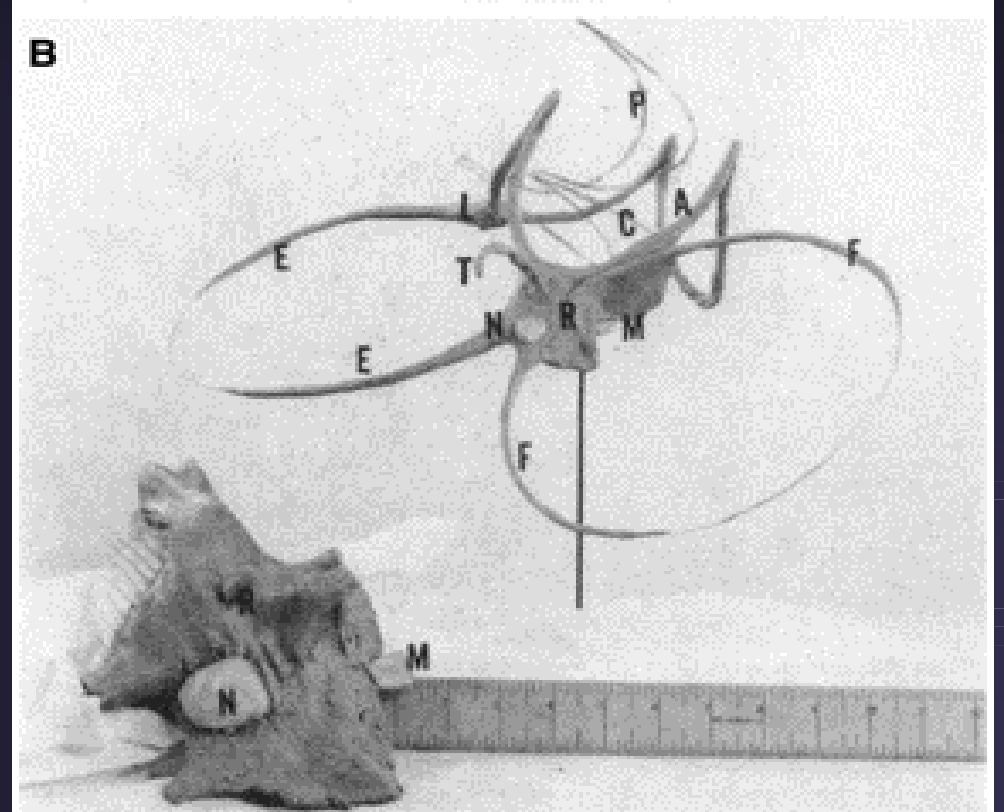
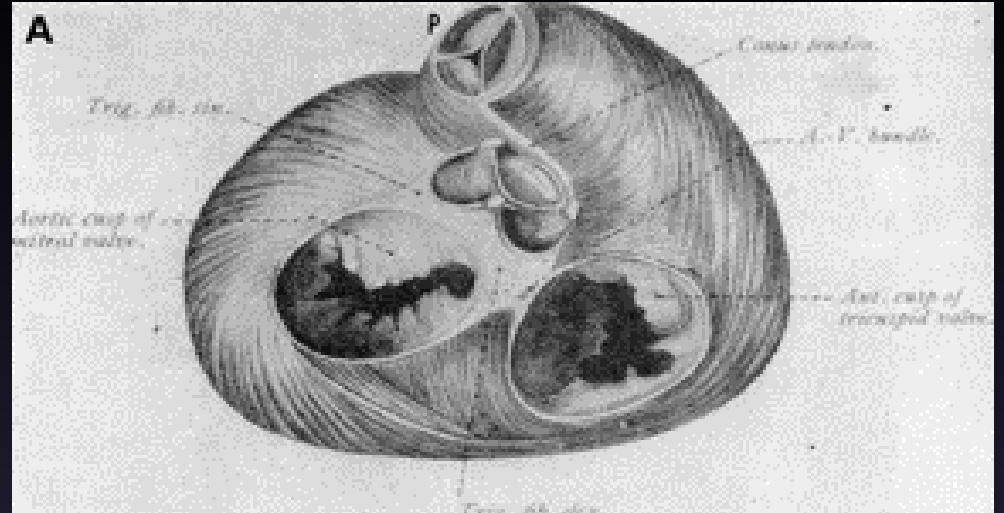
폐동맥판

대동맥판



승모판

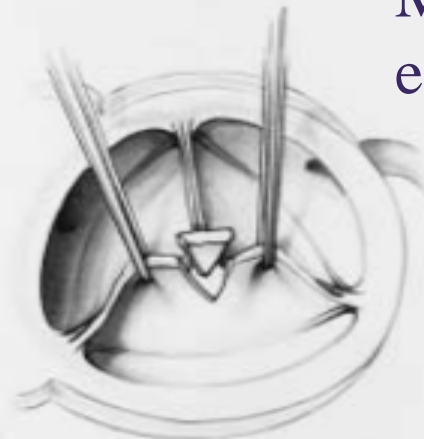
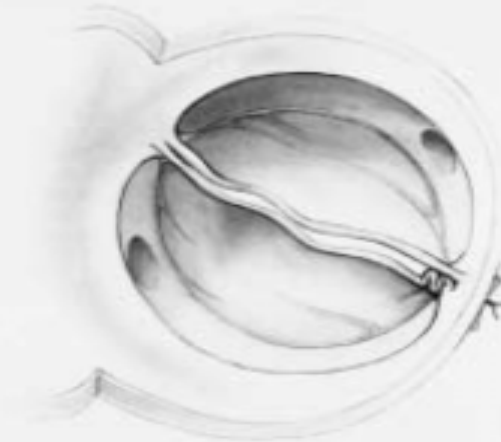
삼첨판



Redundant leaflet tissue



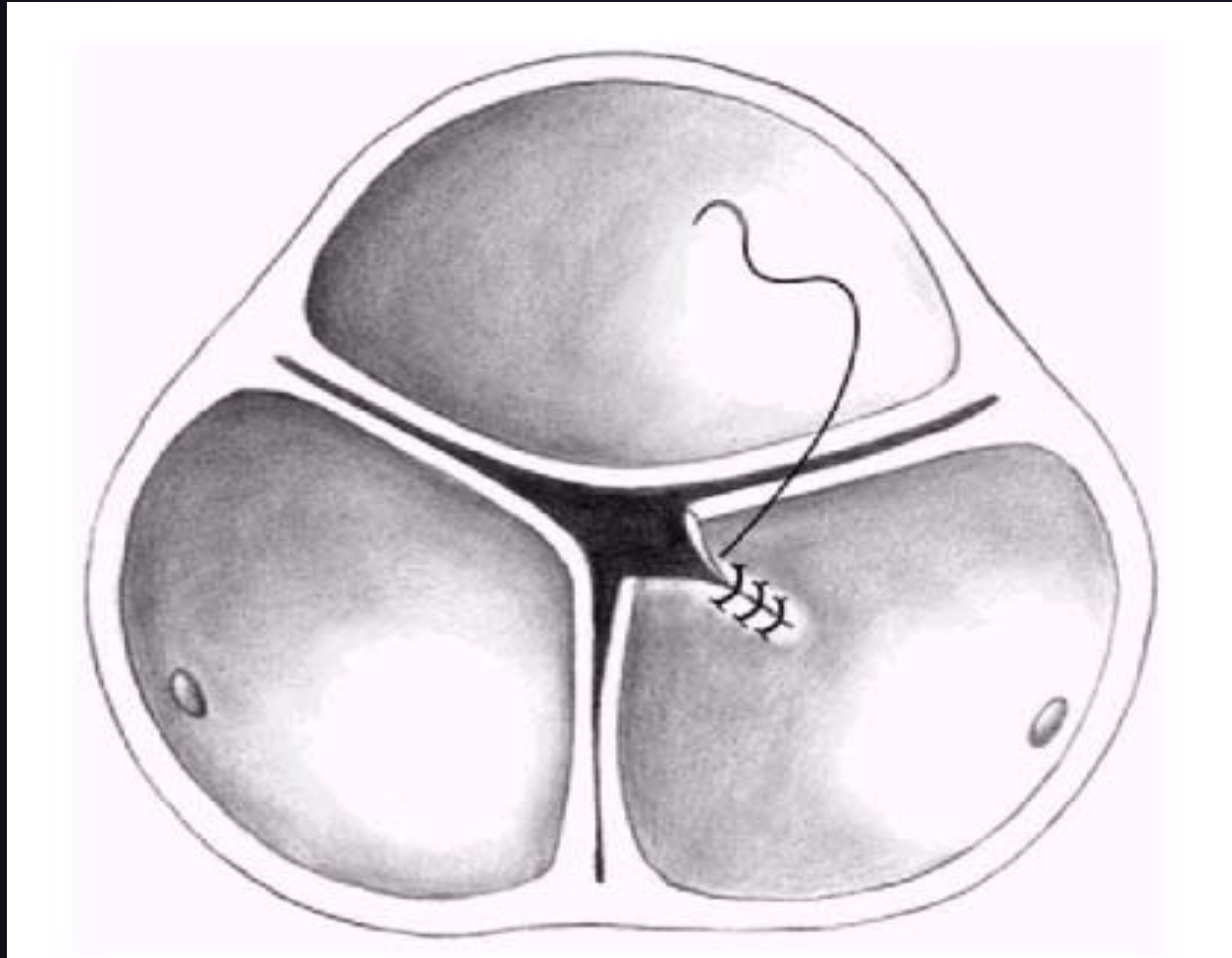
Leaflet
plication



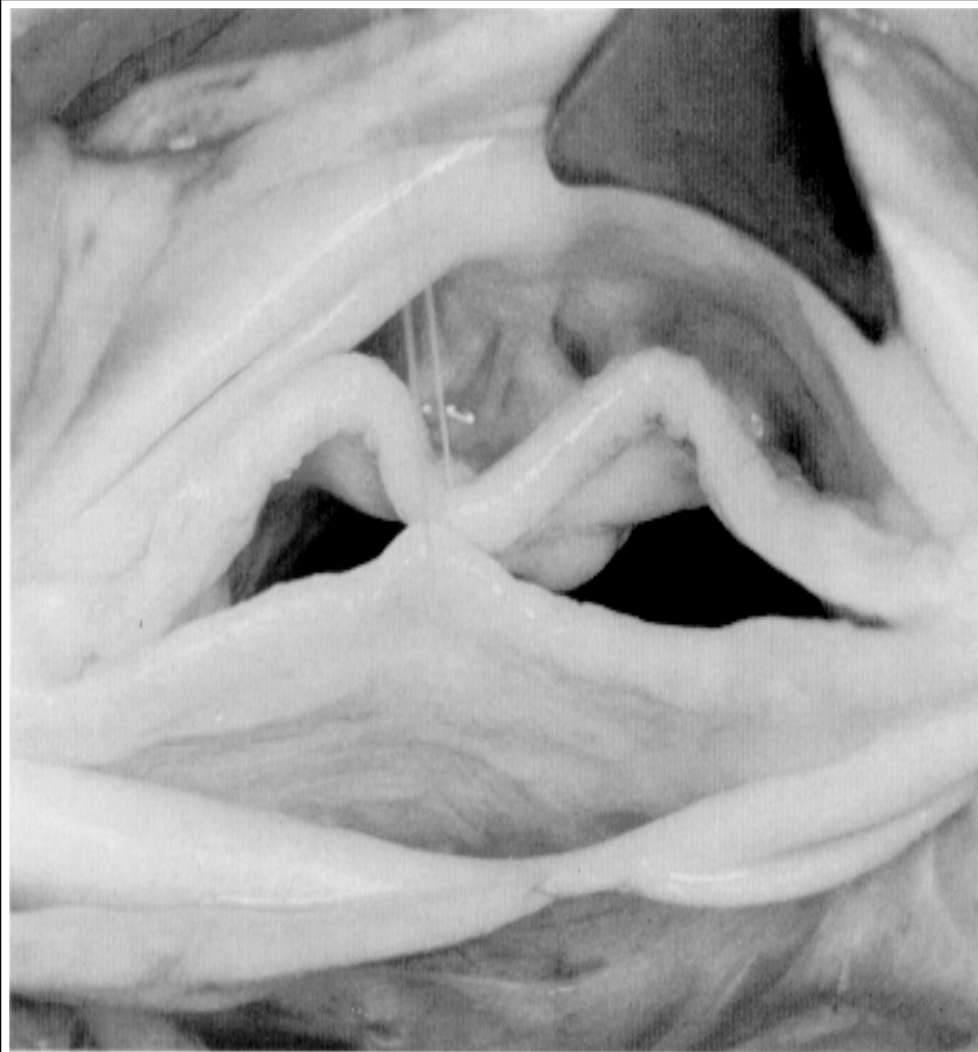
Midleaflet
excision



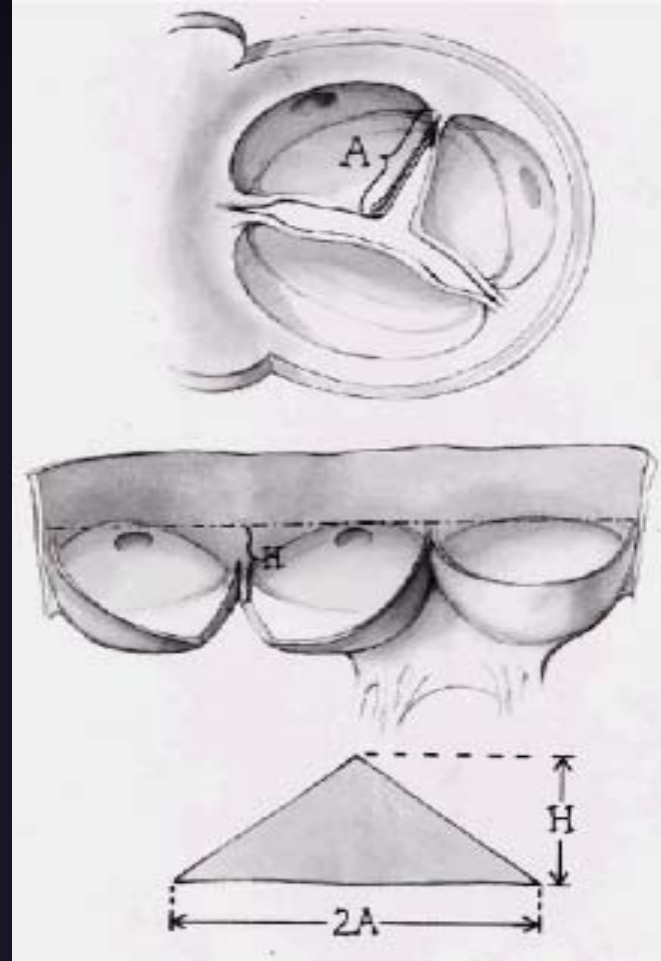
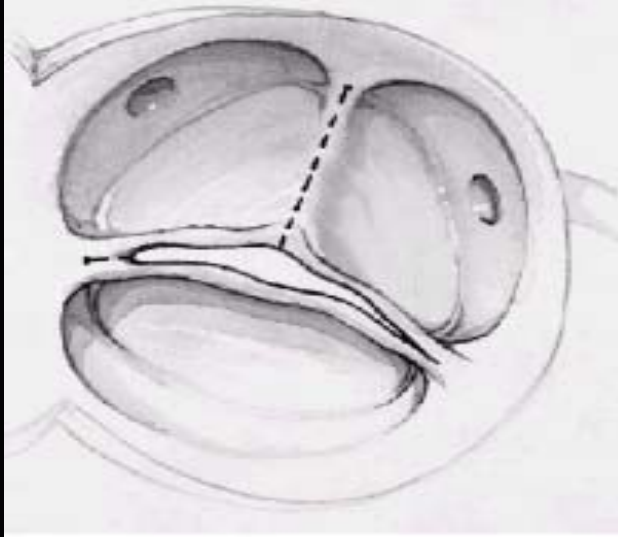
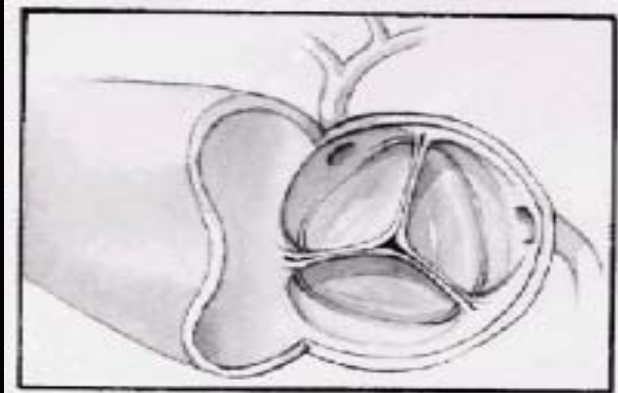
Triangular Resection



Repair of Bicuspid Aortic Valve



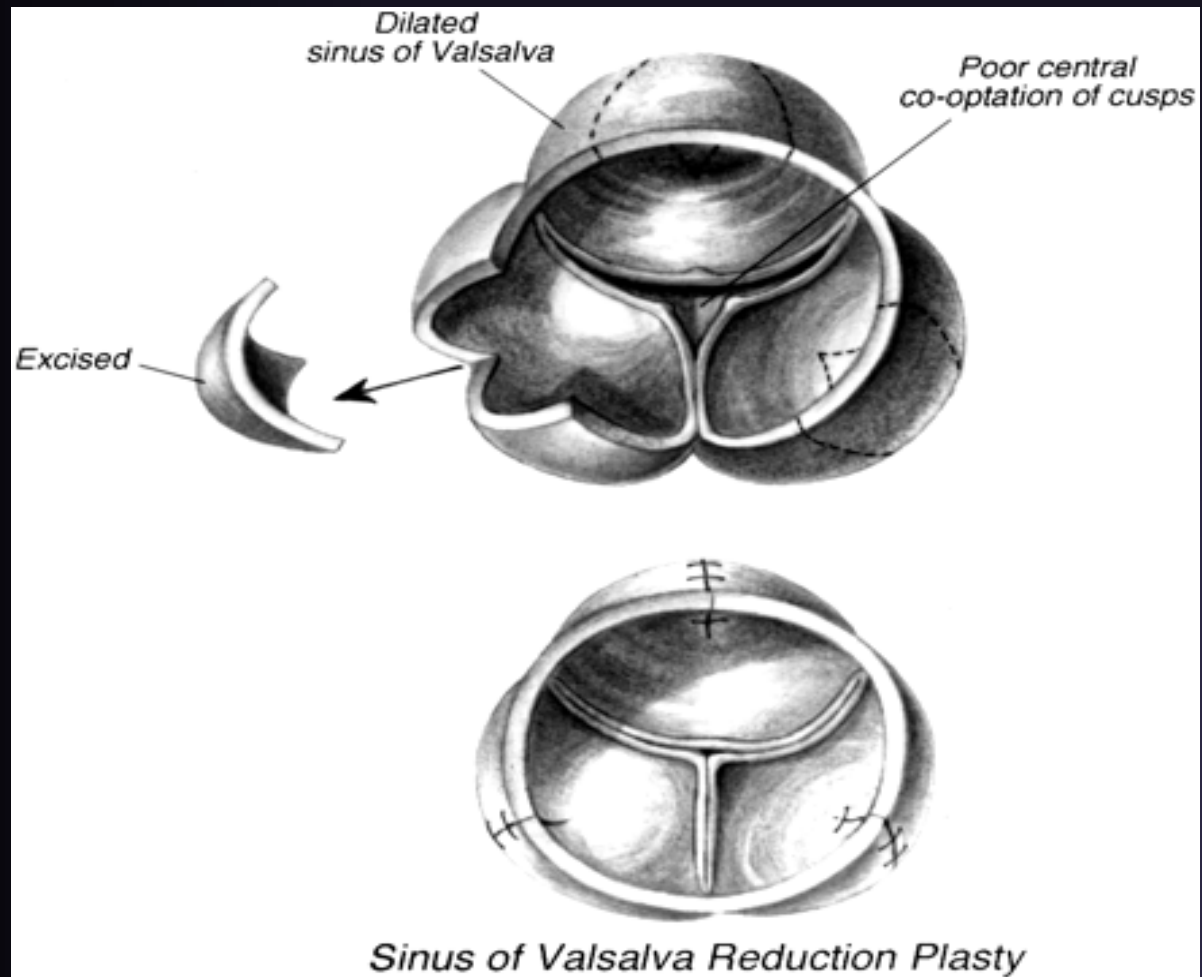
Commissurotomy and Bileaflet Pericardial Augmentation- Resuspension for Bicuspid AV Stenosis



Ann Thorac Surg 1997;63:548-50
Ann Thorac Surg 1997;63:465-9
JTCS 2003;125:964-966

F/15 F/U 6 yr.
14 mo. - 17 yr. 6 children F/U 2 - 60 mo.
F/14 F/U 2 mo.

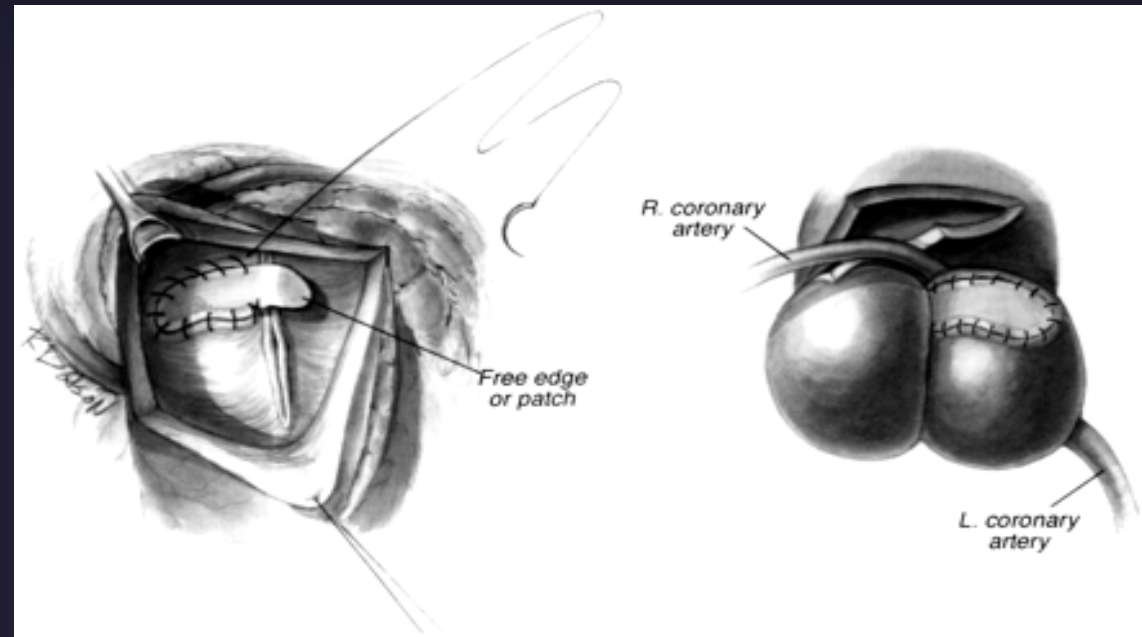
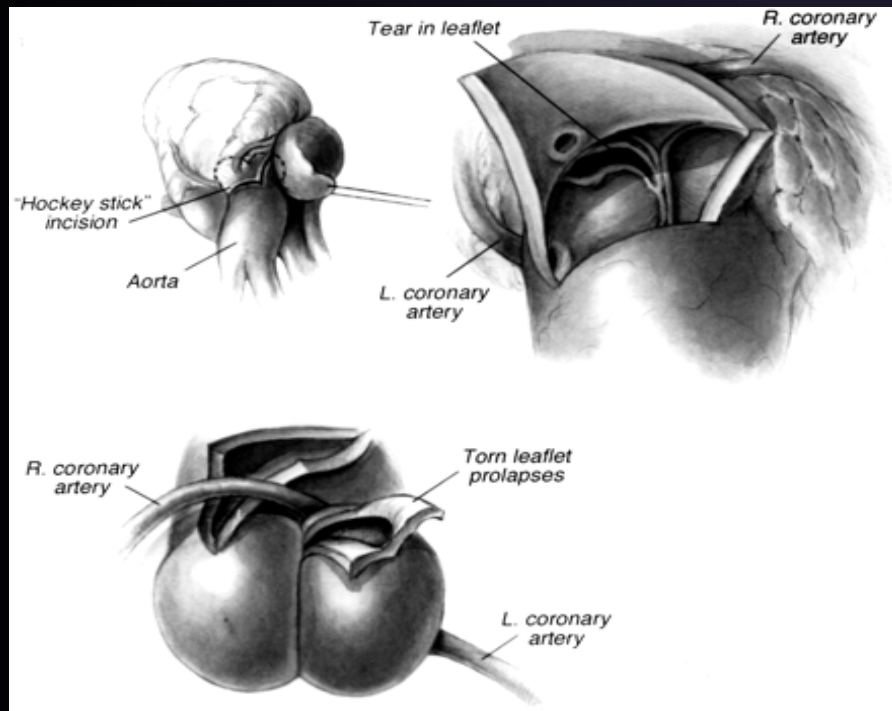
Balloon-Induced AR in Cong. AS



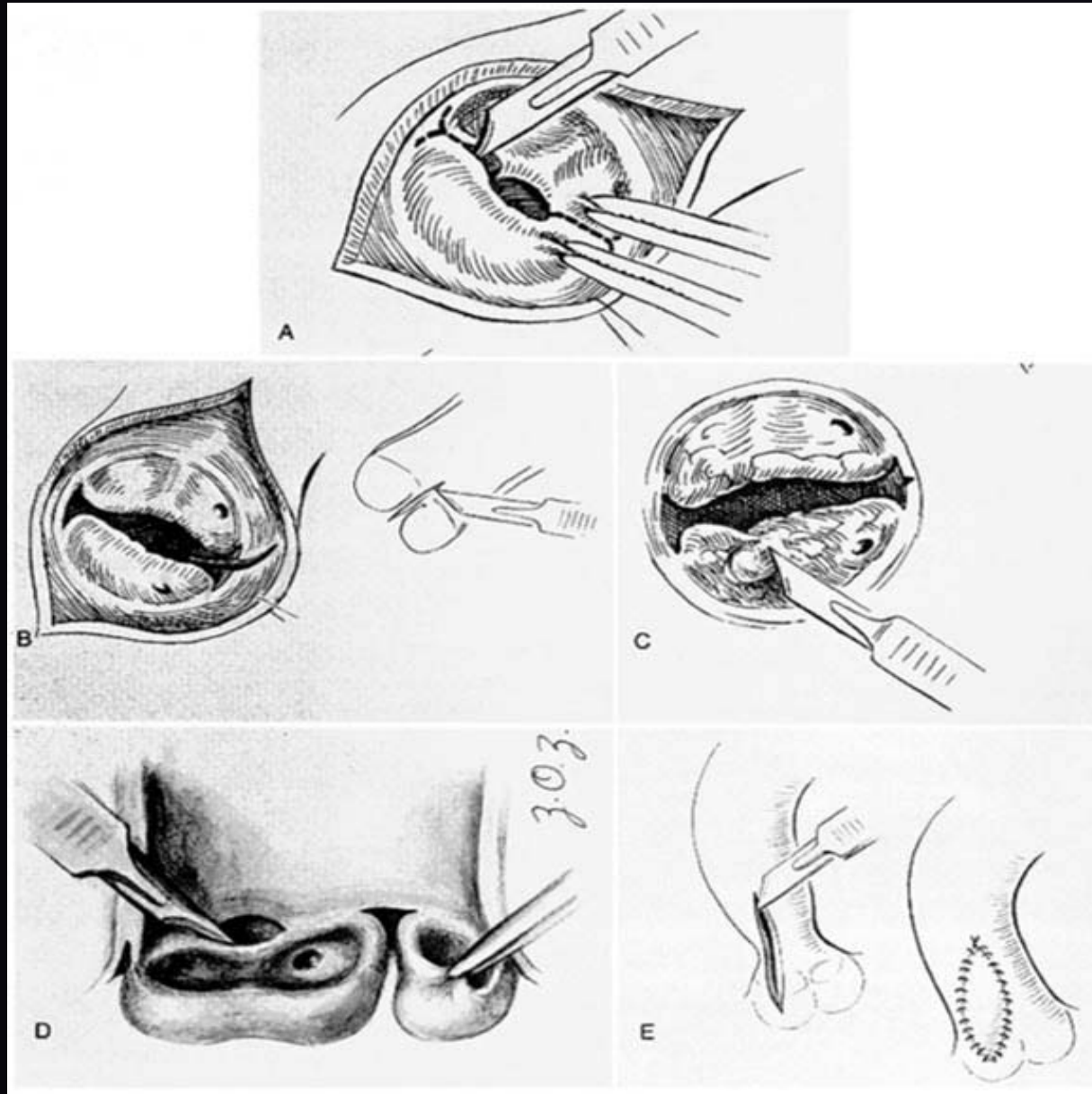
Jonas RA et al.

JTCS 2001;122:162-8

Balloon-Induced AR in Cong. AS

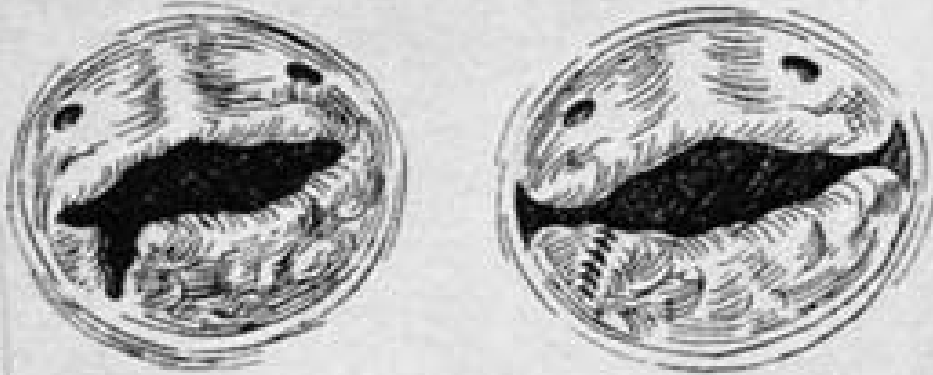


Extended Aortic Valvuloplasty



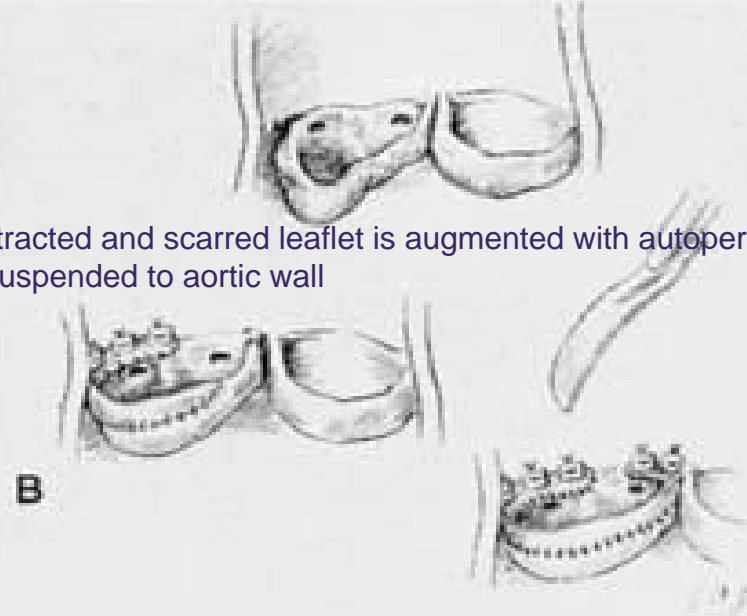
Extended Aortic Valvuloplasty

Reapproximation of tears in free edge of cusp



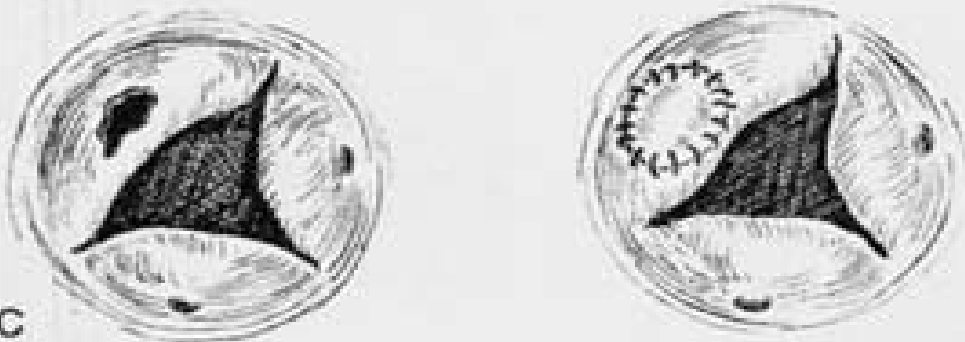
A

Retracted and scarred leaflet is augmented with autopericardium and resuspended to aortic wall



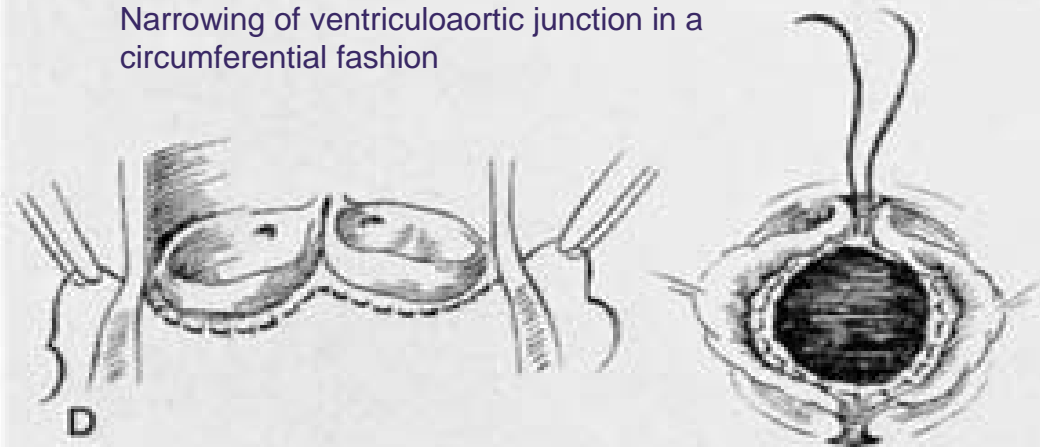
B

Patch repair of sinus of Valsalva perforation



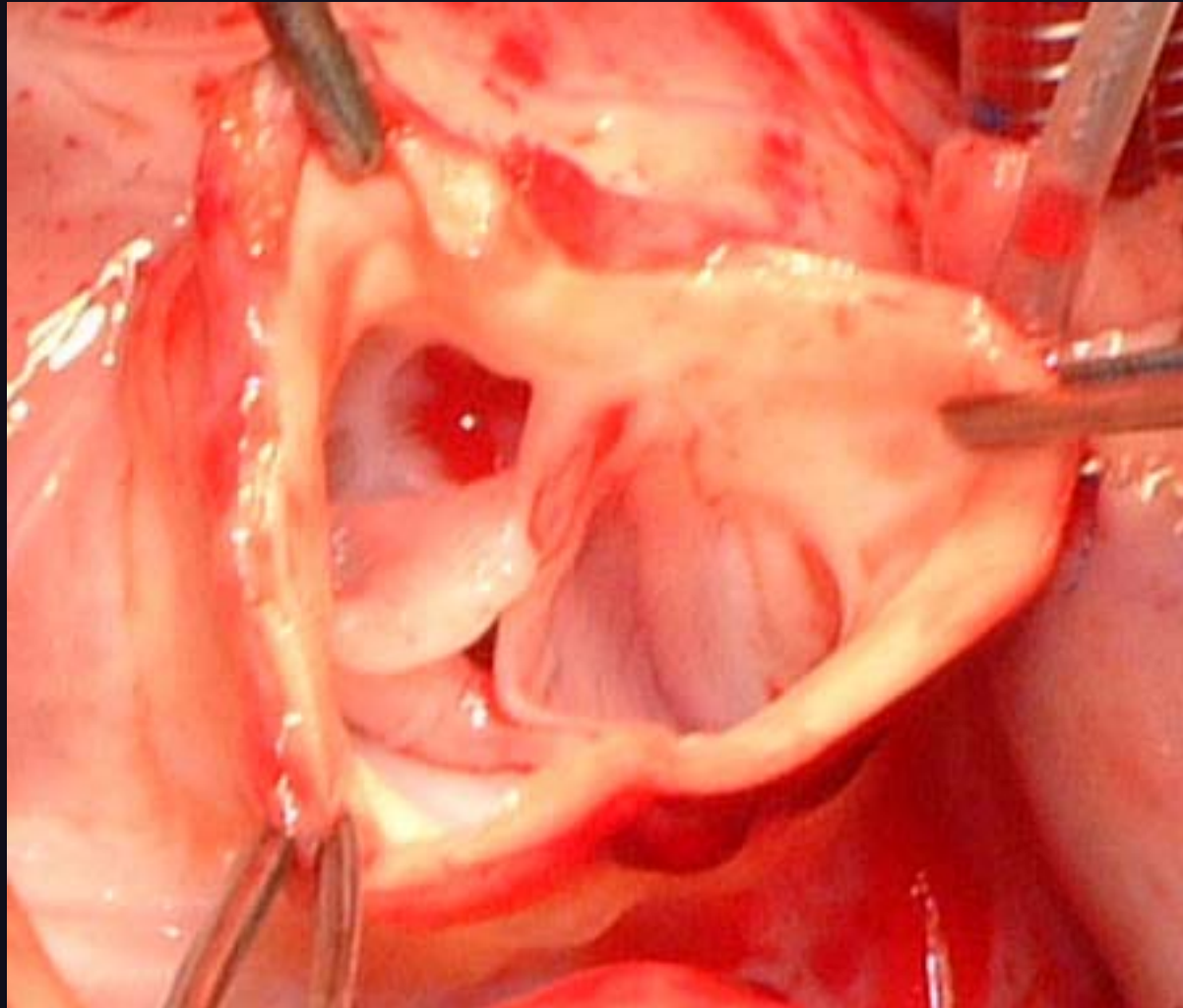
C

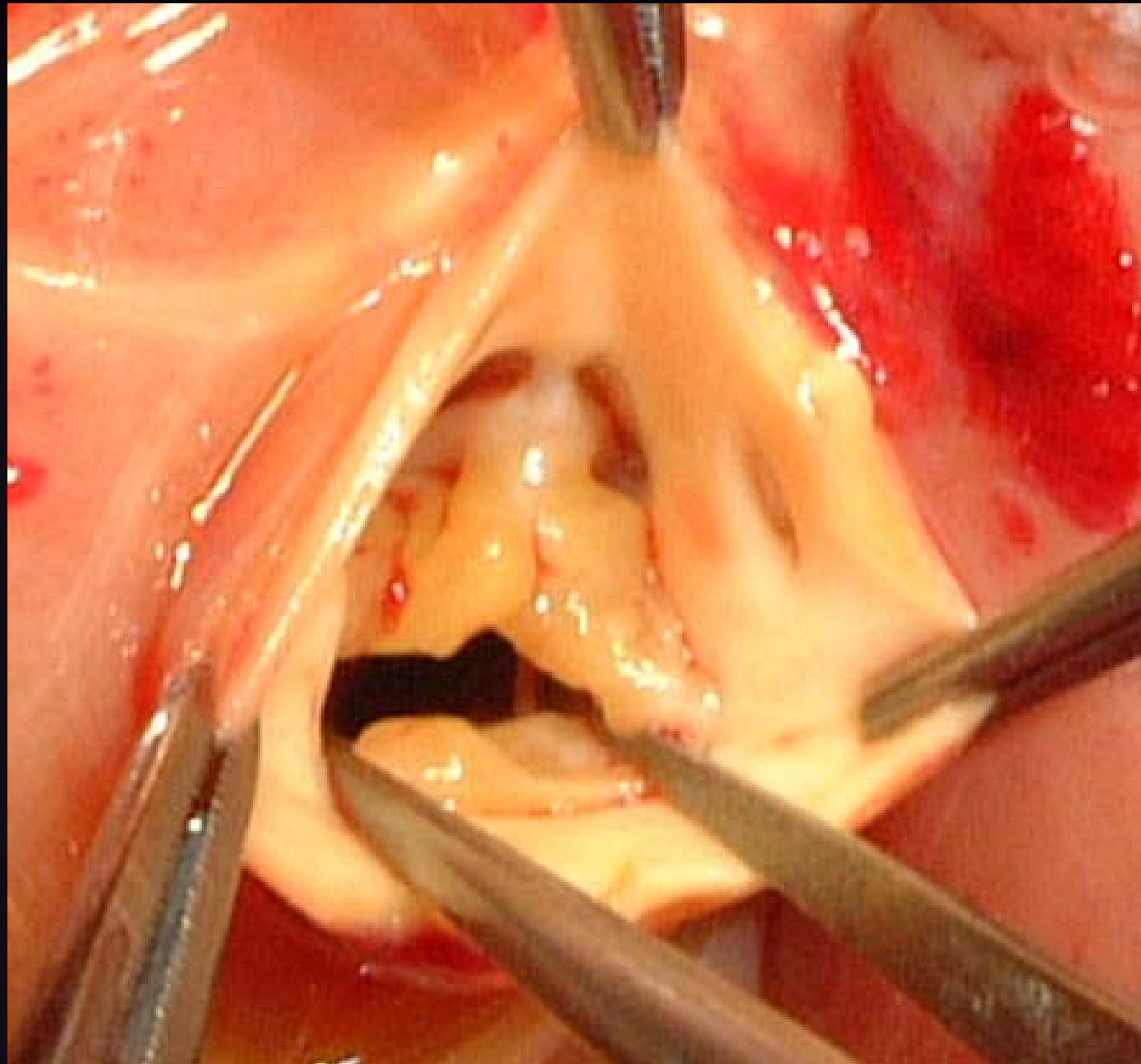
Narrowing of ventriculoaortic junction in a circumferential fashion



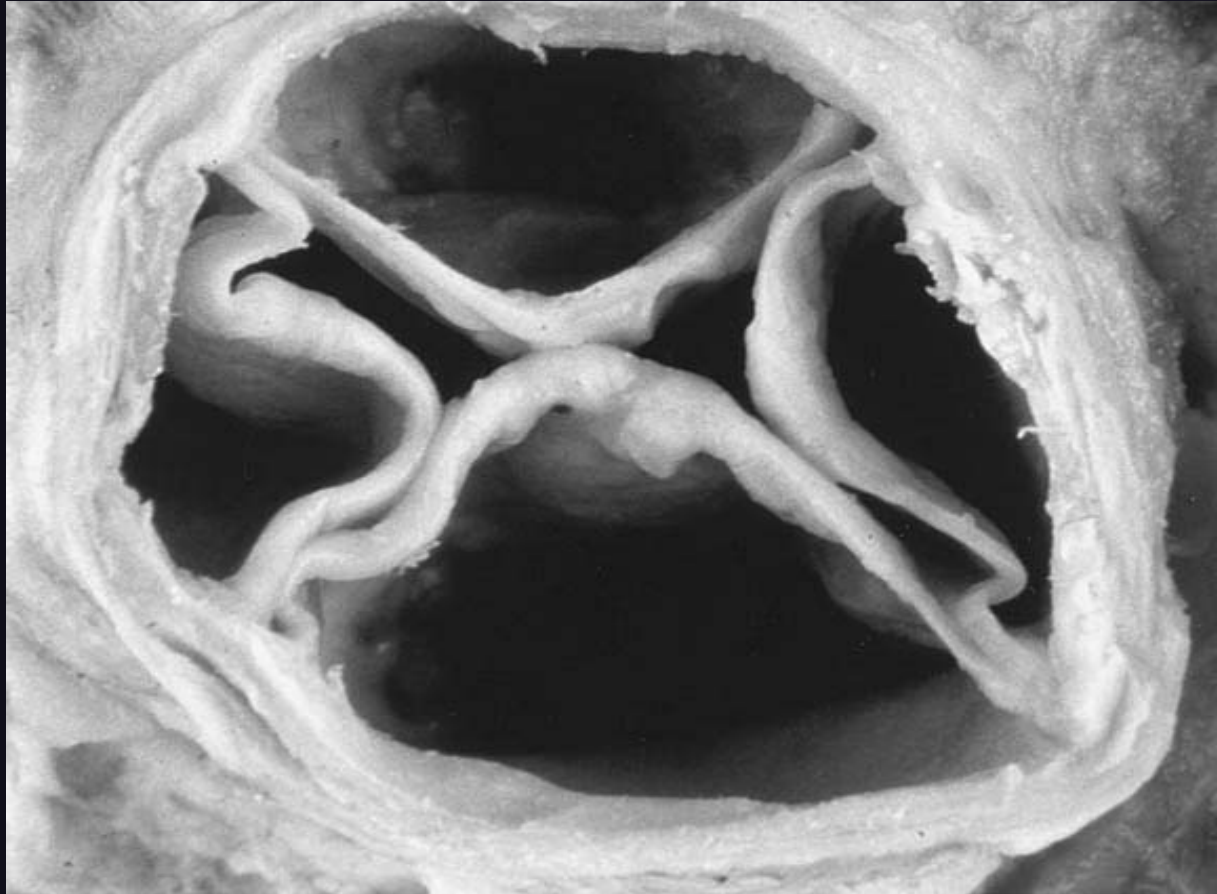
D

Truncus Arteriosus

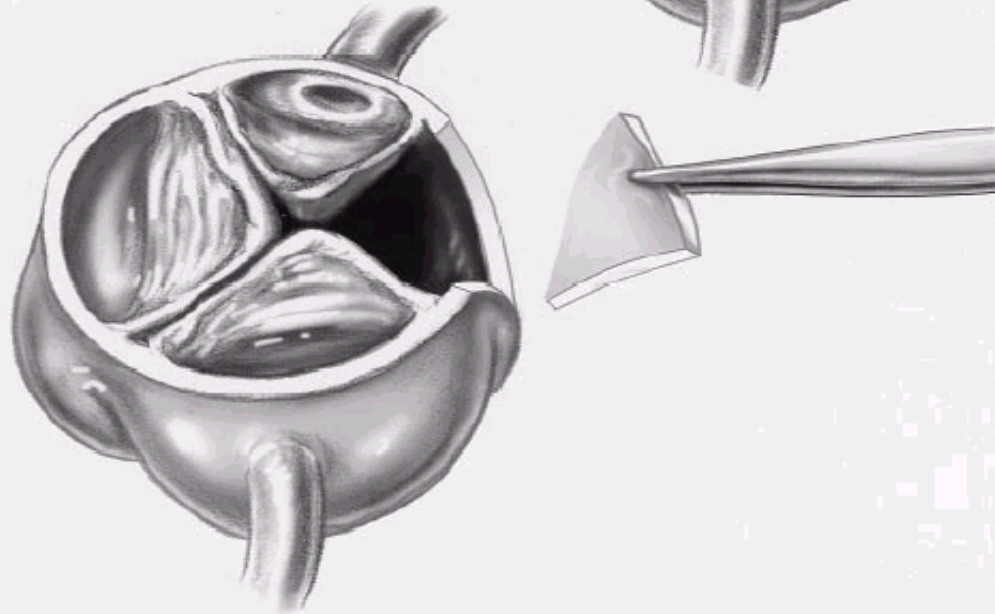




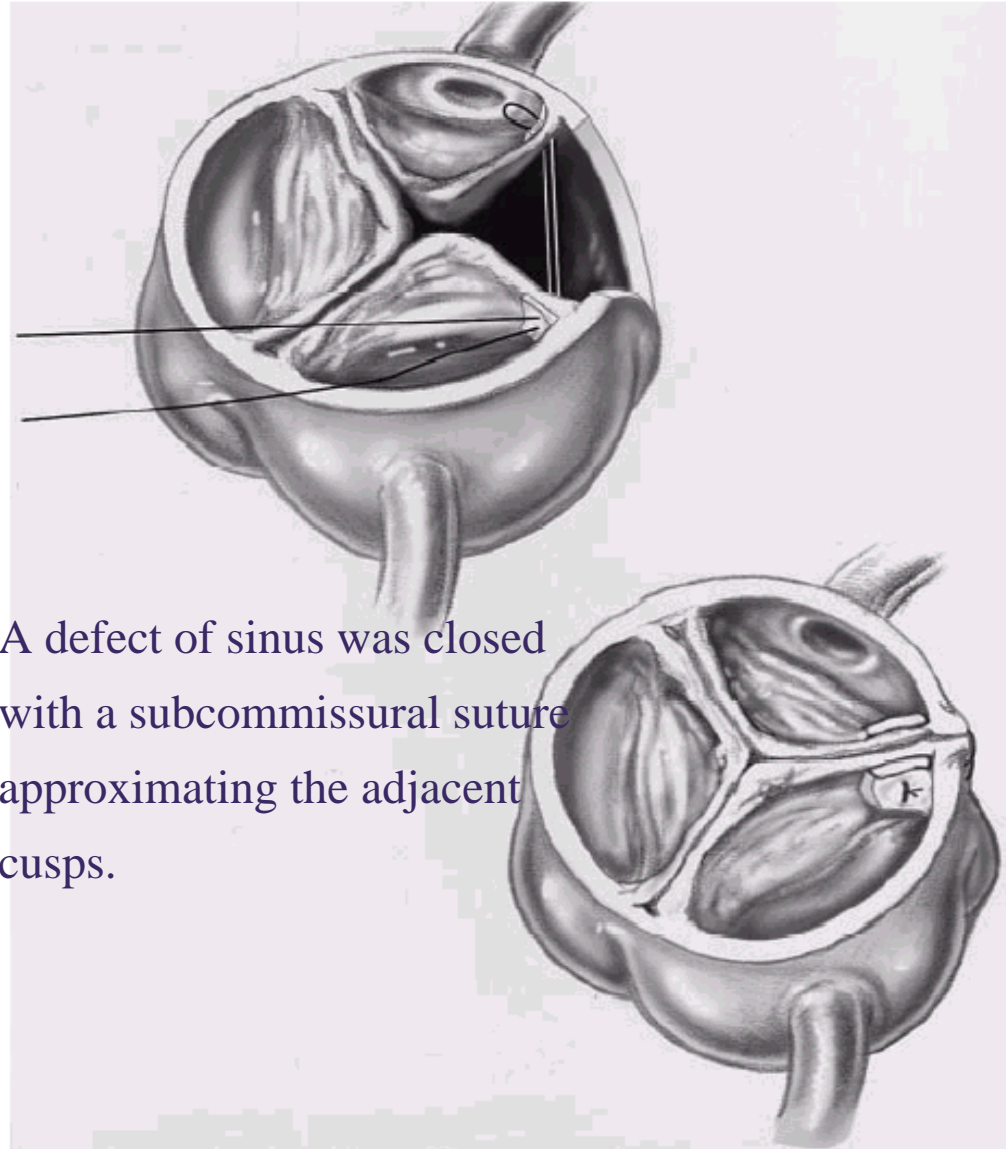
Quadricuspid aortic valve

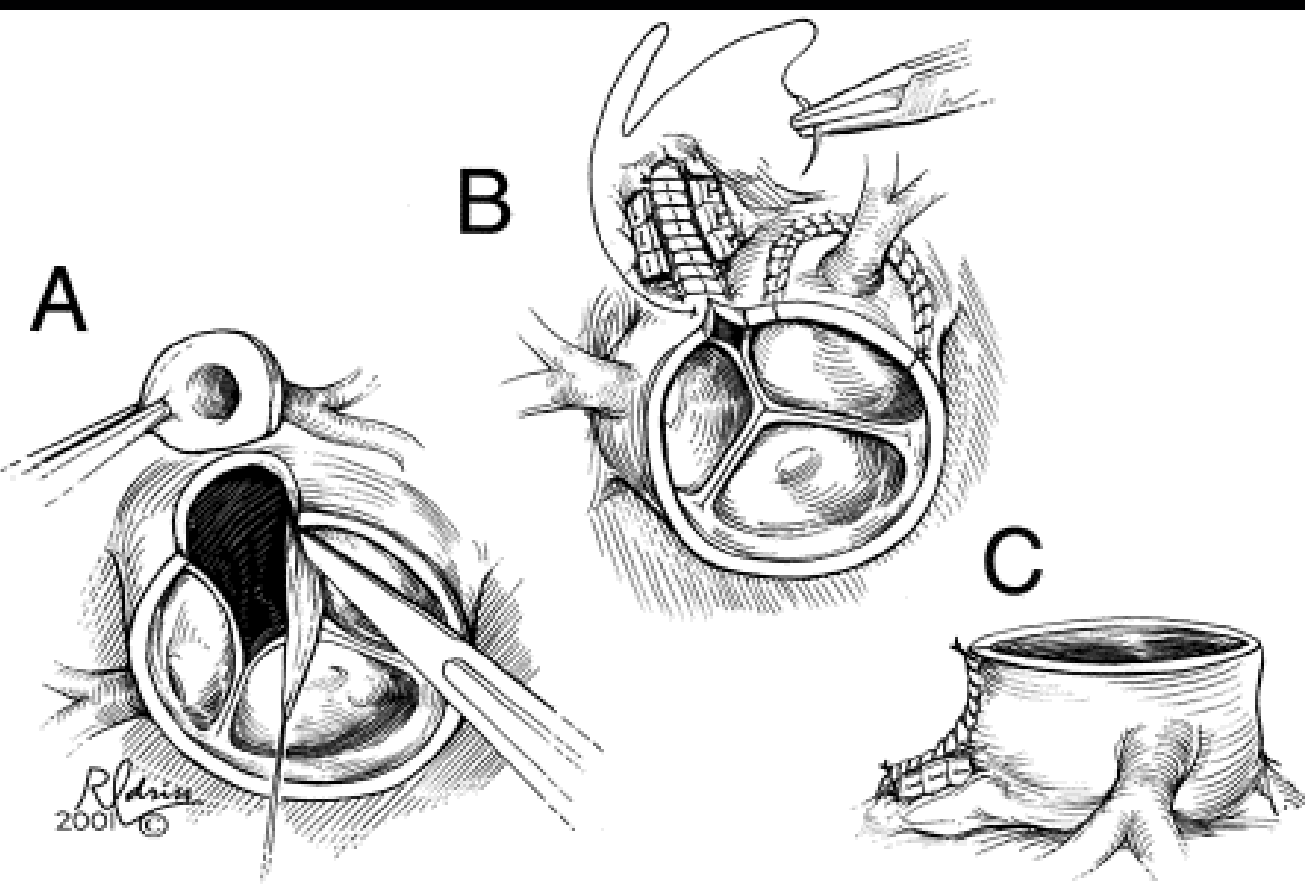
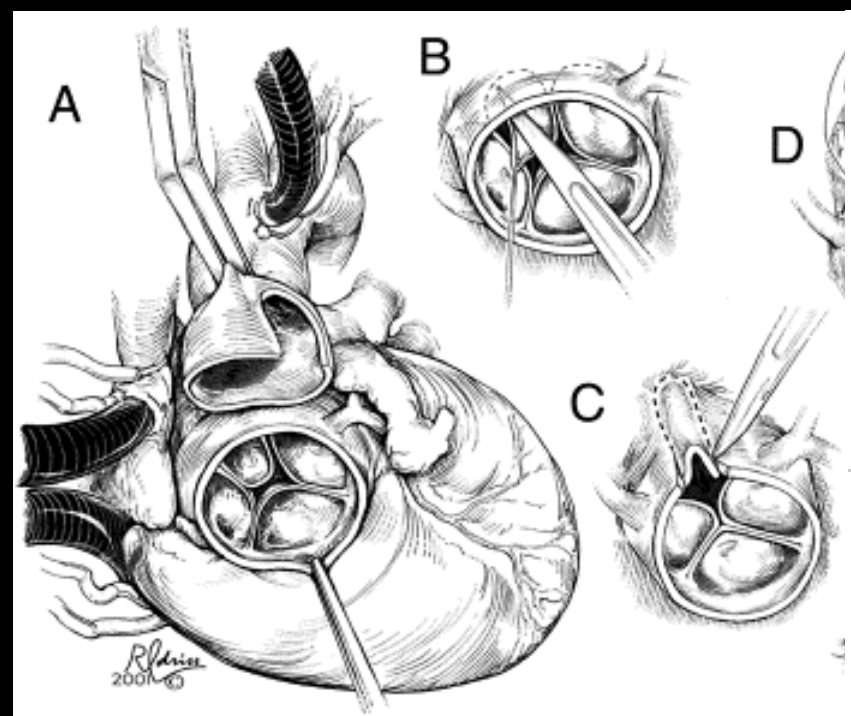


The smallest cusp is excised

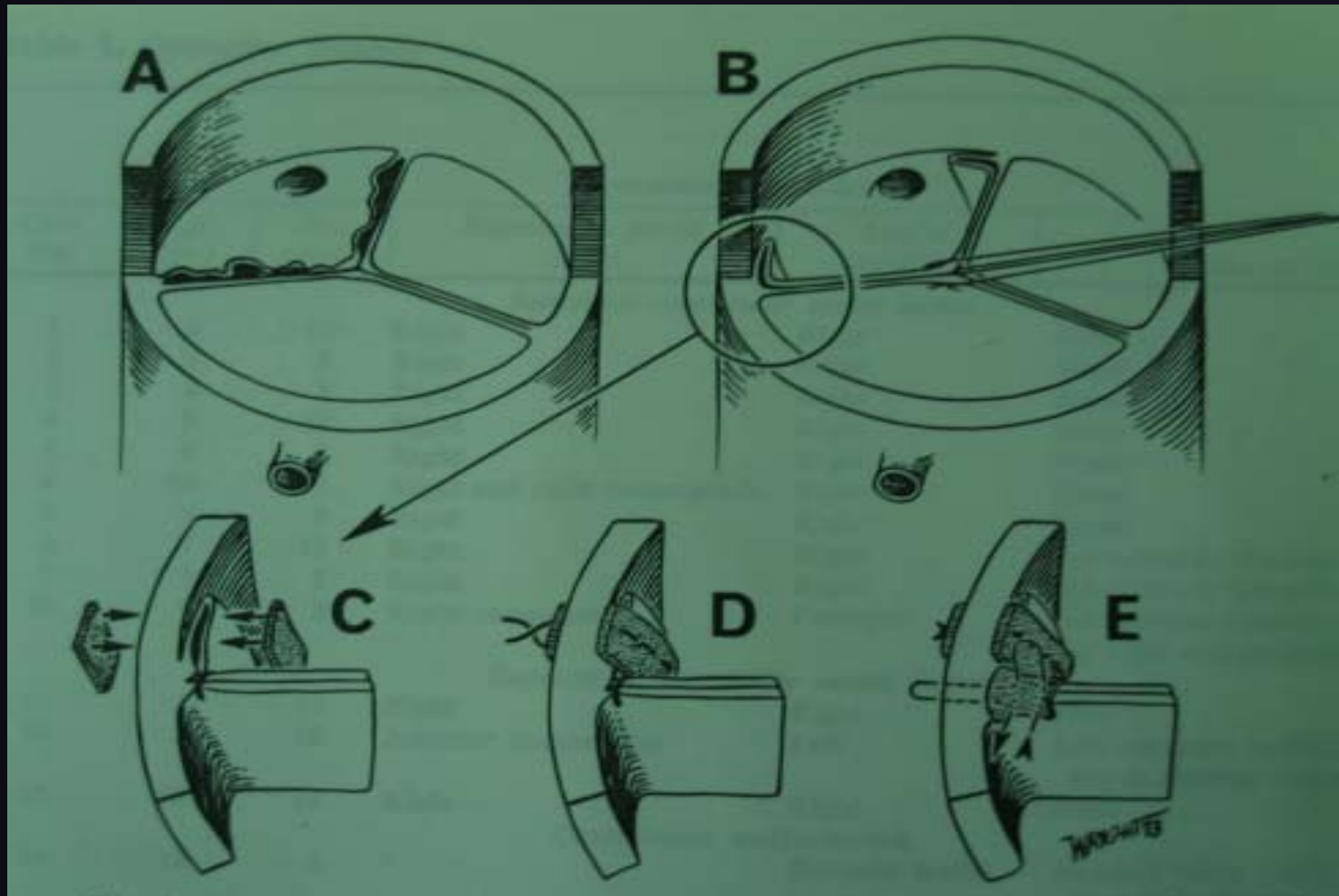


A defect of sinus was closed with a subcommissural suture approximating the adjacent cusps.





Trusler's method of plication

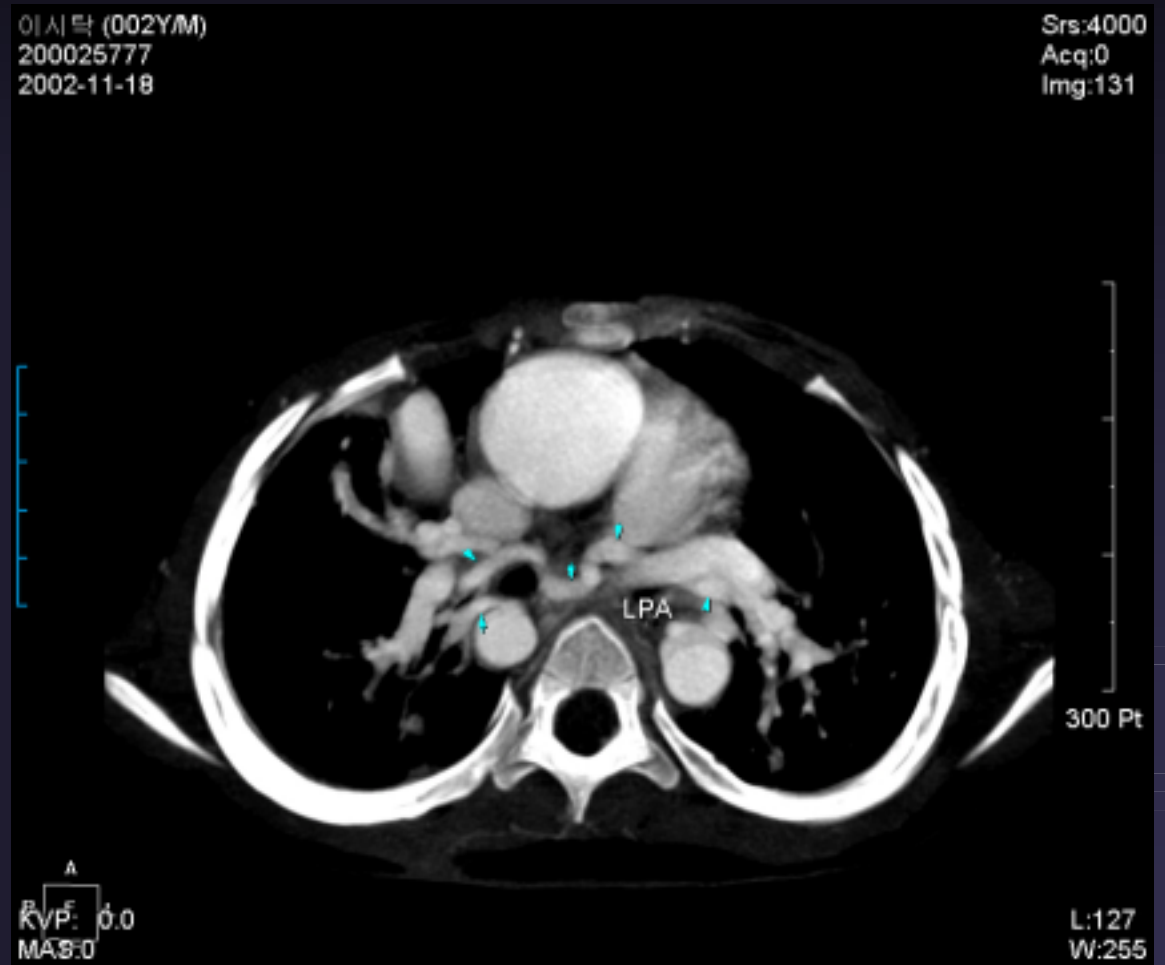


Frater stitch

Progressive Aortic Dilatation

✦ M / 2

- PA / VSD / MAPCA

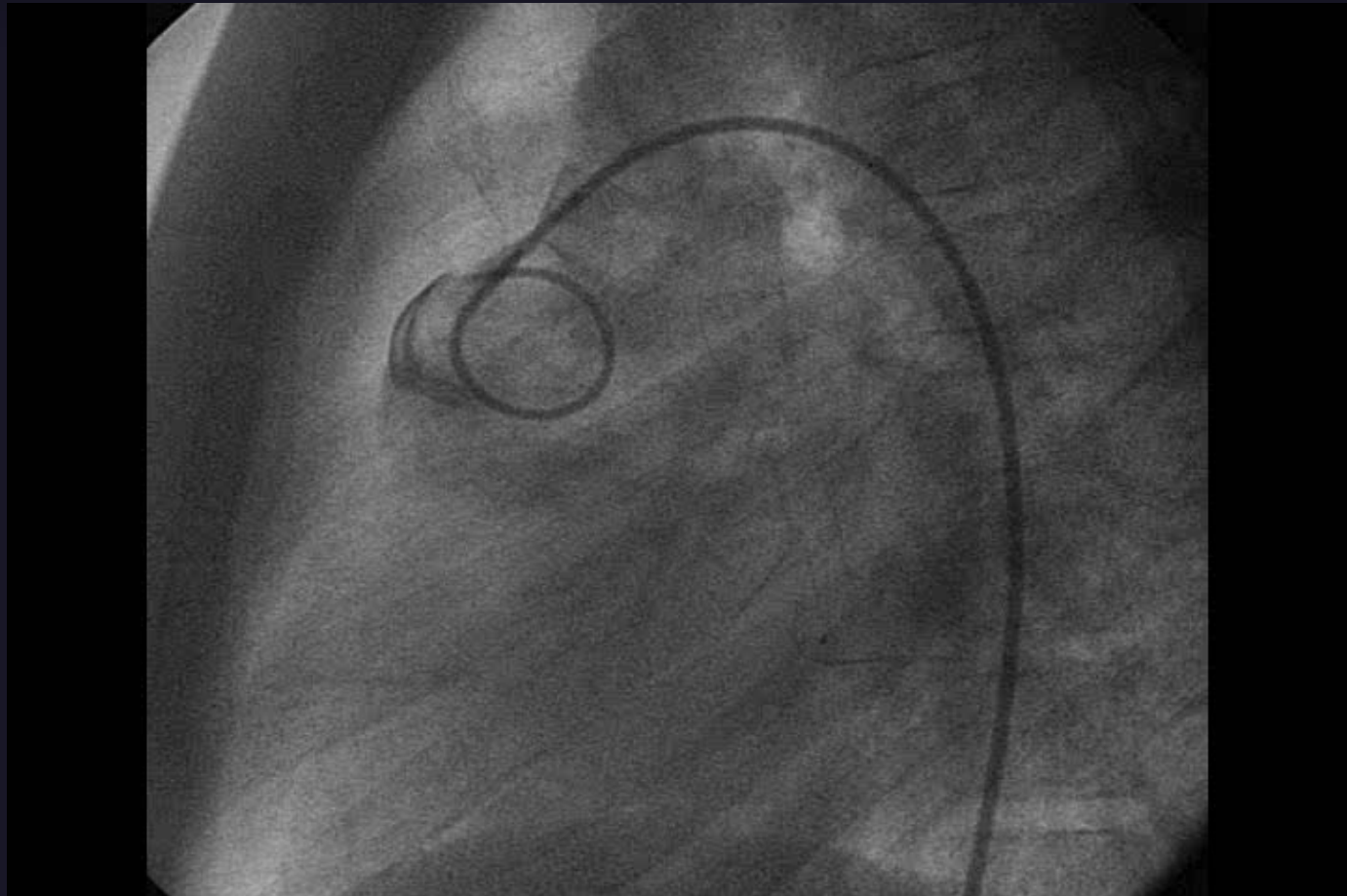


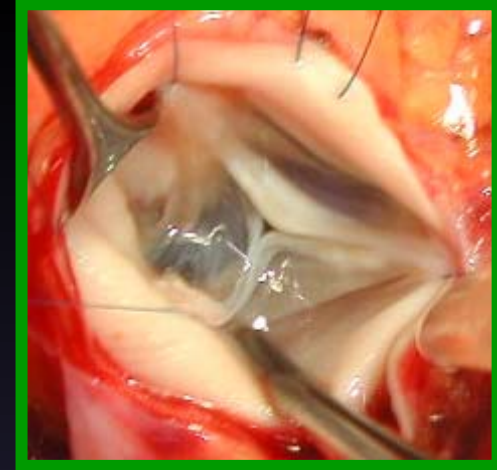
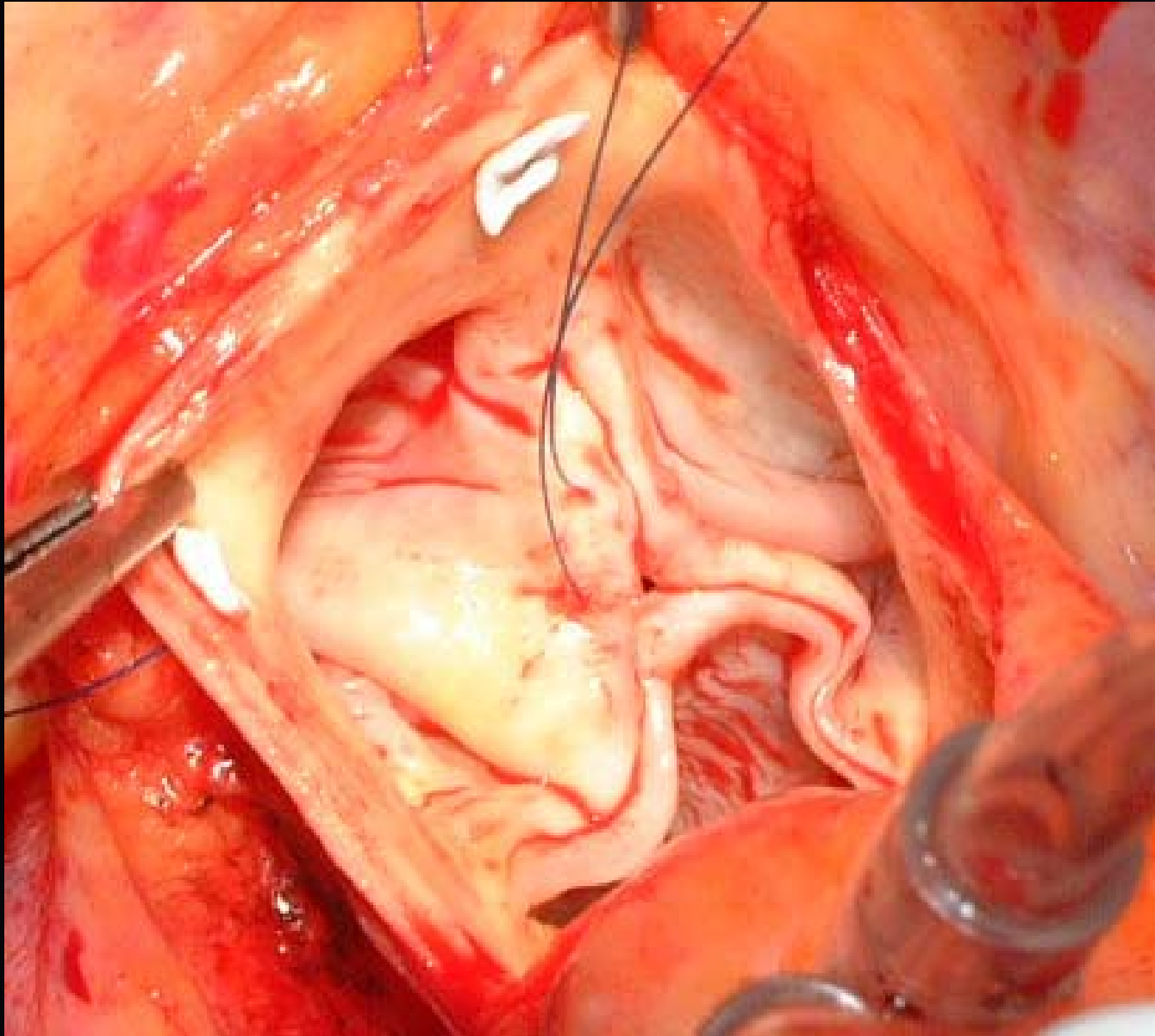
Neo-Aortic Dilatation

Complete TGA with VSD

s/p Arterial switch op

→ 8 yr. later





M / 37

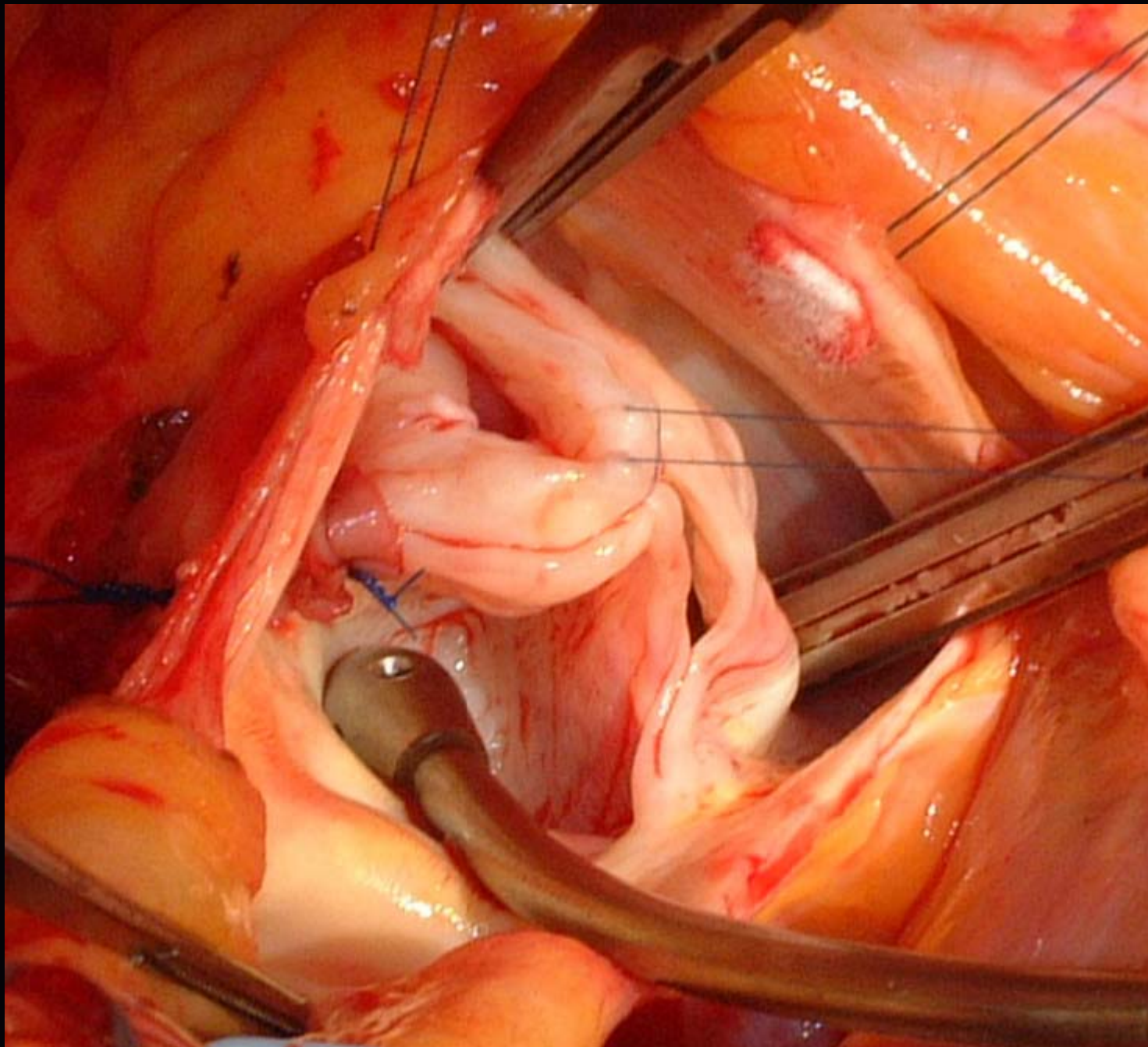
Absent PV syndrome

AR : Gr. II – III

→ Gr. I

→ Gr. II

F/U : 1 yr. 3 mo.



F / 23

VSD + AR + PS

AR : Gr. II

→ minimal

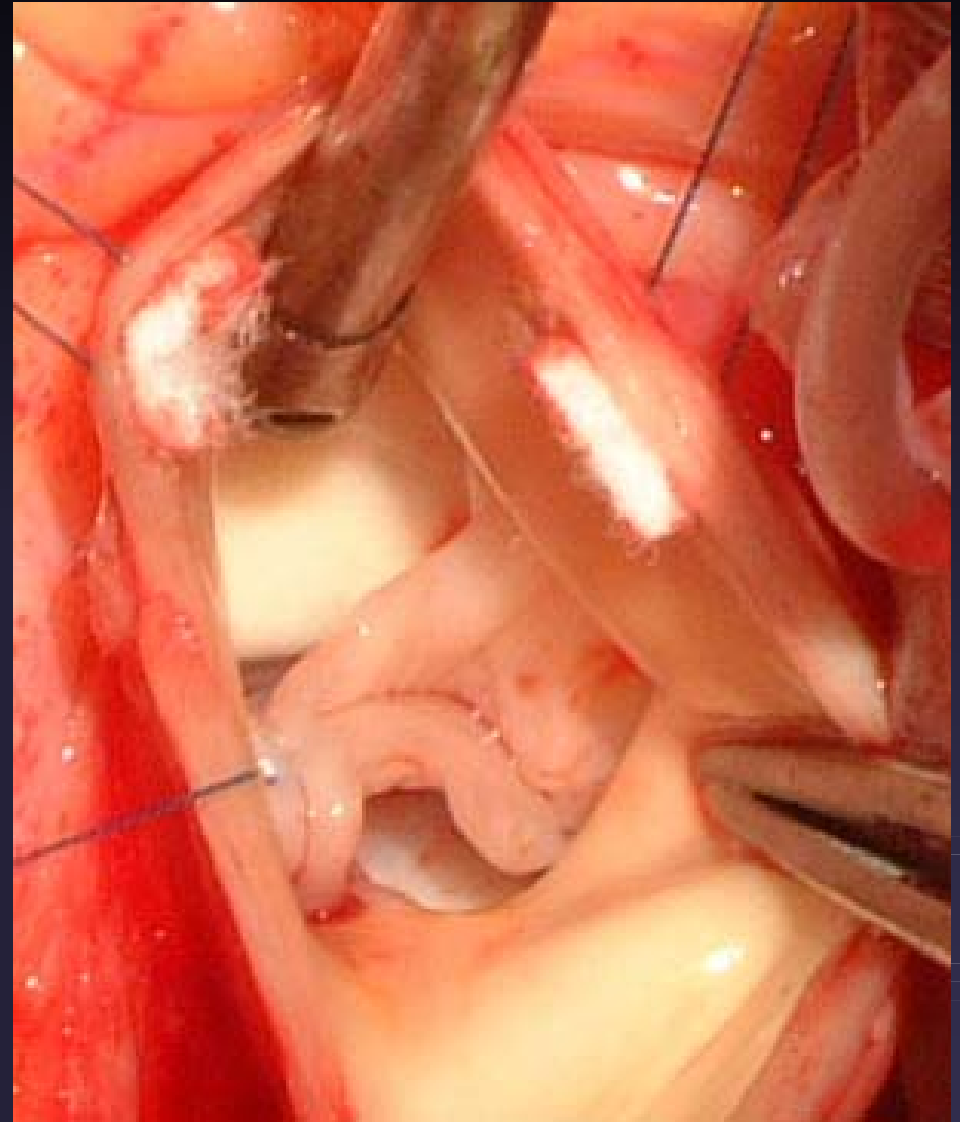
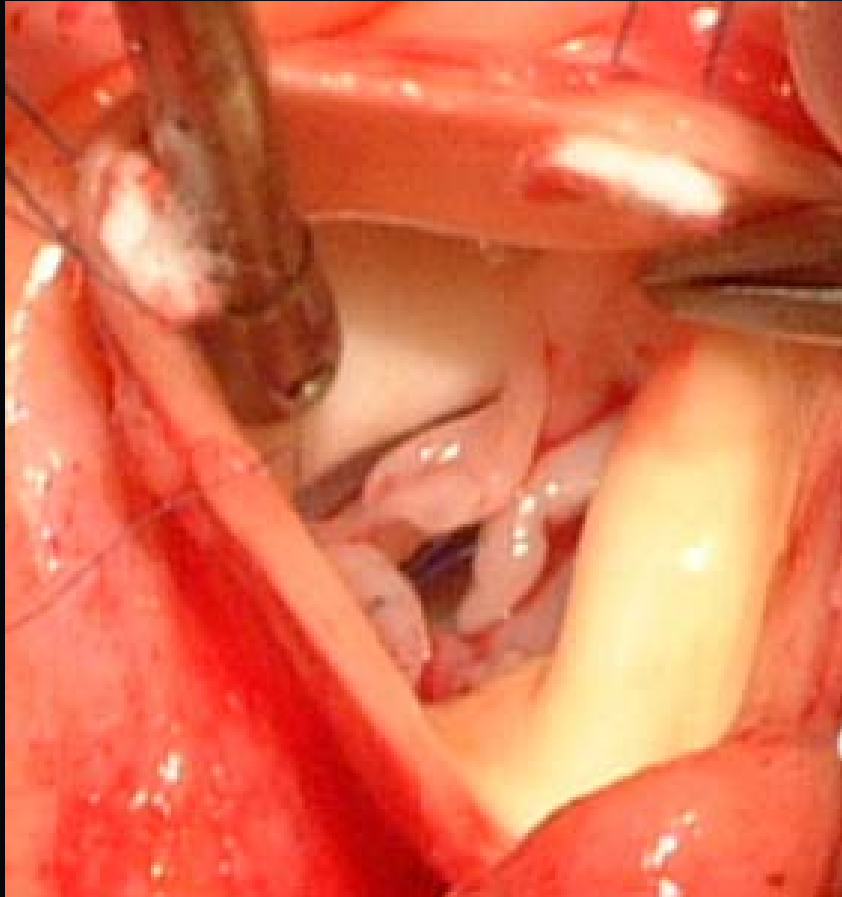
F/U : 4 mo.

M / 6 yr. 8 mo.

Congenital AR

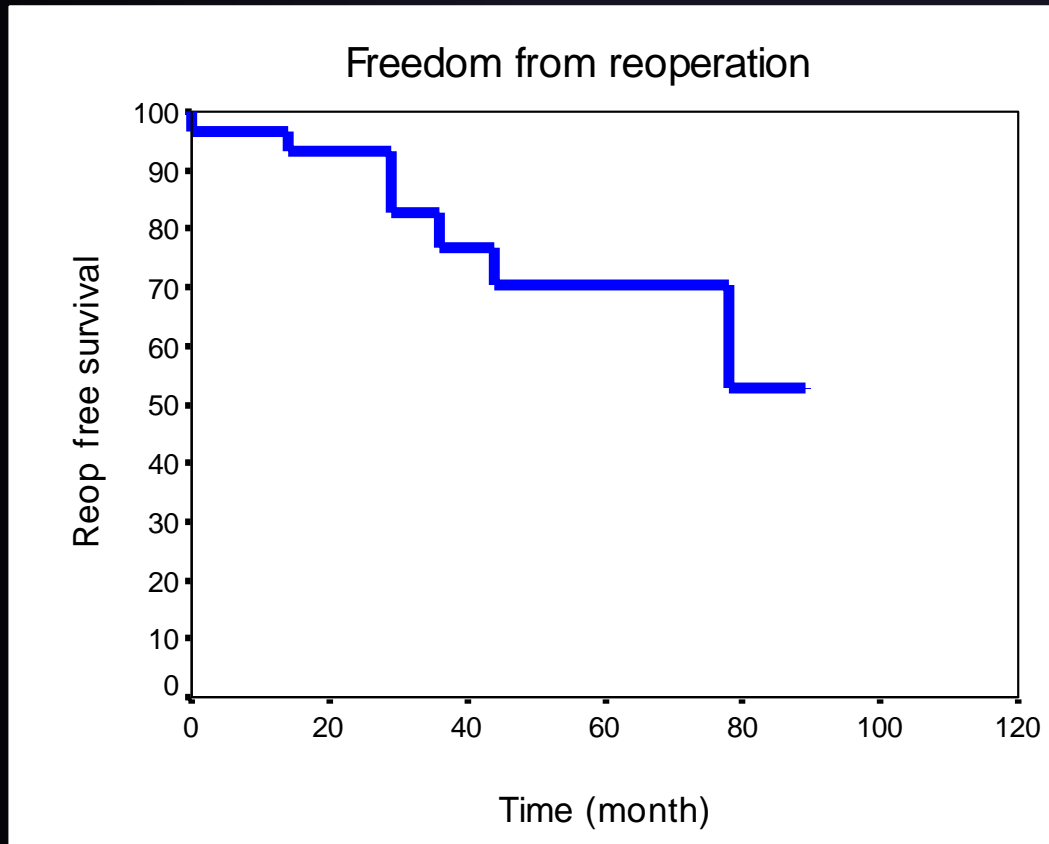
AR : Gr. III – IV → minimal → Gr. I

F/U : 1 yr. 7 mo.



Experiences of Seoul National University Children's Hospital

Aortic Valvuloplasty in Pediatric Age



- 1993.1. – 2004.3. 35 pts.
- Freedom-free reop.
 - ✓ 2-yr : 93.1%
 - ✓ 5-yr : 70.4%
 - ✓ **7-yr : 52.8%**
- Log-rank
 - ✓ Age : 0.224
 - ✓ Mode : 0.333
 - ✓ Severity : 0.294
 - ✓ Morphology : 0.197

Long-term F/U of Congenital AV disease

University of Oklahoma, 1961 - 1994

* Congenital AV Ds.

1st AV surgery (n=237)

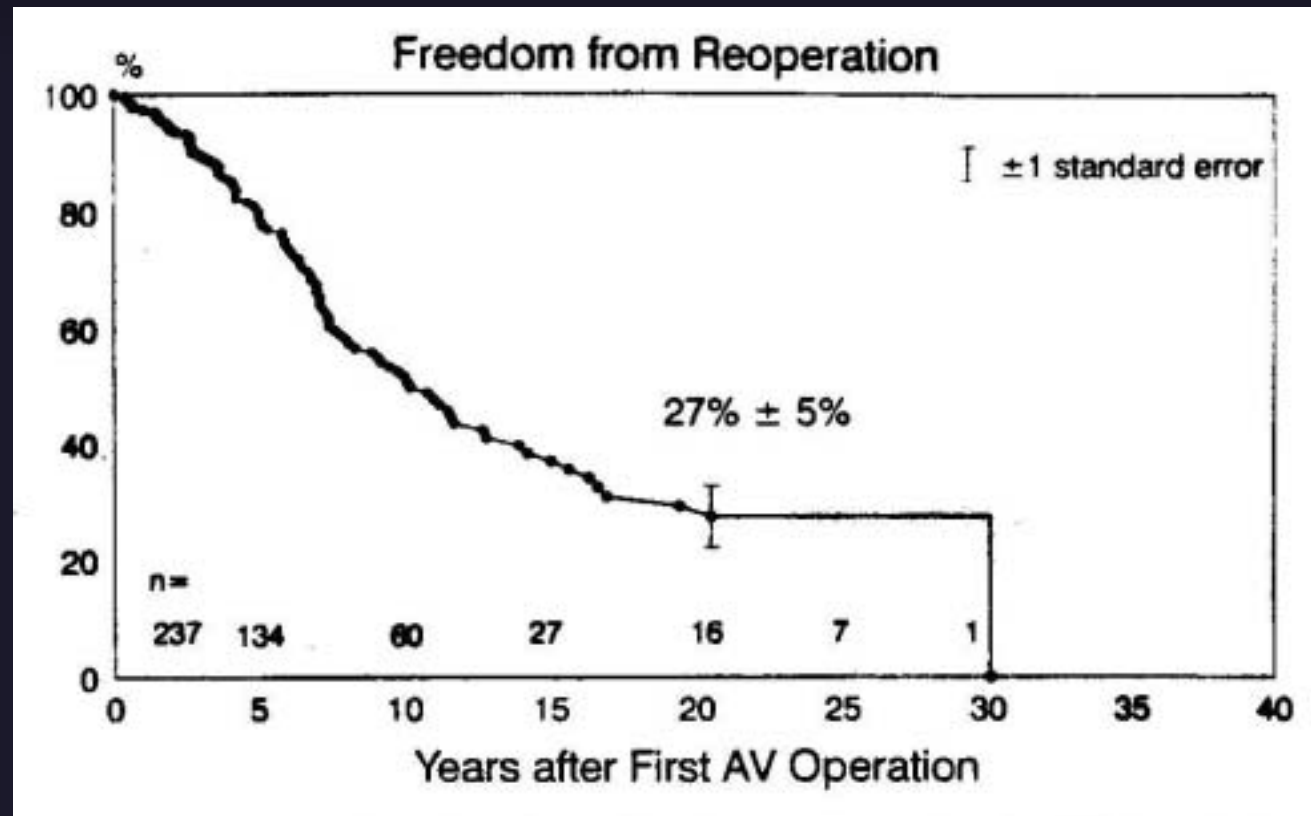
* Valvotomy

Valvuloplasty 146

* Subvalvar resection 67

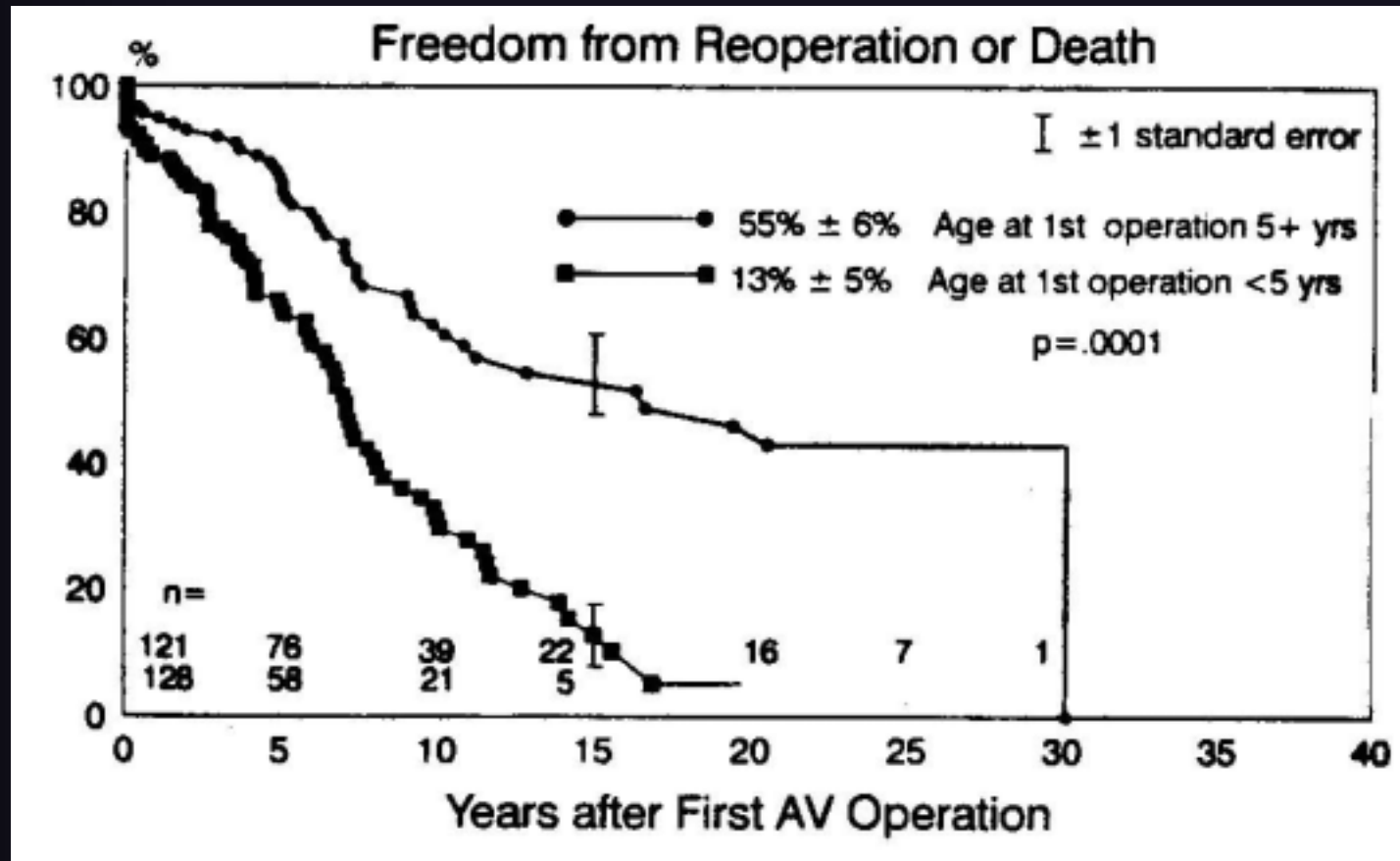
* AVR 43

Elkins, Ann Thorac Surg 1995



Long-term F/U of Congenital AV disease

University of Oklahoma, 1961 - 1994



Aortic valvuloplasty at present is still a
palliative procedure in children.