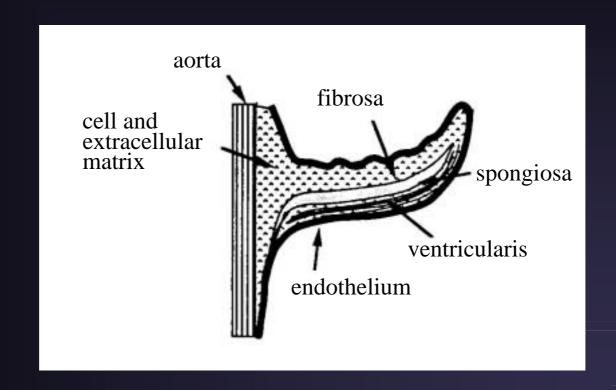
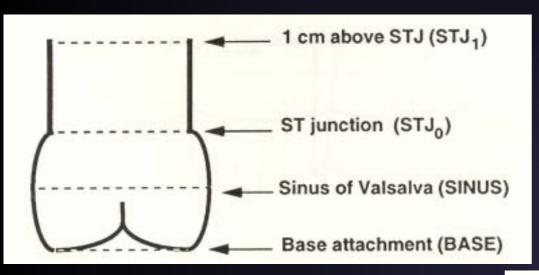


### Aortic Valve



#### Aortic Root and Leaflets



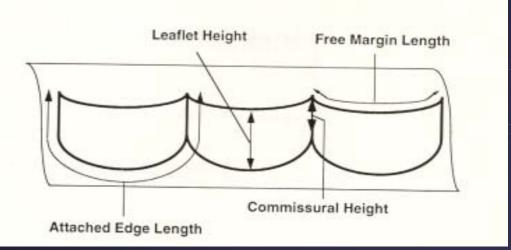
Aortic annulus (Ratio; 0.97)

Sinus of Valsalva (Ratio; 1)

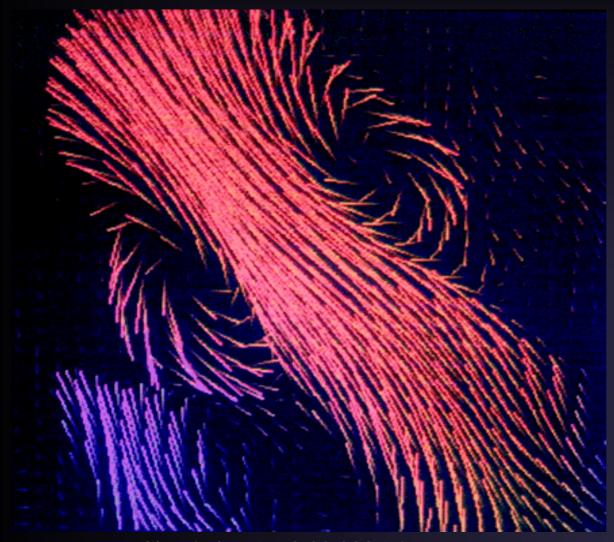
ST junction (Ratio; 0.81)

Aortic cusp & commissure

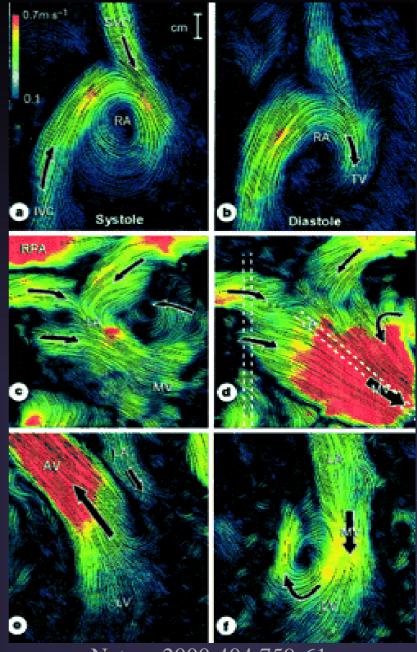
Base of leaflet = 1.5 x free margin



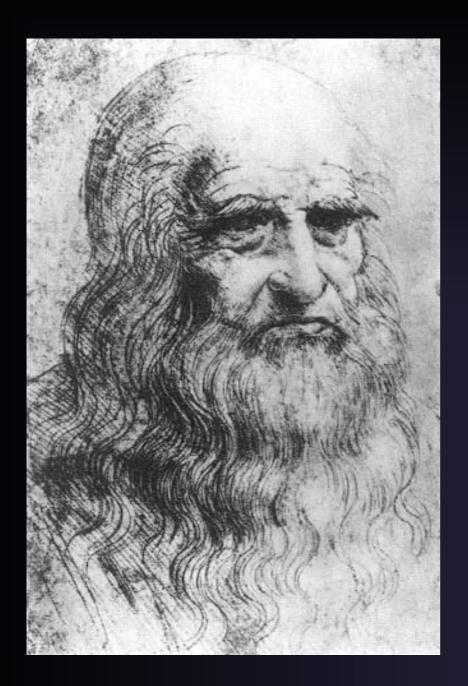
#### 3-Directional MR Velocity Mapping



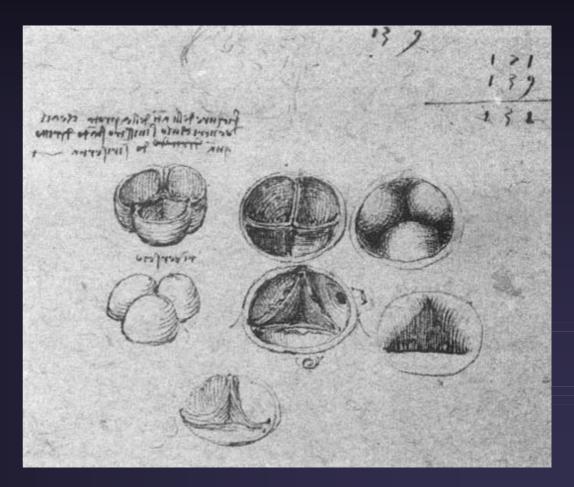
Circulation 1993;88:2235-47



Nature 2000;404:759-61



#### Leonardo da Vinci



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VICTOR PRINTS Tol You

### 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

- \* Achives 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

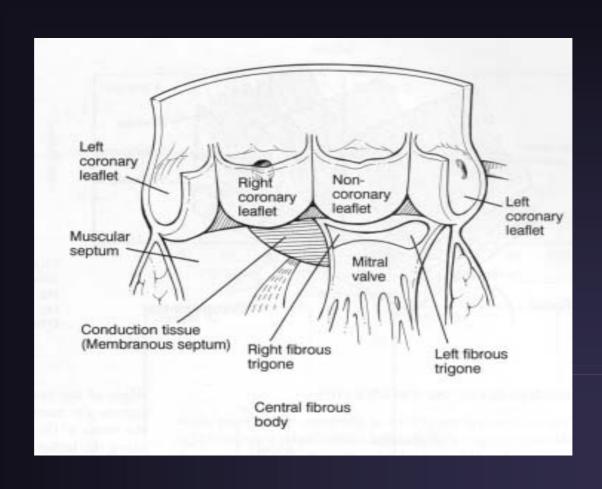
Moore, J Am Coll Cardiol;1996:1257-63 Mosca, J Thorac Cardiovasc Surg 1995;109:147-54 Gildein, Am Heart J 1996;131:754-9 Shaddy, J Am Coll Cardiol 1990;16:451-6 Sholler, Circulation 1988;78:351-60 Zeevi, Circulation 1989;80:831-9 Egito, J Am Coll Cardiol 1997;29:442-7 McCrindle, Am J Cardiol 1996;77:286-93 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

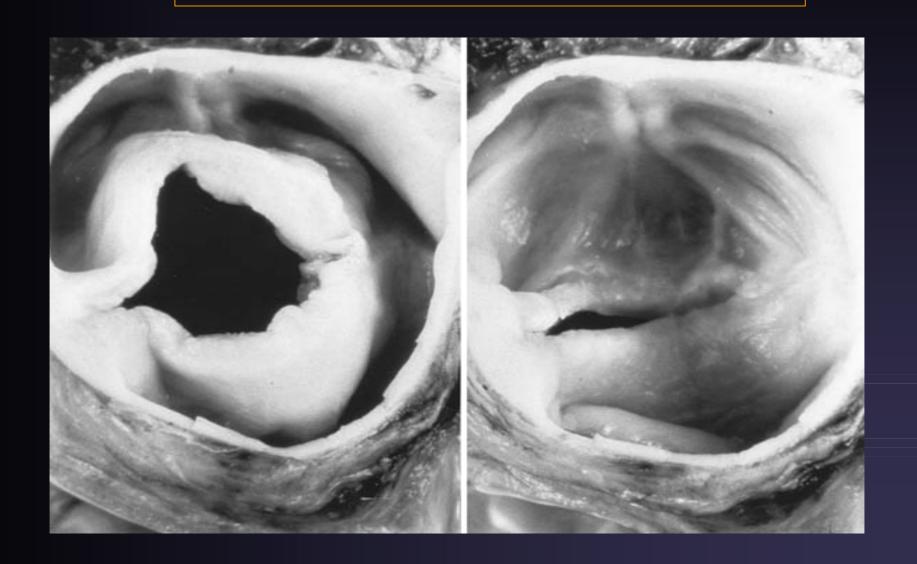
#### 1. Important geonetric features

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

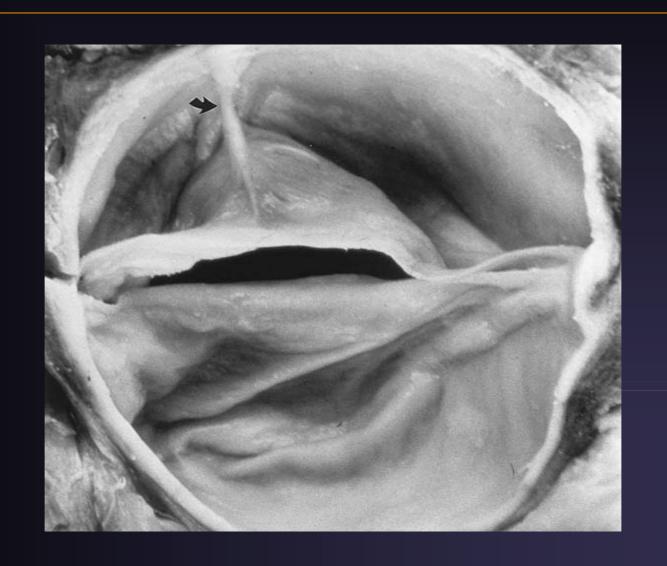
# Aortic Root Anatomy



# **Bicuspid Aortic Valve**



## Bicuspid Aortic Valve with Raphe



## Congenital AR: difficult to Repair

#### 2. Dominant AR

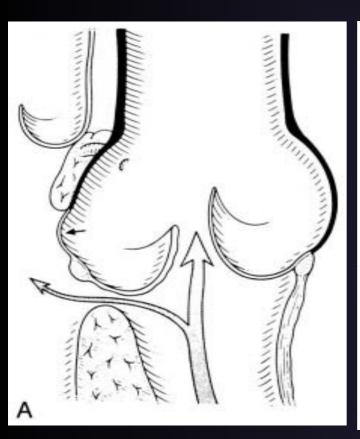
• Frequently an element of real or potential stenosis

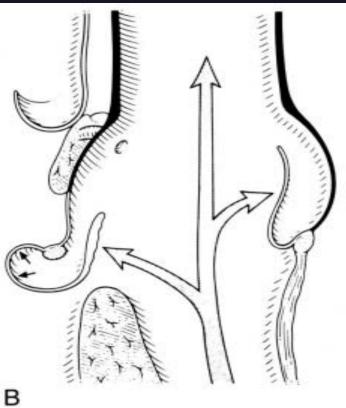
### Congenital AR: difficult to Repair

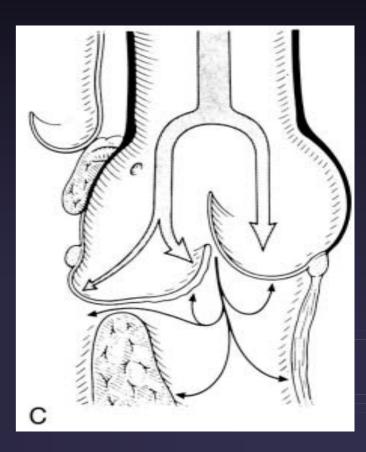
#### 3. Prolapsed AV leaflets

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

# VSD & Aortic Incompetence





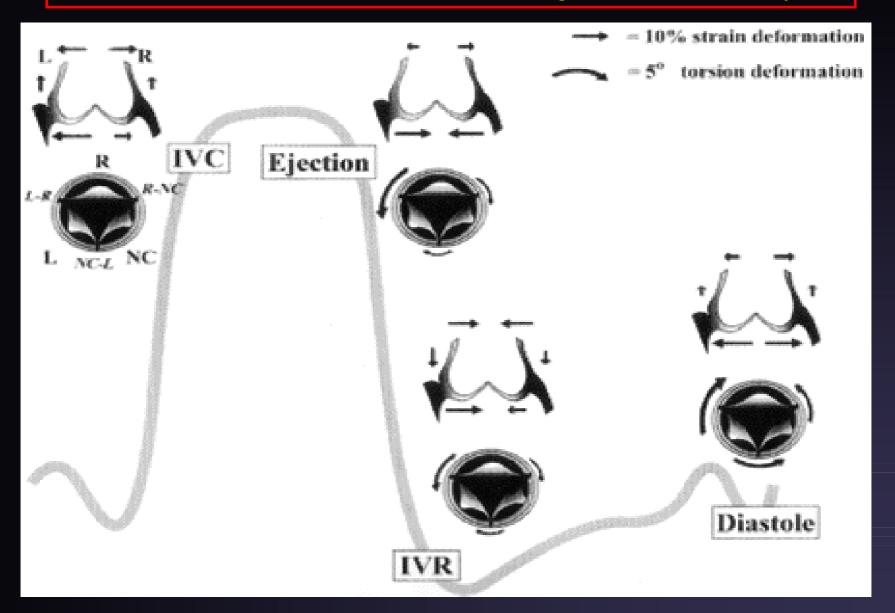


### Congenital AR: difficult to Repair

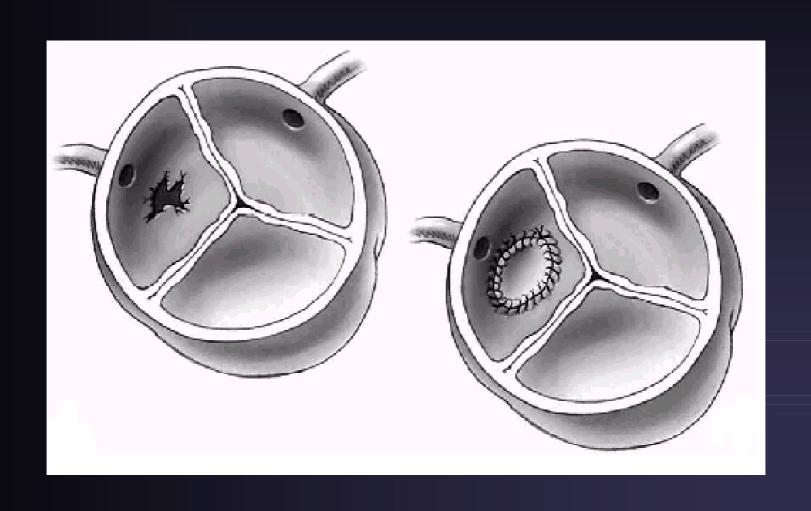
\* Significant challenge to durable surgical repair

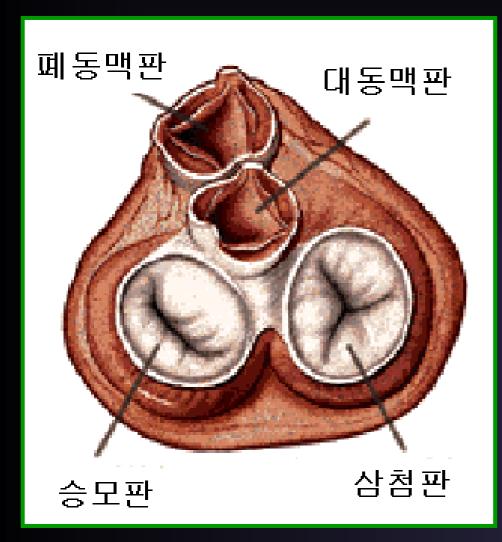
\* May fail miserably with time

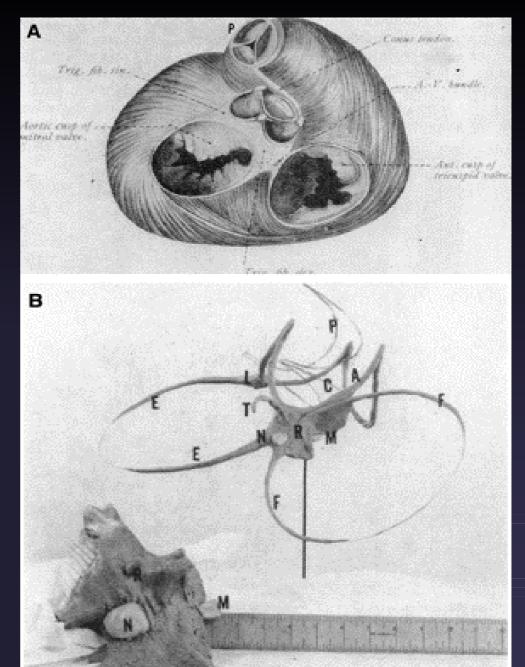
#### Aortic annular deformation throughout cardiac cycle



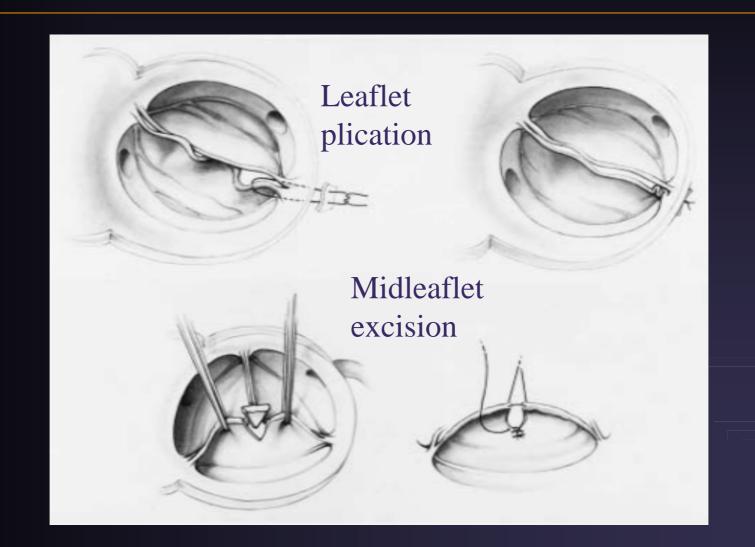
## Patch Closure of Cusp Perforation



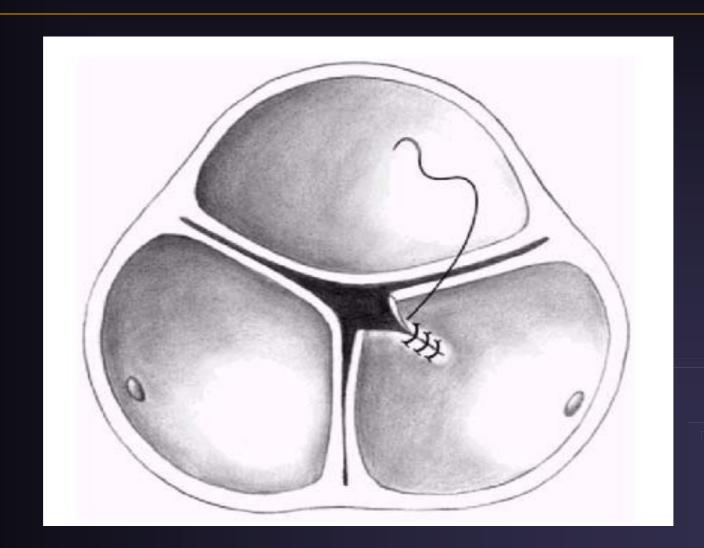




### Redundant leaflet tissue

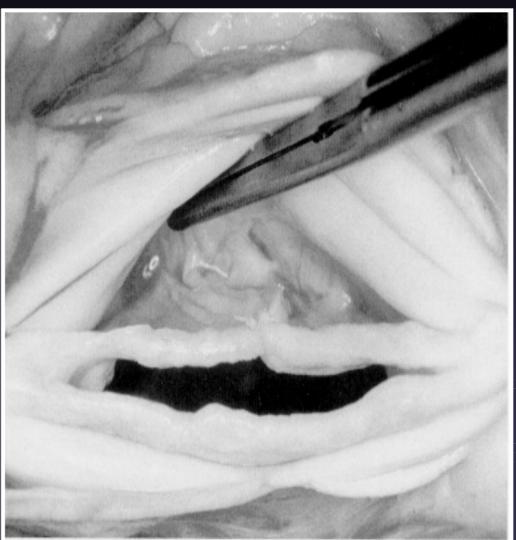


# Triangular Resection

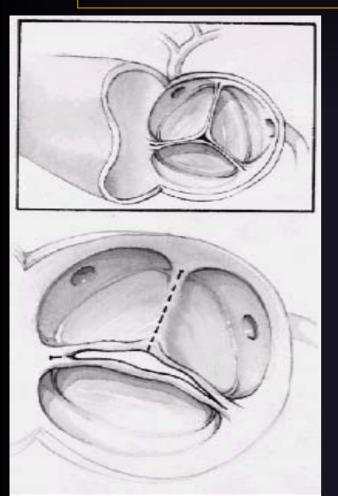


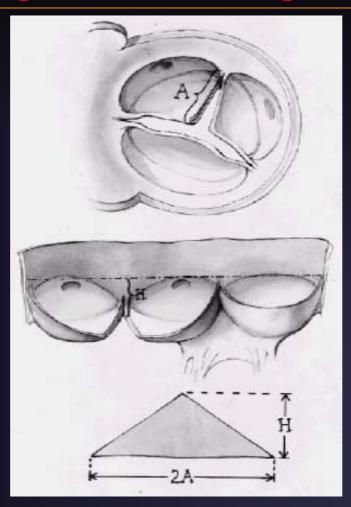
# Repair of Bicuspid Aortic Valve

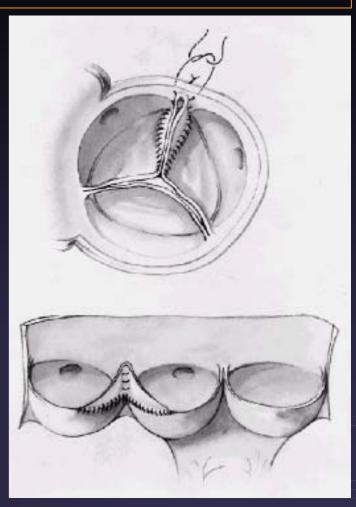




#### Commissurotomy and Bileaflet Pericardial Augmentation-Resuspension for Bicuspid AV Stenosis



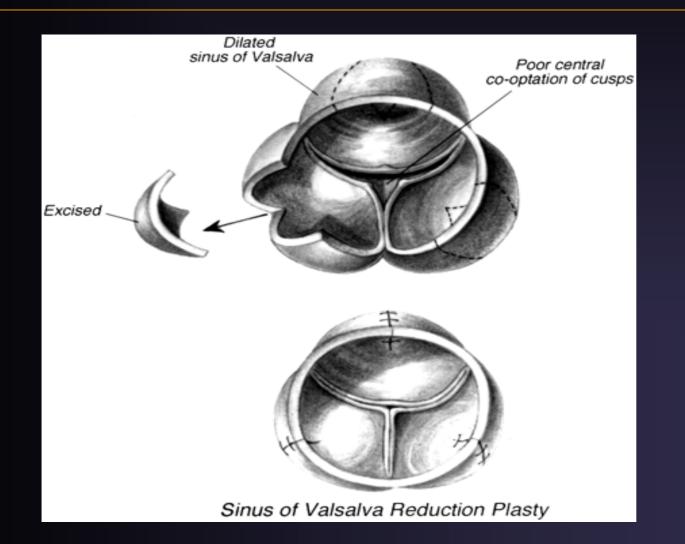




Ann Thorac Surg 1997;63:548–50 Ann Thorac Surg 1997;63:465-9 JTCS 2003;125:964-966

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

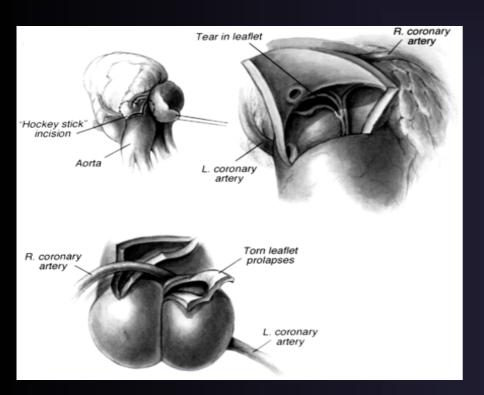
### Balloon-Induced AR in Cong. AS

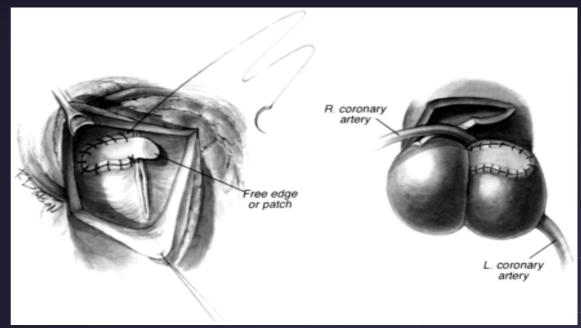


Jonas RA et al.

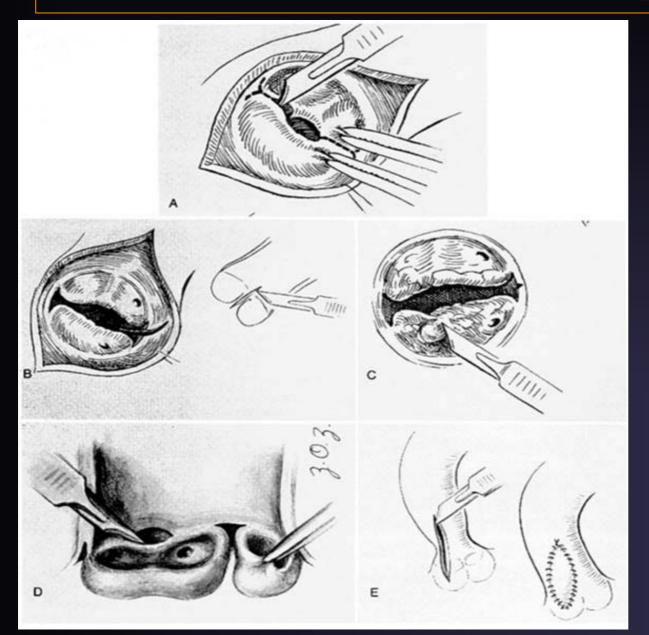
JTCS 2001;122:162-8

## Balloon-Induced AR in Cong. AS



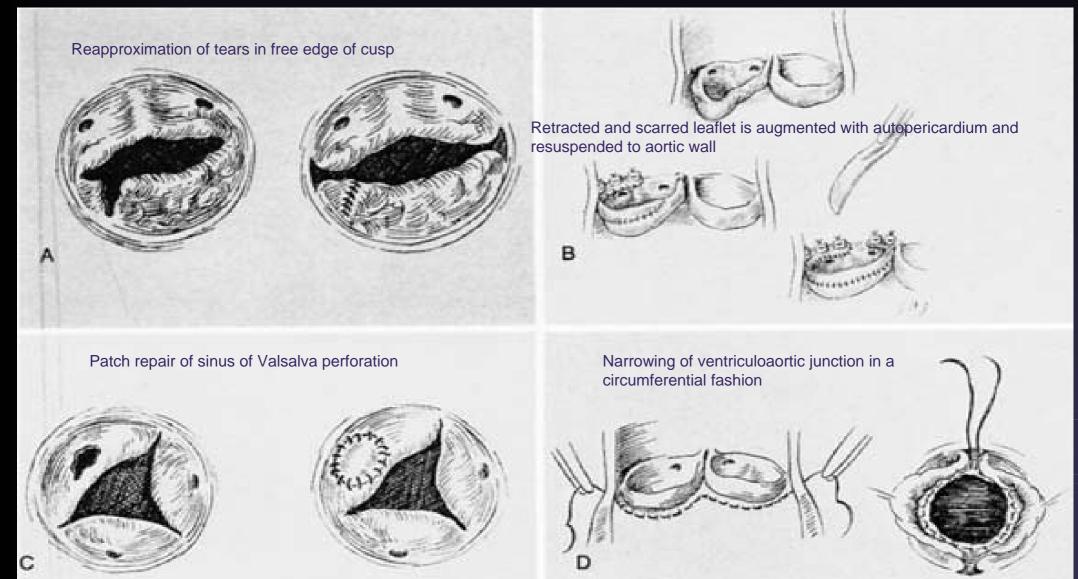


## Extended Aortic Valvuloplasty

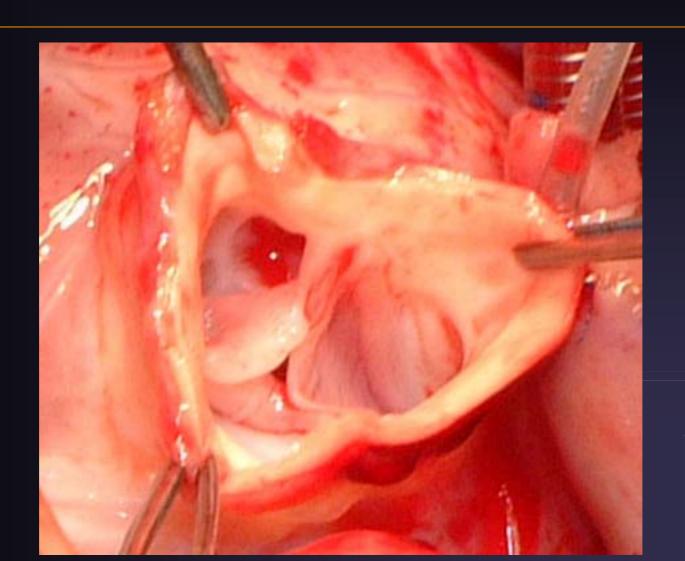


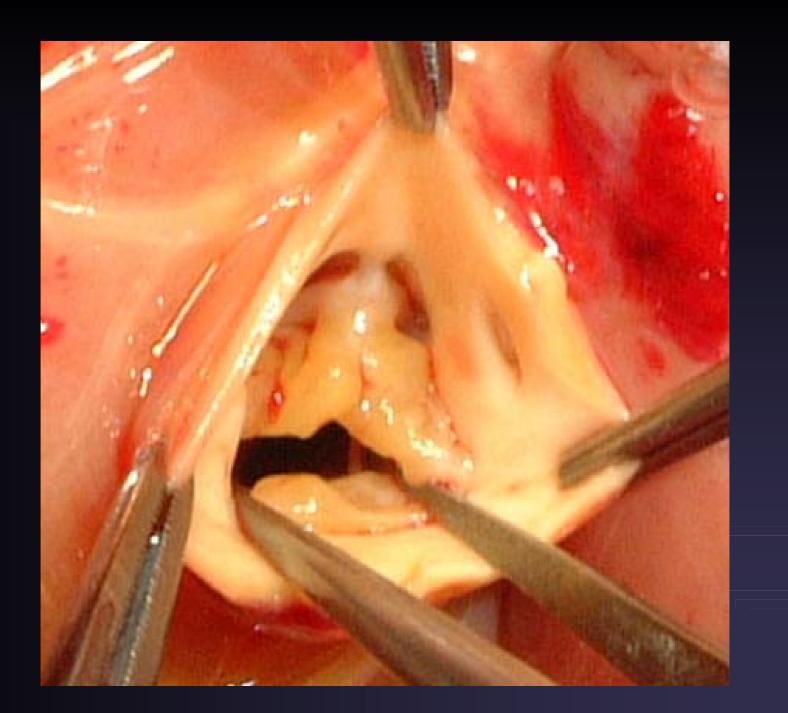
JTCS 1994;107 :1114-20

### Extended Aortic Valvuloplasty

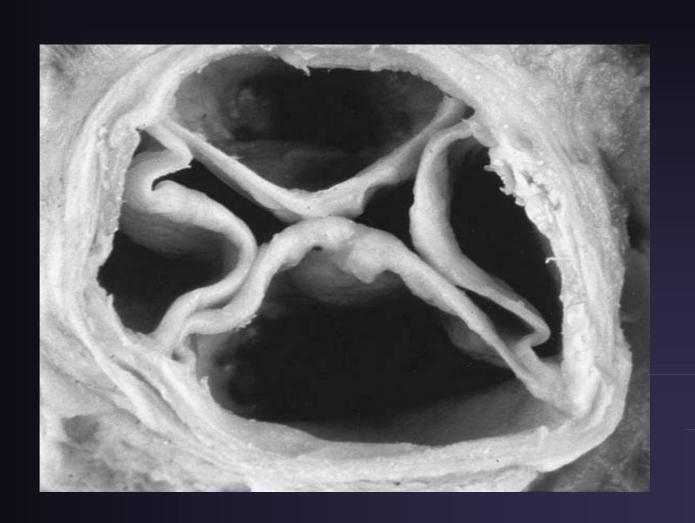


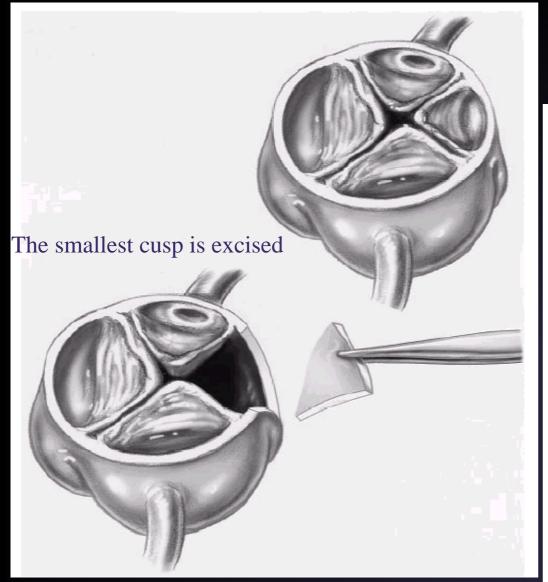
## Truncus Arteriosus

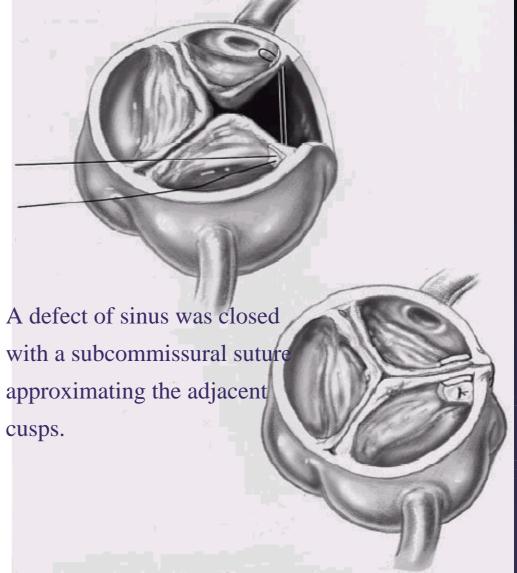




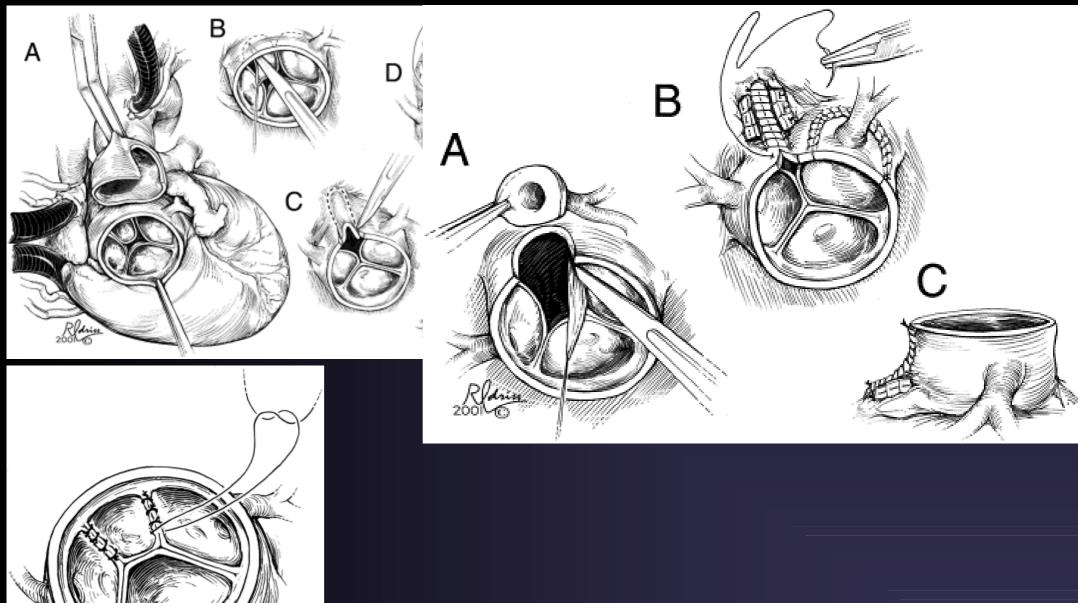
## Quadricuspid aortic valve



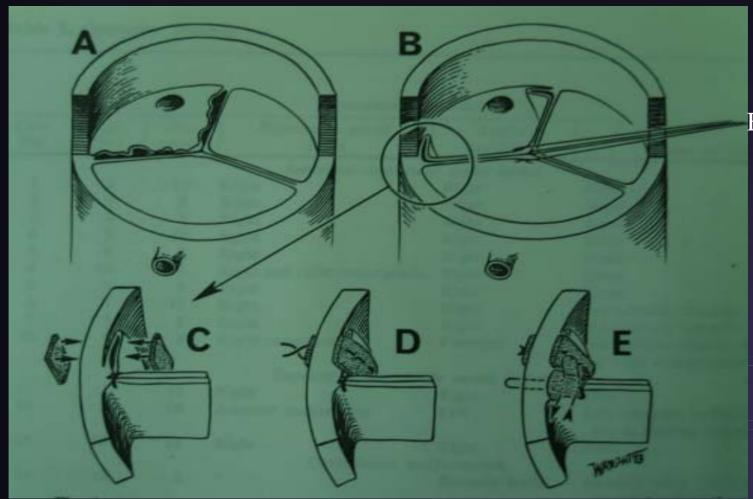




Mee RBB, ATS 1999;67:1142-6



# Trusler's method of plication

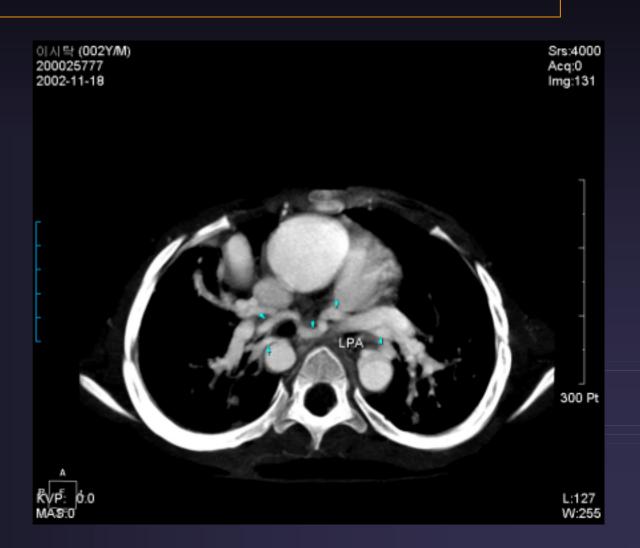


Frater stitch

## Progressive Aortic Dilatation

\*M/2

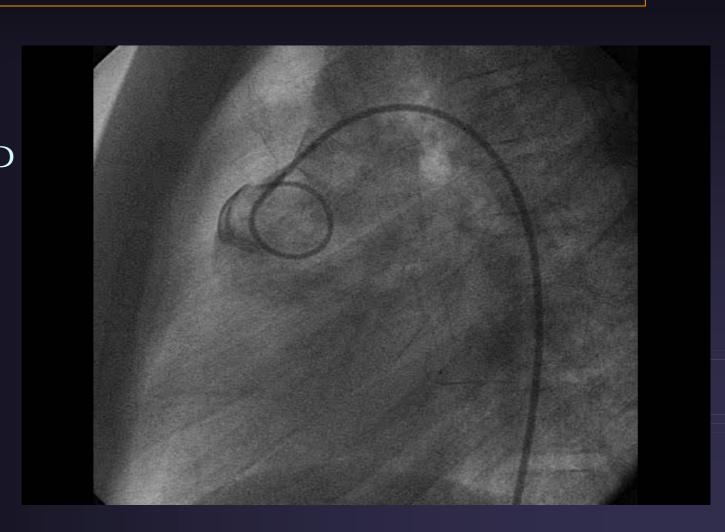
• PA / VSD / MAPCA

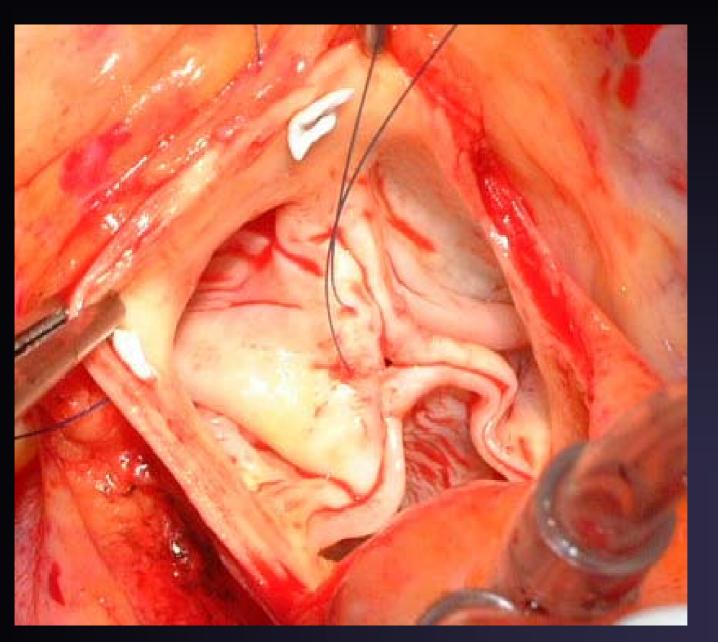


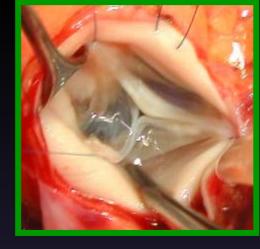
### Neo-Aortic Dilatation

Complete TGA with VSD s/p Arterial switch op

 $\rightarrow$  8 yr. later







M/37

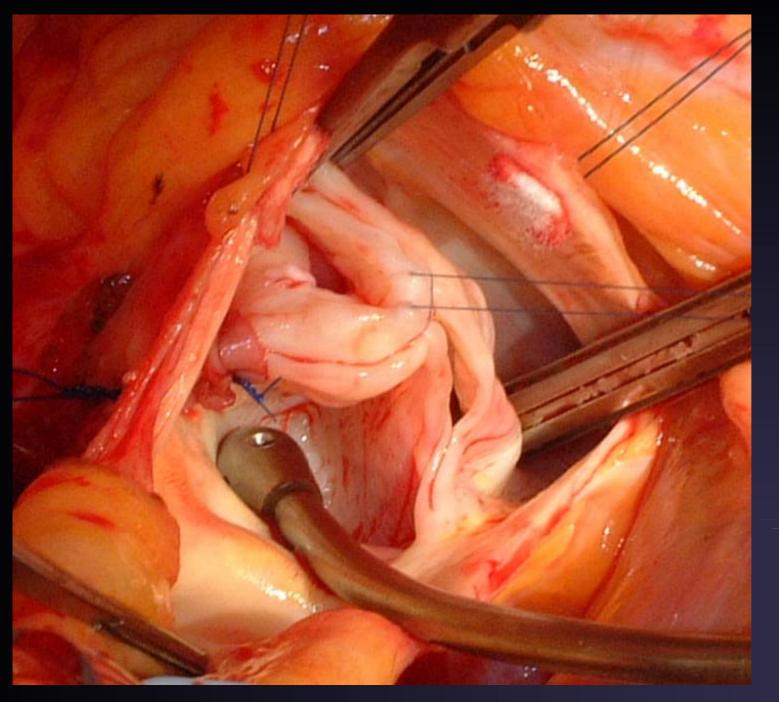
Absent PV syndrome

AR: Gr. II – III

 $\rightarrow$  Gr. I

 $\rightarrow$  Gr. II

F/U: 1 yr. 3 mo.





F/23

VSD + AR + PS

AR : Gr. II

 $\rightarrow$  minimal

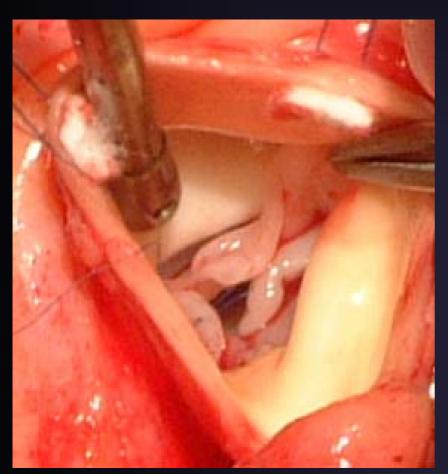
F/U: 4 mo.

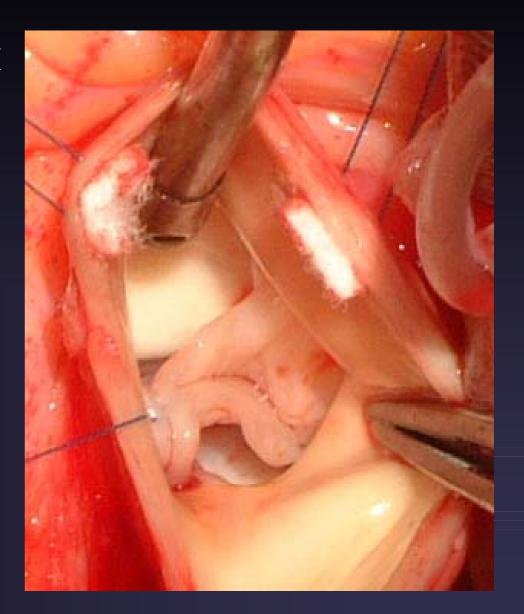
M / 6 yr. 8 mo.

Congenital AR

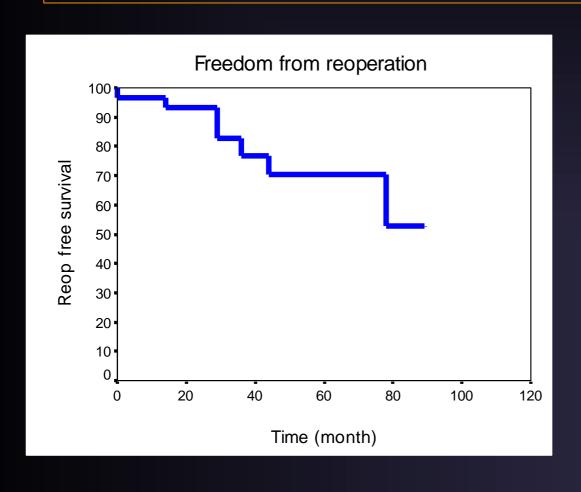
 $AR : Gr. III - IV \rightarrow minimal \rightarrow Gr. I$ 

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)

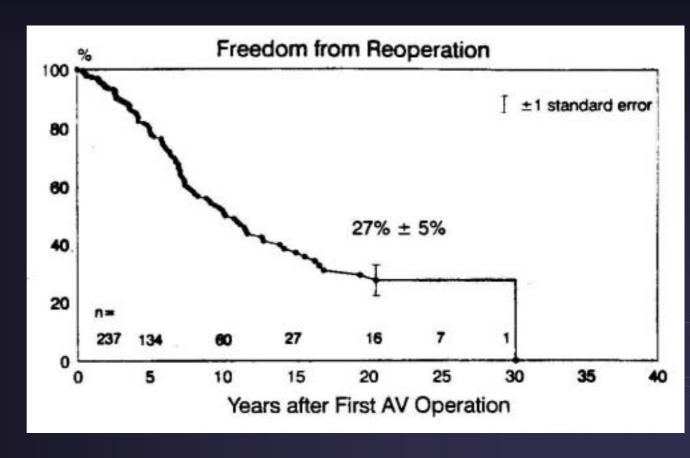
\* Valvotomy

Valvuloplasty 146

\* Subvalvar resection 67

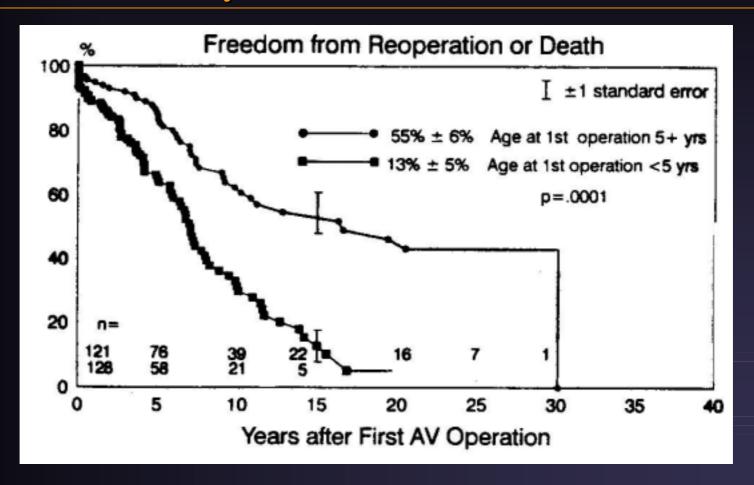
\* AVR 43

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.