

# Congenitally Corrected Transposition of the Great Arteries

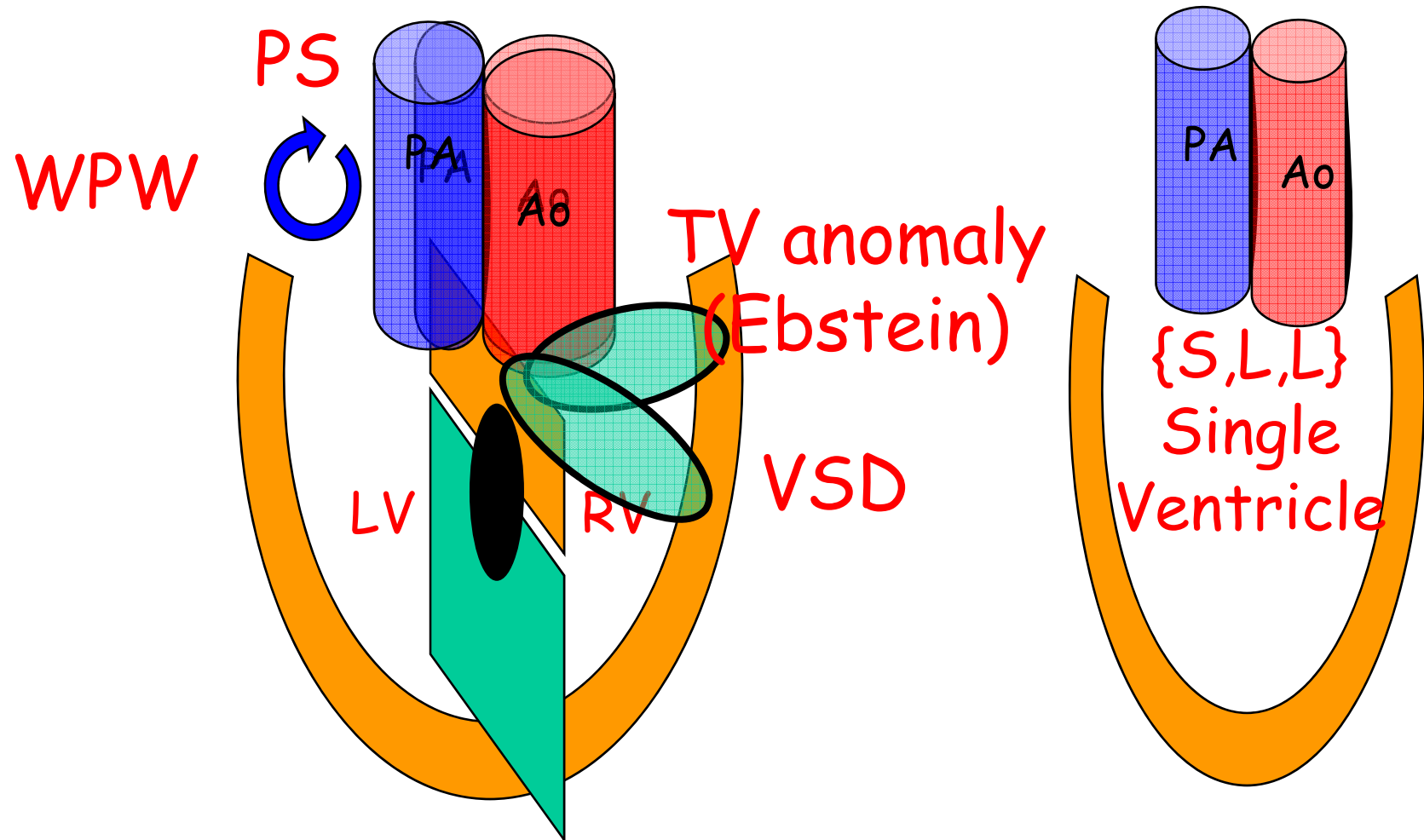
Rokitansky ,1875

Is DSO a final ?

I don't think so.

# Congenitally corrected TGA

Commonly associated lesion



# CC-TGA

## Natural history

- Nadas AS, et al. NEJM 1970;282:1053  
CCTGA+Associated anomaly: 10YSR=30%

# CC-TGA

## Natural & Unnatural history

111pts, Somerville J, et al. Am J Cardiol 1990;65:1222-9

- 청색증이 있으면 **shunt**건 교정이건 필요하다
- **TR G2** 이상이면 대치 대상이다
- 증상이 있건 없건 **VSD, TR**로 심장이 크면 수술을 해야 한다
- 심부전이나 심기능 **3 or 4**이면 매우 큰일이다

# CC-TGA

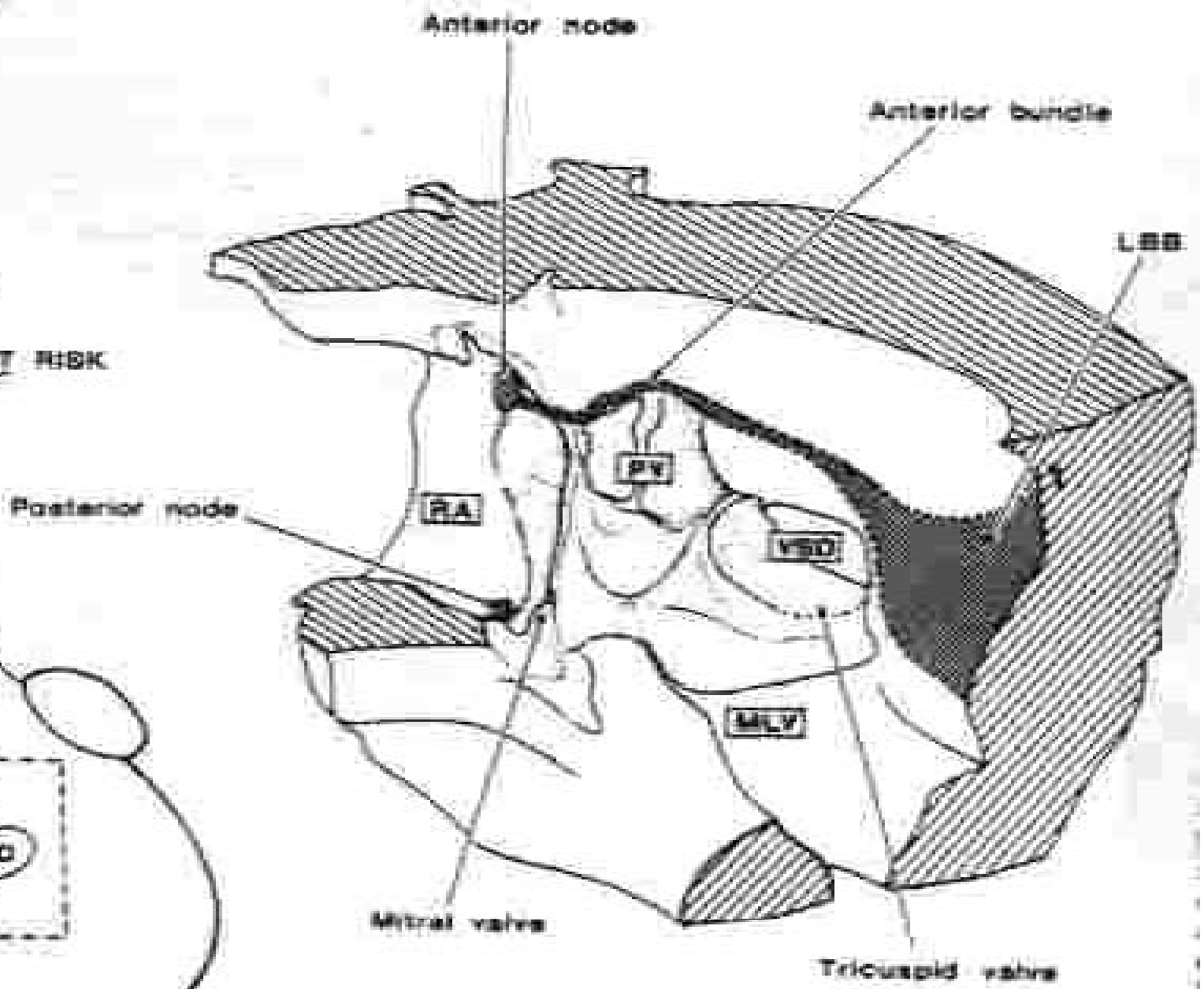
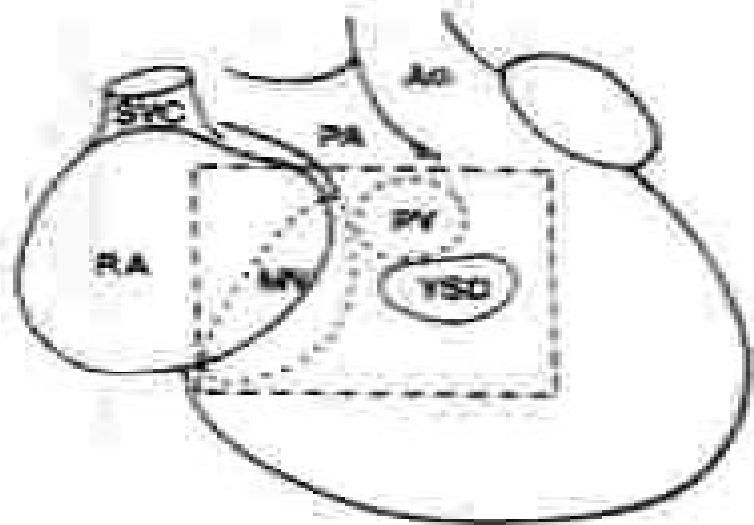
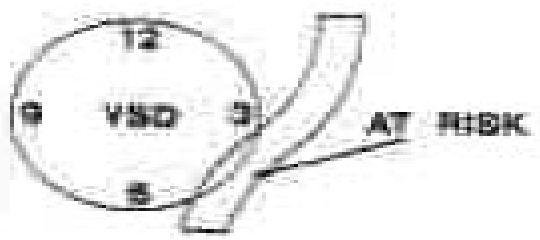
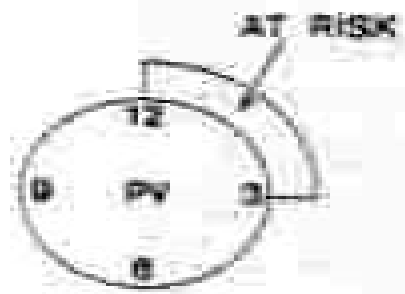
## Surgical results

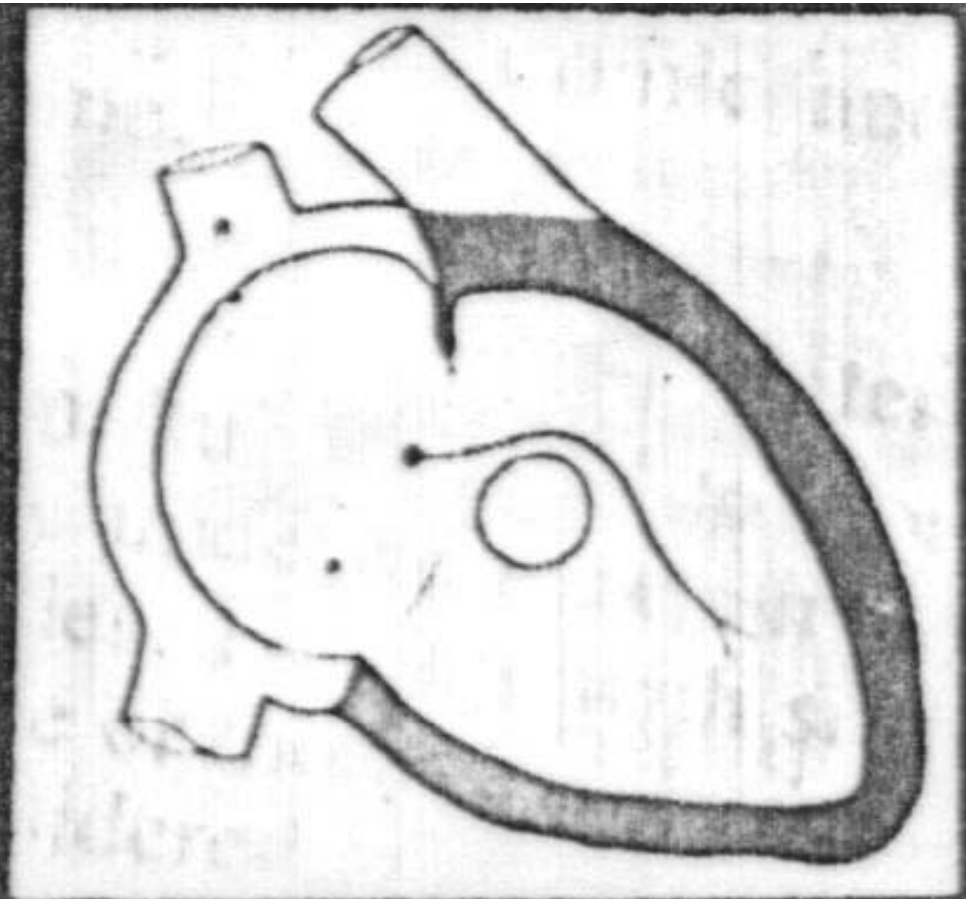
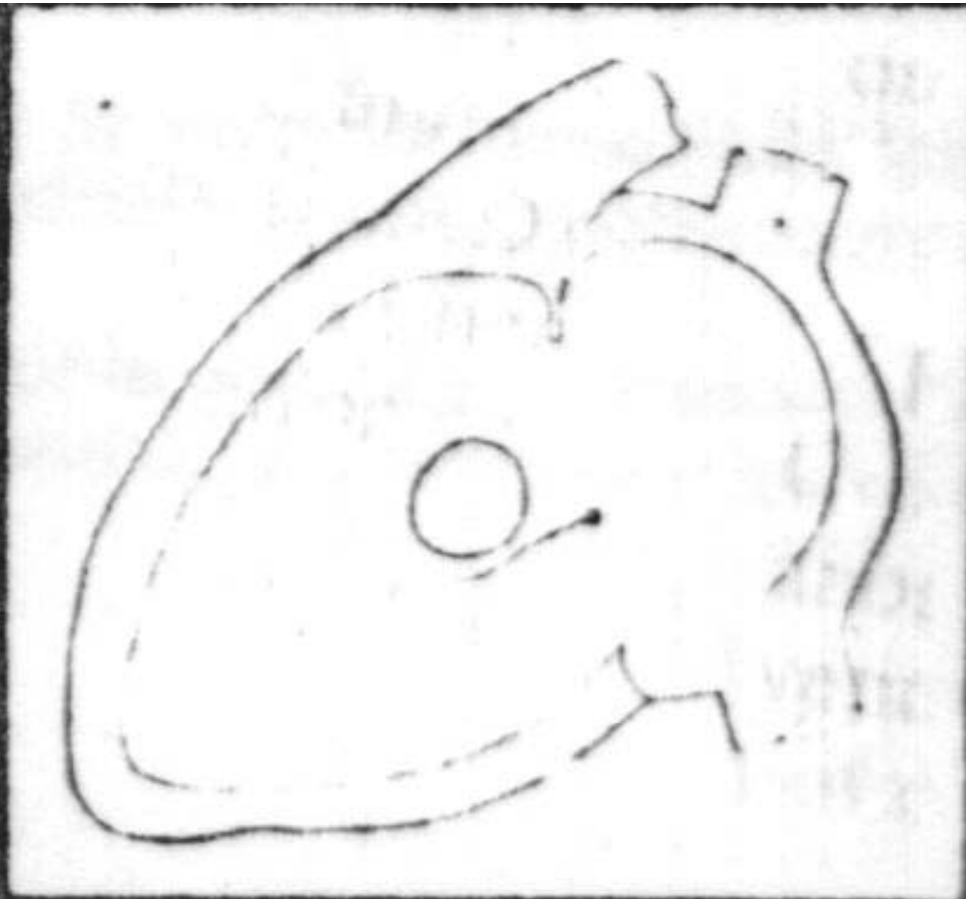
- 20 y survival : 48% Yeh et al, 1999
- 30 y survival with no TR: 72% Hraska, et al, 2005
- Incidence of TR : unpredictable
- LV/MV is not normal, is rotated, deteriorates.
- Preop-/ Postsurgical Arrhythmia

# What if tricuspid valve replacement ?

Mayoclinic, J Thorac Cardiovasc Surg 1995;109:642-53

- Indications :
  - 36 severe TR, 4 moderate TR
  - 67.5% NYHA III or IV
  - 40% complete AV block
- Results :
  - Early mortality : 10%
  - Late mortality : 20%
    - 5ysr 78%, 10ysr 60.7%
- Risk factors:
  - preoperative EF
  - interval of operation
  - preoperative NYHA





{I, D, D}

{S, L, L}

# Morphology of CC-TGA

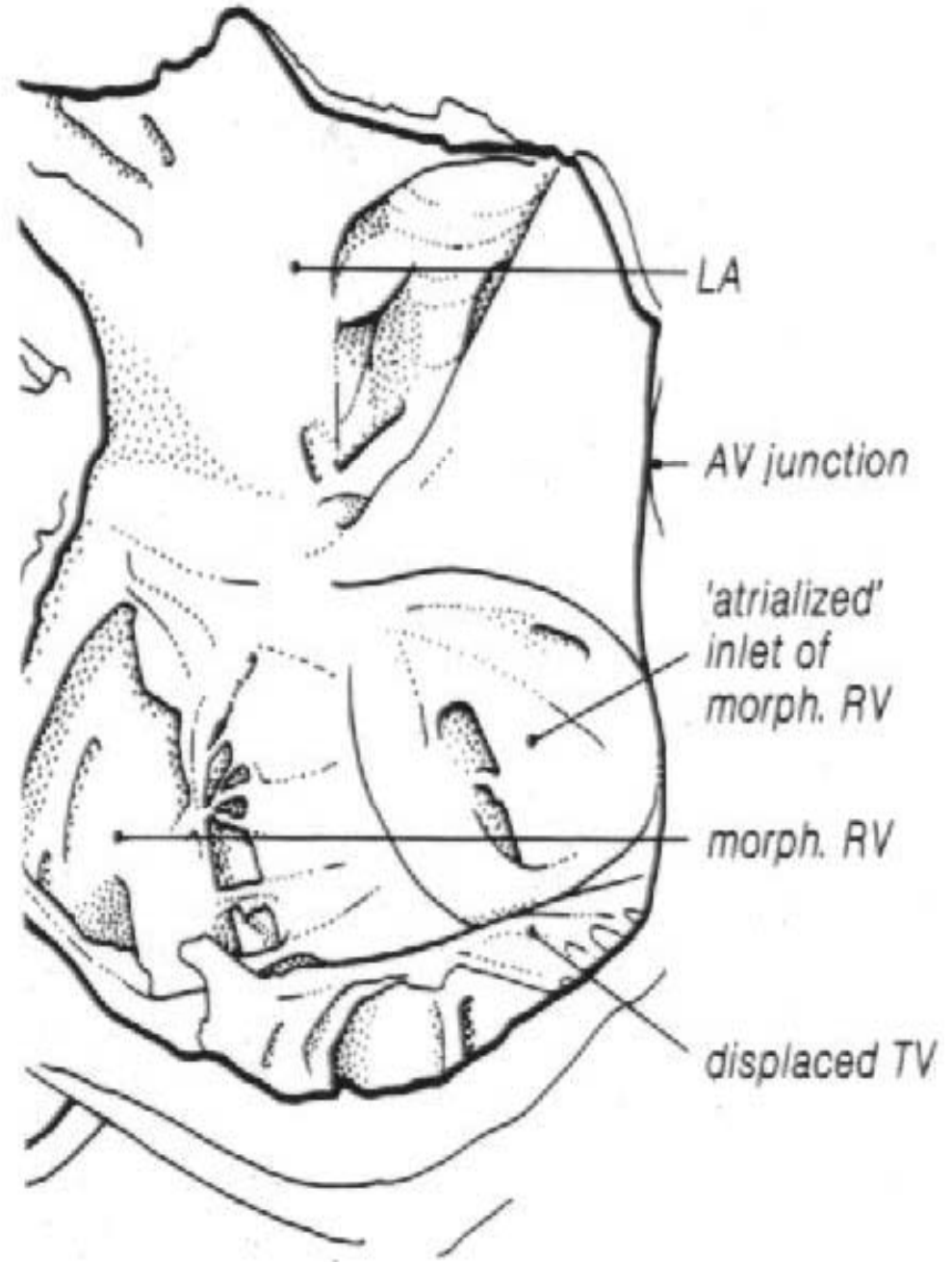
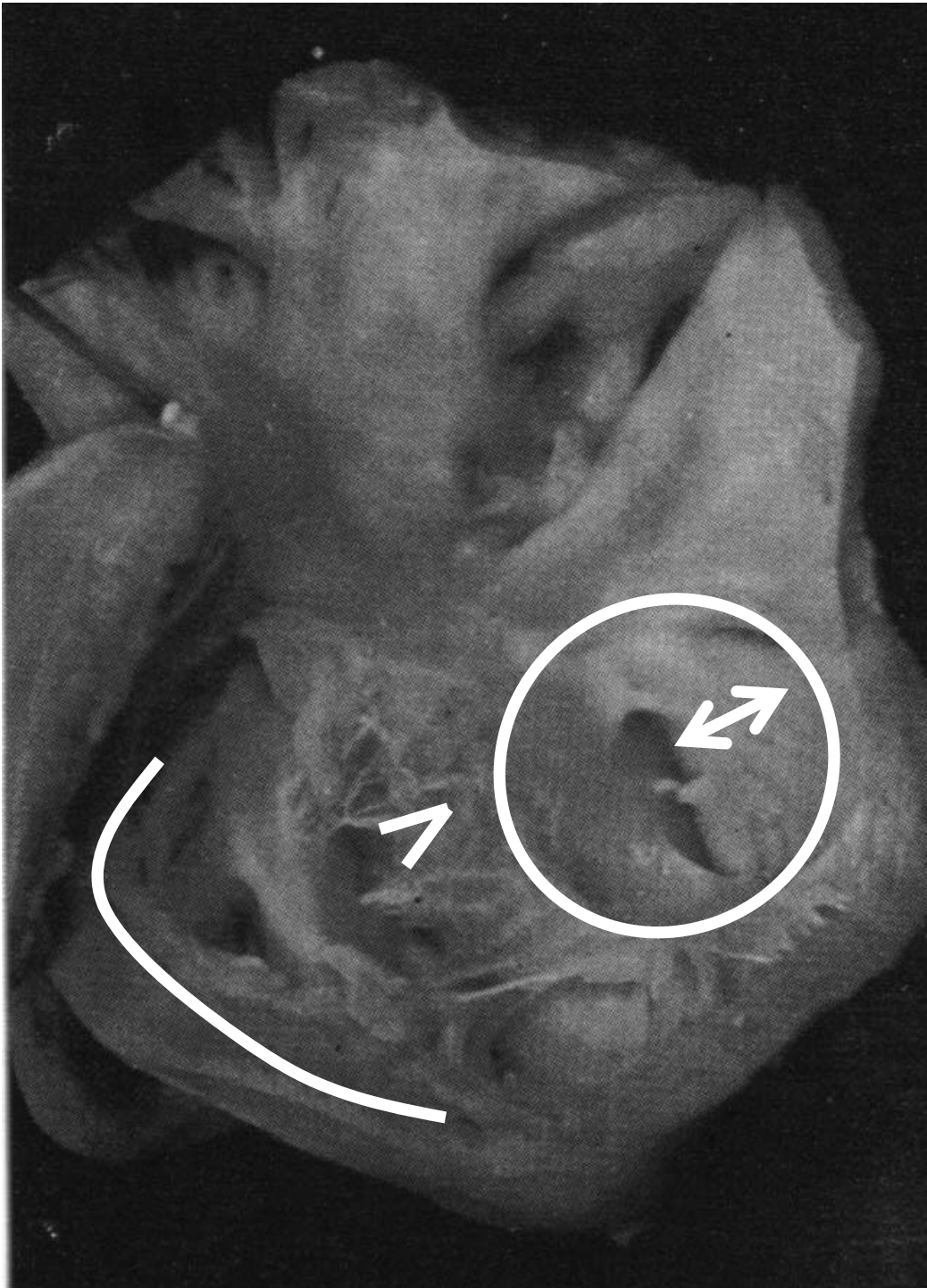
## Pulmonary outflow tract

- Wedged between mitral and tricuspid valve.
- Overrides the muscular ventricular septum.
- Commits with the left sided morphologic right ventricle.
- Valvular, muscular or fibrous tissue tags.

# Morphology of CC-TGA

Left-sided Ebstein vs classic right-sided variety

- Annulus not dilated.
- Anterior leaflet not enlarged (cleft)
- Small or normal sized RV
- Late dilatation of RV
- Atrialized ventricle not thin



# Morphology of CC-TGA

## Coronary artery pattern

- Usual pattern, less variation
- Very short non-branching left main (2-3mm)
- Malalignment of commissures
- Deeply wedged PA (supracommissural transfer)
- SA, AV nodal artery from circumflex(kinking)

# Treatment options

- Observation
- Shunt or PAB
- Classical repair/Repair of associated anomaly
- Anatomic repair/Double switch operation
- One & half ventricle repair
- Fontan type operation
- Transplantation

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## Favoring LV repair

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- Poor RV function
- Poor TV function
- Good MV function
- Systolic LVP/RVP > 0.7
- Normal PVR
- Balanced ventricle
- Septatable
- Normal coronary pattern
- No LVOTO (DSO)
- LVOTO (Rastelli type)
- Normal PV (DSO)

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## Favoring RV repair

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- Good RV function
  - Good TV function
  - Good MV function
  - Balanced ventricle
  - Septatable ventricle
  - Single coronary
  - Restrictive VSD
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# CC-TGA

## Limitations for ASO in DSO

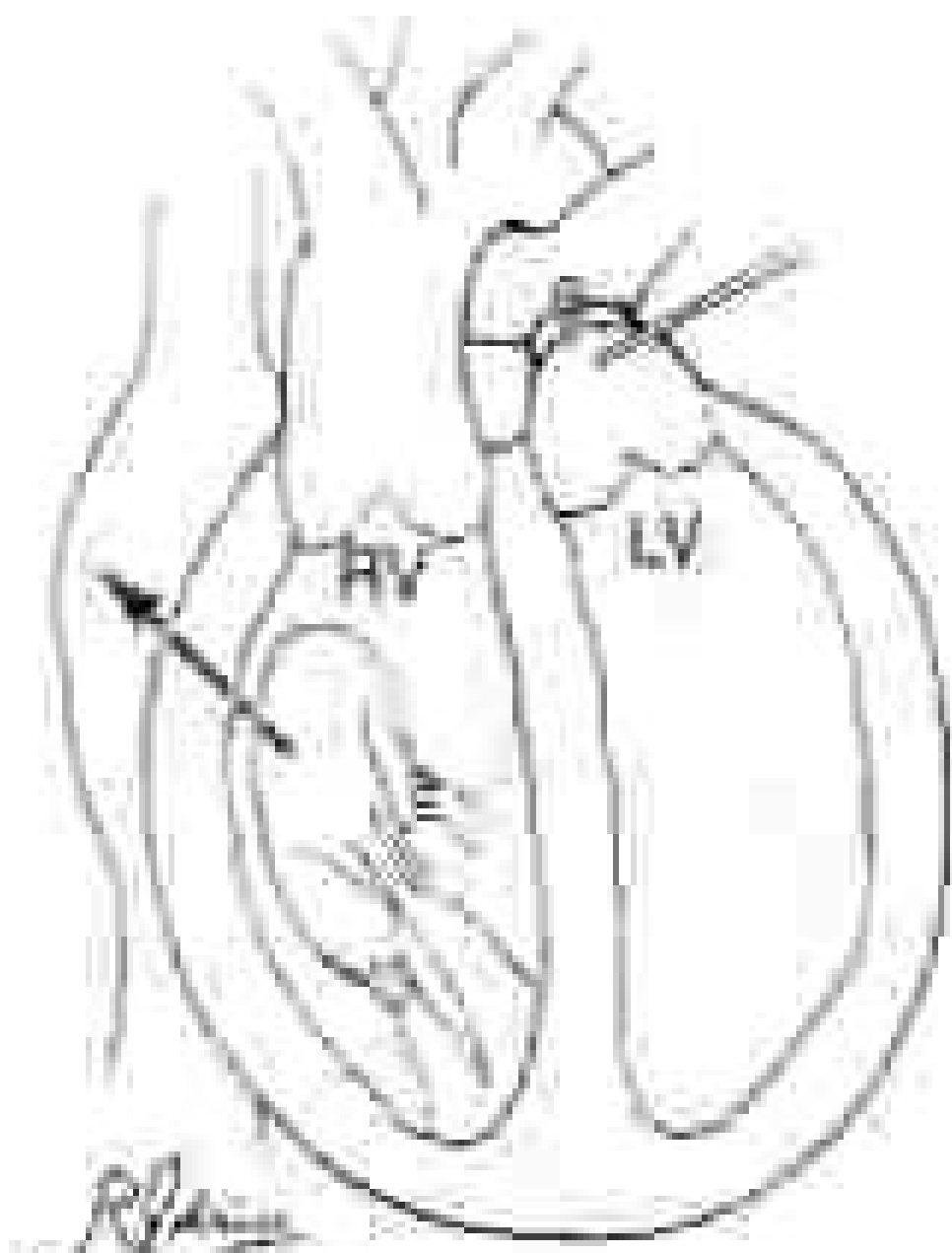
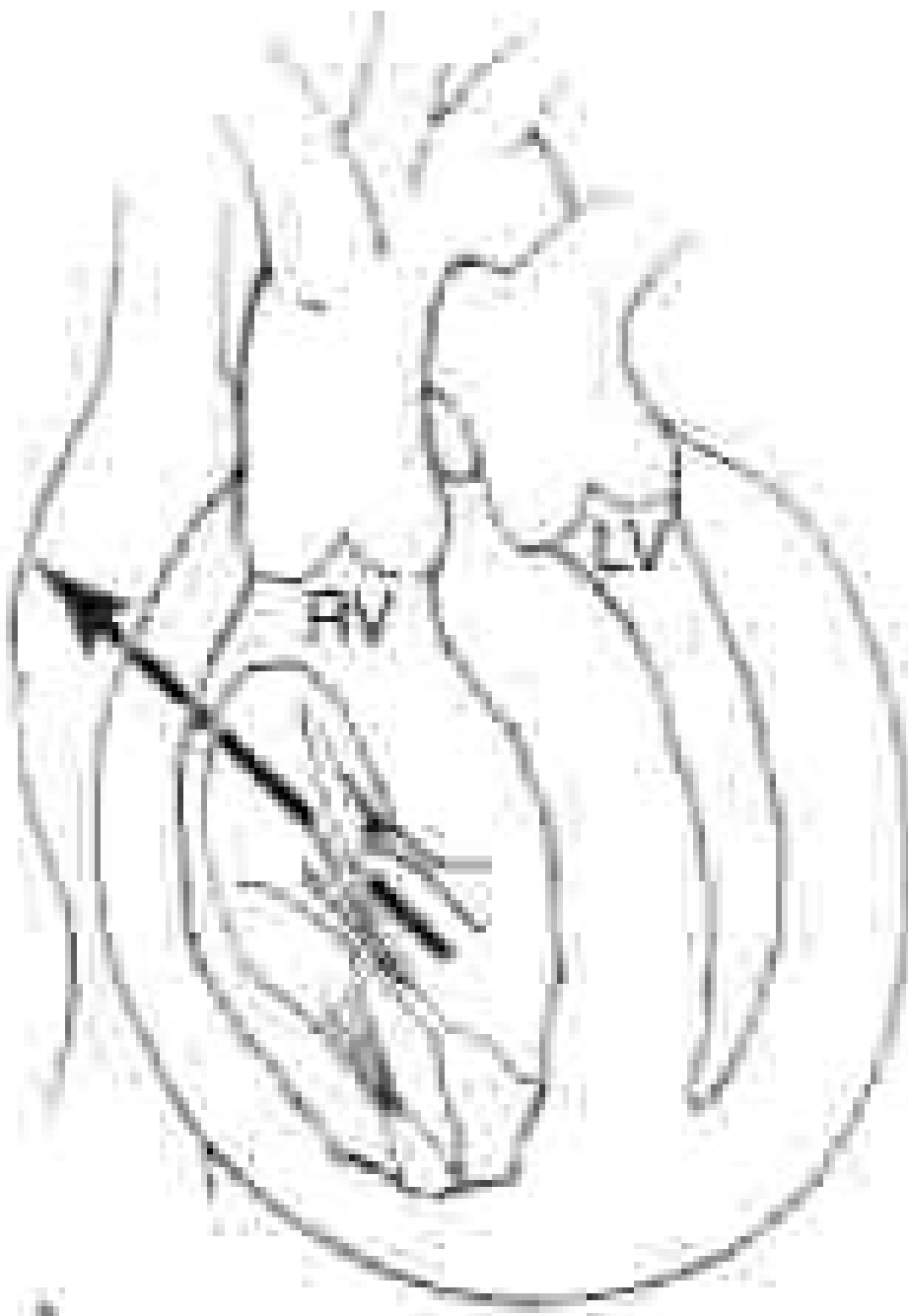
- LVOT
  - Direct resection 어렵다
  - Pulmonary valve 자체도 비정상이다
  - 동반 병변 많다 subvalvar membrane, membranous septal aneurysm, fibrous tissue tag, malalignment of ventricular septum encountered.
- Right ventricular size
  - Small cavity
  - Straddling
- Heart block
  - natural occurrence (5-10% at birth 2% every year)
- Coronary arteries
  - sometimes problematic :refer to morphology
  - technically more difficult

Karl TR, et al. Ann Thorac Surg 1997;64:495-502

# CC-TGA

## PAB=LV preconditioning for anatomic repair

- Role:
  - Preconditioning of LV
  - Leftward shift of vent septum
  - Reduce TR
- Suitability
  - during op :  $P[LV/RV]= 0.9$
  - at DSO :
    - $P[LV/RV] > 0.75\sim 0.8$ , Never under 0.6
    - LV peak pressure rise to isoproterenol test
    - Normal age and weight-indexed LV wall thickness
- Probability of conversion:
  - 40%-100%
- Age at PAB:
  - 5-24y/13m-17y/2.5~17y
- Ages at PAB of failed or waiting patients:
  - 7y, 7.5y, 17y
- Interval:
  - 13d-5y(28m)/ (2.2m)/12m-4.5y



A

B

RV  
LV

# CC-TGA

## Indication for 1&1/2 repair, DSO

- Patient with Glenn shunt for ultimate Fontan
- Later septatable but small RV or minor dysfunctional RV

# CC-TGA

## Indication for Univentricular repair

- Good RV/LV or UV function
- Good TV/MV of AVV function
- Not septatable (straddling etc, criss-cross, hypoplastic one ventricle)
- Normal PVR
- Low PAP

# Pitfalls of Double switch operation

- Benefit of using morphologic LV as a systemic pump is in no doubt.
- Selection criteria are still controversial.
- Technically more challenging.
- Postoperative complications are still many.
- Time-matched long-term outcome with classical repair remains to be answered.
- Reported world-wide total cases are still either too small or followed up too short.

# CC-TGA

## Change of anatomic RV/LV after DSO

		preop	postop	p
• Volume	RV	122%	79%	0.0003
	LV	134%	127%	ns
• EF	RV	56%	56%	ns
	LV	61%	56%	ns

# **Congenitally Corrected Transposition of the Great Arteries**

**Korean Experience  
2008**

# Preoperative Anatomy

## Situs/Inversus

{S,L,L} : 151

{I,D,D} : 27

rt. Isomerism : 1

lt isomerism : 1

no data : 17 (?)

VSD : 160/197 (81.2%)

## Pulmonary outflow tract

None : 54/197 (27.4%)

PS : 87/197 (44.2%)

PA : 56/197 (28.4%)

Preop. BT shunt : 58/197 (29.4%)

# Surgical indications

	All	Conventional	DSO
SNUCH	86	64	22
A	47	39	8
B	15	5	10
C	28	7	21
D	21	19	2
Total	197	134	63

Con : conventional repair

DSO : anatomical repair (double switch operation)

# Surgical indication

Diagnosis	RV as a systemic pump	LV as a systemic pump
No PS		
VSD or ASD	13	19
TR	26	0
PS or PA		
VSD or ASD	95	44
Total	134	63

# Age at operation

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	Mean $\pm$ SD	Range (median)	No
RV	11.7 $\pm$ 16.0	1m ~ 62.7y (4.9y)	134
LV	4.3 $\pm$ 4.8	1m ~ 23.7y (2.4y)	63
All	9.3 $\pm$ 13.9	1m ~ 62.7y (4.1y)	197

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p-value = 0.0005

# Preoperative EchoCG

- TR  $1.16 \pm 1.31$  (0-4, median 1)
  - 0 75/173
  - I 39/173
  - II 26/173
  - III 17/173
  - IV 16/173
- Con  $1.25 \pm 1.43$  (0-4, median 1)
  - 0 51/113
  - I 22/113
  - II 14/113
  - II-III 2/113
  - IV 14/113
- DSO  $0.99 \pm 1.04$  (0-4, median 1)
  - 0 24/60
  - I 17/60
  - II 12/60
  - III 5/60
  - IV 2/60

# Preoperative EchoCG

- RV function
  - good 133/173
  - fair 34/173
  - poor 6/173
- Con
  - good 87/114
  - fair 22/114
  - poor 5/114
- DSO
  - good 46/59
  - fair 12/59
  - poor 1/59

# Preoperative rhythm

• Conventional	9/115 (7.8%)
- CAVB	4
• Intraop PPM	2
- Atrial fibrillation	3
- 2nd degree AV block (Mobitz I)	1
- PSVT	1
• DSO	4/60 (6.7%)
- CAVB	2
• Preop PPM	2
- 2nd degree AV block (Mobitz I)	1
• Preop PPM	1
- PSVT	1

# Operations

Duration	: 1983.3. ~ 2008.2.
Total	: 197 patients
DSO / Anatomic repair	: 63 cases
Atrial + Arterial switch	: 24
Senning ASO	: 15
Mustard ASO	: 9
Atrial switch + Rastelli/REV	: 39
Senning Rastelli	: 17
Mustard Rastelli	: 20
Senning REV	: 1
Mustard REV	: 1
Conventional	: 134 cases
Rastelli	: 54
RVOT widening	: 31
TVR	: 26
VSD closure	: 11
ASD closure	: 3
REV	: 8
AVR	: 1

# Case No & mortality of ccTGA

	Total	Con	DSO
SNUCH	86/71*	64/52*	22/19*
A	47/42*	39/34*	8*
B	15*	5*	10*
C	28*	7*	21*
D	21/19*	19/17*	2*
Total	197/175*	134/115*	63/60*
Op Mortality	20/175(11.4%)	<b>3/115(2.6%)</b>	<b>17/60(28.3%)</b>
Late Mortality	7/155(4.5%)	<b>7/112(6.3%)</b>	<b>0/43(0.0%)</b>
Overall Mortality	27/175(15.4%)	10/115(8.7%)	17/60(28.3%)

\*No of patients whose follow up data are available

# Operative mortality

Total	: 175 patients (22명 FU loss)
<b>DSO</b>	<b>: 17/60 (28.3%)</b>
Atrial + Arterial switch	: 9/23 (39.1%)
Senning ASO	: 6/14 (42.9%)
Mustard ASO	: 3/9 (33.3%)
Atrial switch + Rastelli/REV	: 8/37 (21.6%)
Senning Rastelli	: 4/15 (26.7%)
Mustard Rastelli	: 3/20 (15.0%)
Senning REV	: 0/1 (0.0%)
Mustard REV	: 1/1 (100.0%)
<b>Conventional</b>	<b>: 3/115 (2.6%)</b>
Rastelli	: 1/45 (2.2%)
RVOT widening	: 1/26 (3.9%)
TVR	: 0/23 (0.0%)
VSD closure	: 1/10 (10.0%)
ASD closure	: 0/3 (0.0%)
REV	: 0/7 (0.0%)
AVR	: 0/1 (0.0%)
<b>All</b>	<b>: 20/175 (11.4%)</b>

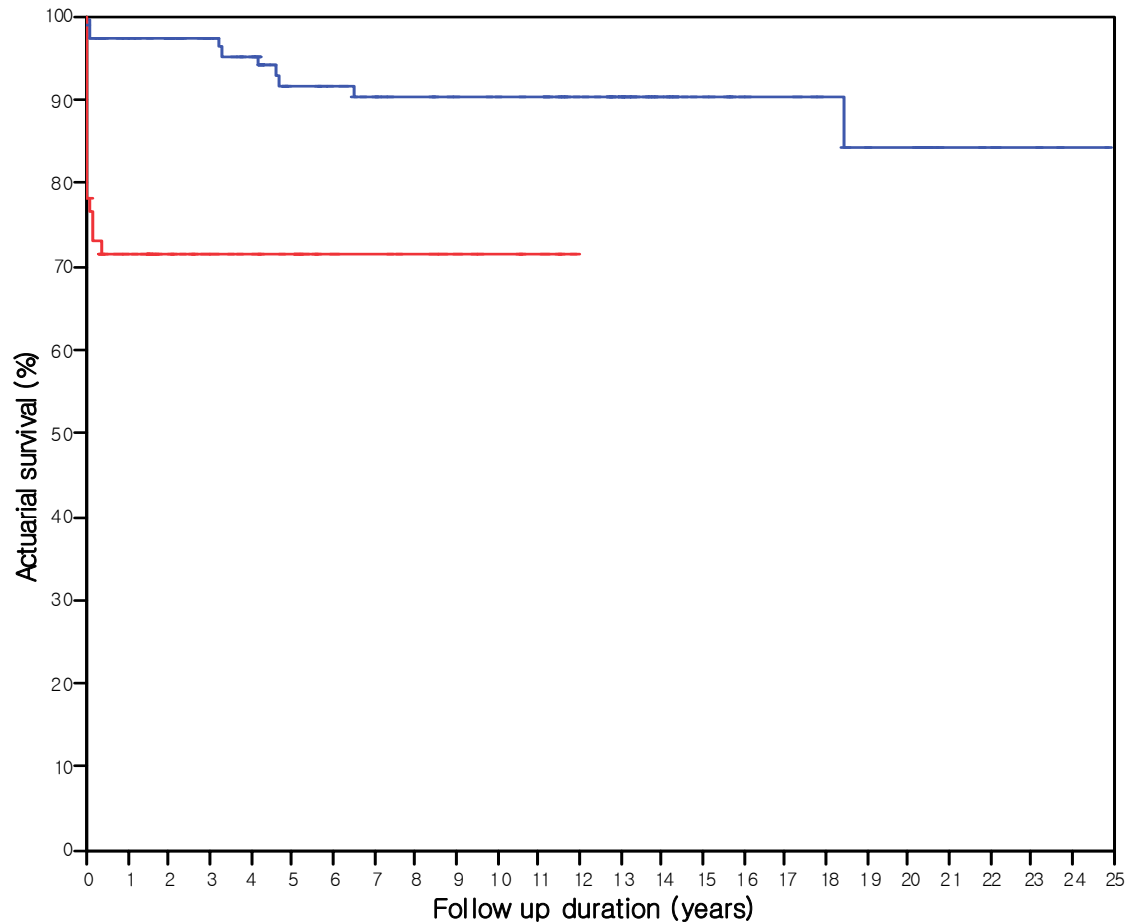
# Late mortality

Total	: 155 patients
DSO	: 0/43 (0.0%)
Atrial + Arterial switch	: 0/14 (0.0%)
Senning ASO	: 0/8 (0.0%)
Mustard ASO	: 0/6 (0.0%)
Atrial switch + Rastelli/REV	: 0/29 (0.0%)
Senning Rastelli	: 0/11 (0.0%)
Mustard Rastelli	: 0/17 (0.0%)
Senning REV	: 0/1 (0.0%)
Conventional	: 7/112 (6.3%)
Rastelli	: 3/44 (6.8%)
RVOT widening	: 2/25 (8.0%)
TVR	: 1/23 (4.4%)
VSD closure	: 1/9 (11.1%)
ASD closure	: 0/3 (0.0%)
REV	: 0/7 (0.0%)
AVR	: 0/1 (0.0%)
All	: 7/155 (4.5%)

# Causes of mortality

DSO/Anatomic repair	
Op mortality	17
LCOS	13
Arrhythmia	1
Resp arrest	1
Cerebral infarction	1
Infection	1
Late mortality	0
Conventional	
Op mortality	3
LCOS	1
Arrhythmia	1
DIC	1
Late mortality	7
Heart failure	3
Arrhythmia	2
Ventricular dysfunction	1
Thromboembolism	1

# Actuarial Survival



- **Conventional Repair**
  - 97.4±1.5% at 1Y
  - 90.3±3.1% at 10Y
  - 84.3±6.5% at 25Y
- **Anatomical Repair**
  - 71.5±5.9% at 1Y,
  - 71.5±5.9% at 12Y
- **p=0.001**

# Risk factors for mortality

## Cox proportional hazard model (1)

	Uni	Multi	Hazard ratio	95% CI
PS	0.650	0.446		
PA	0.108	0.094		
VSD	0.807	0.230		
Shunt	0.972	0.877		
Double switch	0.004	0.863		
TR	0.744	0.874		
RV function	0.186	0.290		
Age	0.268	0.523		
CPB time	0.001	0.001	1.005	1.003-1.008
ACC time	0.016	0.411		
Arrhythmia	0.157	0.257		

## Risk factors for mortality Cox proportional hazard model (2)

	Uni	Multi	Hazard ratio	95% CI
PS	0.724	0.724		
PA	0.118	0.041	0.276	0.080-0.948
VSD	0.837	0.705		
Double switch	0.003	0.002	4.635	1.773-12.113
TR	0.694	0.871		
RV function	0.209	0.141		
Age	0.278	0.525		
ACC time	0.014	0.974		
Arrhythmia	0.150	0.223		

In this analysis, CPB time was excluded

## Risk factors for mortality in double switch Cox proportional hazard model

	Uni	Multi	Hazard ratio	95% CI
PS	0.396	0.997		
PA	0.025	0.134		
VSD	0.023	0.216		
TR	0.123	0.651		
RV function	0.001	0.002	2.378	1.364-4.146
Preop shunt	0.409	0.951		
Preop PAB	0.295	0.350		
Age	0.190	0.808		
ASO/Rastelli	0.111	0.092		
Senning/Mustard	0.467	0.428		
BCPS	0.028	0.067	0.149	0.020-1.141
ACC time	0.913	0.771		
Arrhythmia	0.549	0.715		
CAVB	0.416	0.225		

# Survivors vs nonsurvivors in double switch(1)

	Survivors (n=43)	Non (n=17)	p-value
<b>PS/PA</b>			<b>0.03</b>
No	11/43 (25.6%)	7/17 (41.2%)	
PS	12/43 (27.9%)	8/17 (47.1%)	0.16
<b>PA</b>	<b>20/43 (46.5%)</b>	<b>2/17 (11.8%)</b>	<b>0.01</b>
VSD	41/43 (95.4%)	14/17 (82.4%)	0.10
<b>Preop. RV fx</b>			<b>0.04</b>
good	36	10	
fair to good	4	2	
fair	3	3	
poor	0	1	
Preop. TR	0.91 ± 1.00 (0-4, med : 1)	1.21 ± 1.12 (0-4, med : 1)	0.32
Preop shunt	18/43 (41.9%)	4/17 (23.5%)	0.18

# Survivors vs nonsurvivors in double switch(2)

	Survivors (n=43)	Non (n=17)	p-value
Preop PAB	12/43 (27.9%)	6/17 (35.3%)	0.57
Age (Y)	3.98 ± 4.21 (0.37-18.95, med : 2.27)	5.61 ± 6.24 (0.07-23.69, med : 4.72)	0.24
<b>CPB time</b>	<b>304.9 ± 91.9</b> (131-531, med : 280)	<b>450.4 ± 215.0</b> (186-858, med : 415)	<b>0.001</b>
ACC time	180.2 ± 51.9 (102-327, med : 178)	185.1 ± 59.6 (109-302, med : 168)	0.76
Atrial switch			0.39
Senning	20/43 (46.5%)	10/17 (58.8%)	
Mustard	23/43 (53.5%)	7/17 (41.2%)	
ASO/Rastelli	14:29	9:8	0.14
VSD extension	0/43 (0.0%)	1/17 (5.9%)	0.11
<b>BCPS</b>	<b>16/43 (37.2%)</b>	<b>2/17 (11.8%)</b>	<b>0.05</b>
CAVB	4/43 (9.3%)	3/17 (17.7%)	0.36
Periop Arrhythmia	10/43 (23.3%)	4/17 (23.5%)	0.98

# Postoperative complication

• Conventional repair	36/115 (31.3%)
- AV block	14
• Postop. complete AV block requiring PPM	11
- Postoperative bleeding	1
• Postop. transient AV block	3
- PSVT	2
- Complete AV block, postop TR requiring TVR	1
- Af, postoperative bleeding	1
- Transient Af, AF	1
- Af	1
- Wound problem	5
- Chylothorax	3
• Transient seizure	1
- Postoperative bleeding	3
- Pericardial effusion	3
• Pericardiostomy	2
- ARDS-tracheostomy	1
- Diaphragmatic plication for palsy	1

# Postoperative complication

• DSO	21/60 (35.0%)
- Arrhythmia	5
• Postop. complete AV block requiring PPM	3
• Atrial flutter	1
• Vtac	1
- SVC syndrome (BCPS take down)	2
- Chylothorax	2
• Pericardial effusion	1
- Neurologic complication-bedridden	1
- Cerebral infarction, Postop. bleeding	1
- LCOS	1
- ARF, mustard baffle stenosis	1
- LVOTO, RV dysfunction, Chylothorax	1
- Pulm vein stenosis	1
- Postpericardiotomy syndrome, Transient LV dysfunction	1
- Diaphragmatic palsy, wound dehiscence	1
- Prolonged pleural effusion	1
- Wound infection, Pleural effusion	1
- Delayed sternal closure, Pneumothorax	1
- Pneumonia, Pericardial effusion	1

# Postoperative CAVB

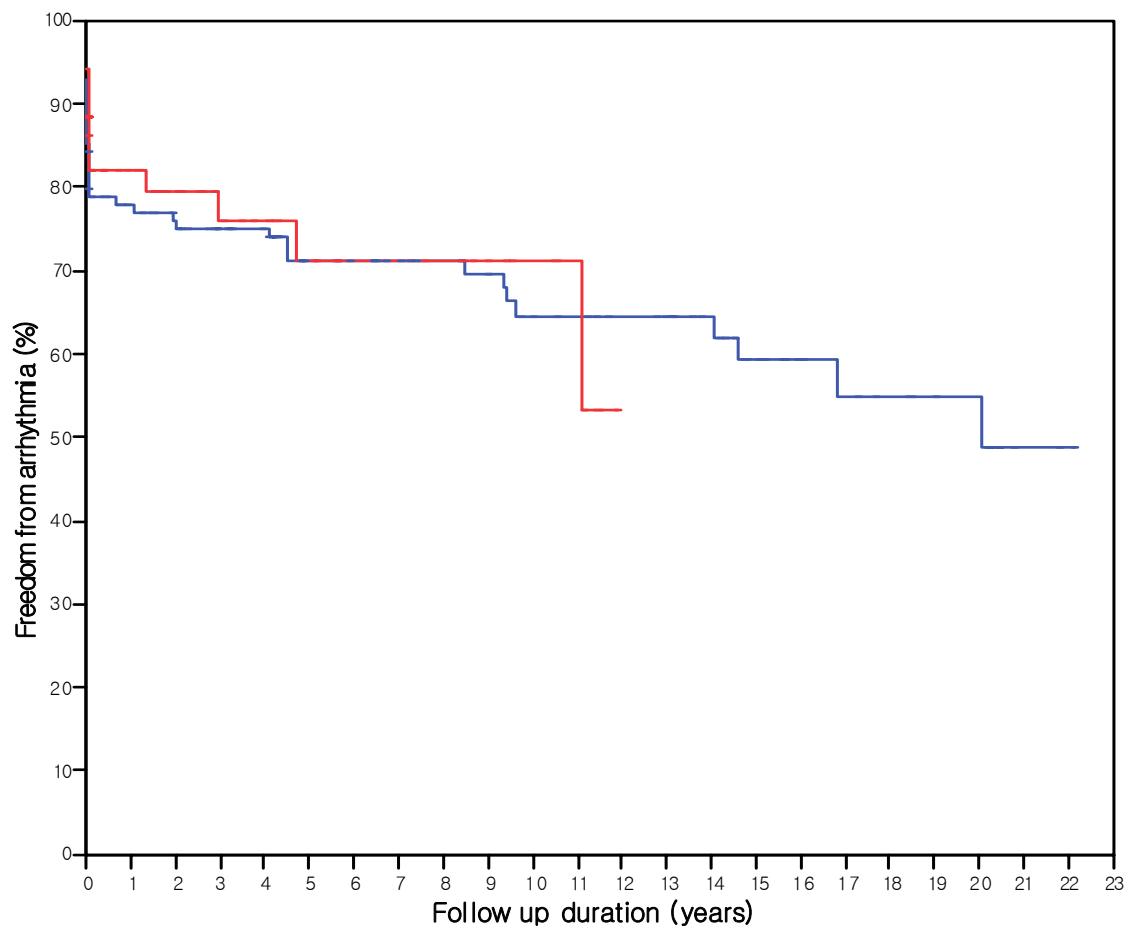
	Preop CAVB	Postop CAVB	No
RV	4	26(22.6%)	115
LV	3	4(6.7%)	60
<i>p</i> -value	0.63	0.008	

CAVB=complete atrioventricular block

# Arrhythmia during FU

• Postop. arrhythmia	49/175 (28.0%)	
• <b>Conventional</b>	<b>37/115 (32.2%)</b>	<div style="border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;"> <p><i>p</i>-value : 0.14</p> </div>
- Complete AV block	27	
• PPM	24	
- + SND, VTac	1	
- + SND, ICD for VF	1	
- + Af, AFL	1	
• + SVT	1	
- Af	6	
• +AFL+PSVT	1	
• +AFL	1	
- PSVT	4	
• <b>DSO</b>	<b>13/60 (21.7%)</b>	
- Complete AV block	5	
• PPM	5	
- + AFL	1	
- AFL	2	
- AFL+PSVT	2	
- VTac	1	
- PSVT	1	
- 1 degree AV block	1	

# Freedom from Arrhythmia



- **Conventional Repair**
  - 78.0±3.9% at 1Y
  - 71.3±4.4% at 5Y
  - 64.6±5.1% at 10Y
  - 55.0±6.9% at 20Y
  - 48.9±8.4% at 22Y
- **Anatomical Repair**
  - 82.1±5.2% at 1Y
  - 71.2±7.6% at 5Y
  - 71.2±7.6% at 10Y
  - 53.4±16.4% at 12Y
- p=0.86

## Risk factors for Arrhythmia Cox proportional hazard model

	Uni	Multi	Hazard ratio	95% CI
PS	0.297	0.718		
PA	0.252	0.736		
VSD	0.158	0.965		
Shunt	0.160	0.510		
Double switch	0.596	0.820		
TR	0.006	0.008	1.379	1.089-1.745
RV function	0.155	0.762		
Age	0.035	0.552		
CPB time	0.828	0.523		
ACC time	0.623	0.480		
Reoperation	0.711	0.323		

# Reoperation

- Conventional repair

- Conduit change
  - TVR
    - MVP
      - » PA angioplasty
    - PA angioplasty
    - AVP
  - TVP, PA angioplasty
  - RVOT widening, PA angioplasty
  - PPM
  - LVOT widening
  - TVP
  - ICD
- TVR
  - PPM
  - PVR, RVOT widening, PPM
  - PVR, PPM
  - PVR, MAP
  - AVR
  - MVR
  - PA angioplasty
  - Maze
- PPM implantation
  - RVOT widening
- PVR
- TVP, RVOT widening
- TAP, BCPS
- PA angioplasty

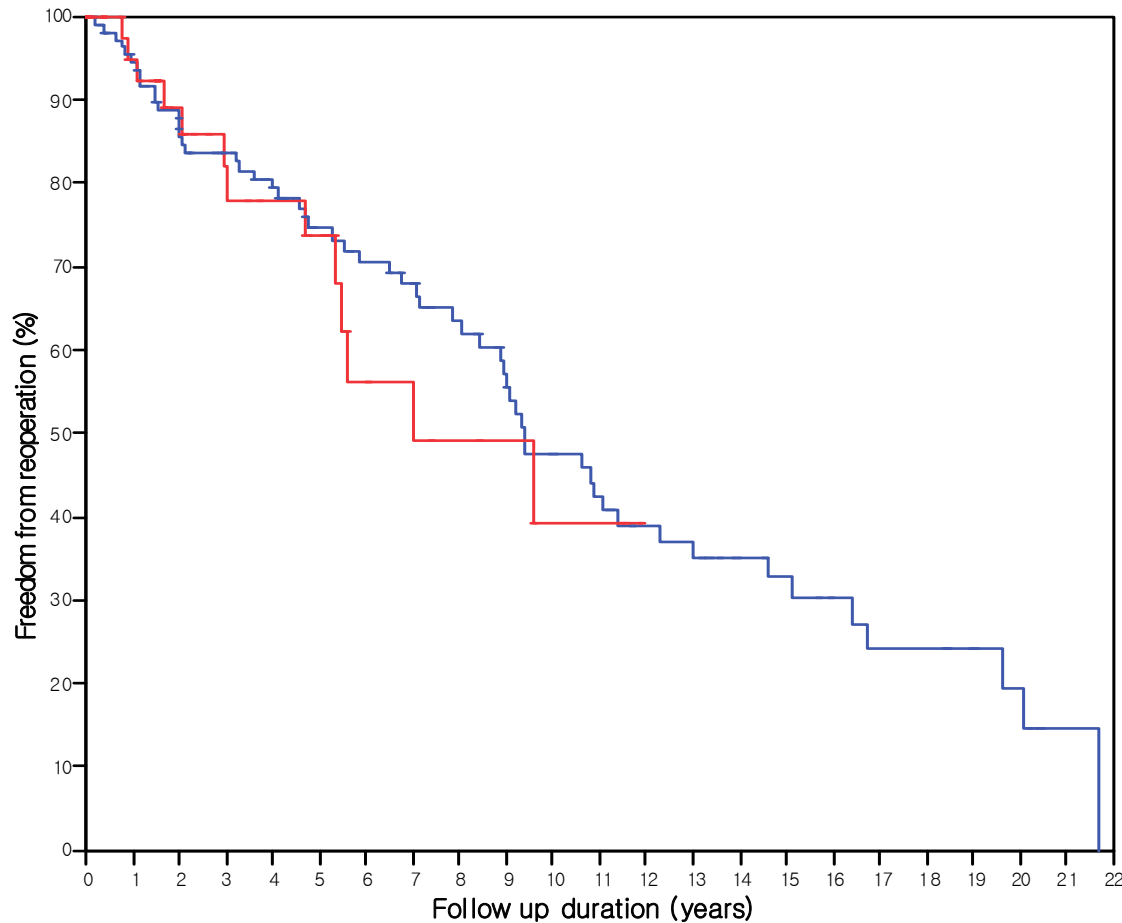
57/112 (50.9%)

29  
8  
2  
1  
1  
2  
2  
1  
1  
1  
1  
1  
1  
15  
2  
1  
1  
1  
1  
1  
1  
1  
6  
1  
4  
1  
1  
1

# Reoperation

- DSO 13/43 (30.2%)
  - Conduit change 11
    - TVR, Gore-Tex patch widening of neo LA wall 1
    - Mustard pathway widening, LVOT widening 1
    - Mustard rebaffling, LA patch widening 1
    - Pulmonary vein patch widening 1
    - Subaortic membrane resection, PA angioplasty 1
    - Subaortic membrane resection, aortic sinus reduction 1
    - PA angioplasty 1
  - PVR, RVOT widening, pulmonary venous pathway widening, LVOT widening (modified Konno), PPM 1
  - Intimal peel excision and Neo-LA reconstruction d/t pulmonary venous pathway stenosis 1

# Freedom from Reoperation



- **Conventional Repair**
  - $94.4 \pm 2.2\%$  at 1Y
  - $74.6 \pm 4.4\%$  at 5Y
  - $47.5 \pm 5.9\%$  at 10Y
  - $19.3 \pm 6.6\%$  at 20Y
  - $0.0 \pm 0.0\%$  at 25Y
- **Anatomical Repair**
  - $94.9 \pm 3.5\%$  at 1Y
  - $73.7 \pm 8.3\%$  at 5Y
  - $39.3 \pm 12.8\%$  at 10Y
  - $39.3 \pm 12.8\%$  at 12Y
- $p=0.67$

## Risk factors for Reoperation Cox proportional hazard model

	Uni	Multi	Hazard ratio	95% CI
PS	0.236	0.155		
PA	0.001	0.001	3.783	1.974-7.249
VSD	0.030	0.227		
Shunt	0.029	0.090		
Double switch	0.669	0.520		
TR	0.117	0.748		
RV function	0.599	0.763		
Age	0.179	0.911		
CPB time	0.507	0.697		
ACC time	0.744	0.281		
Arrhythmia	0.247	0.322		

# NYHA Last FU

- Duration
    - Con 10.1 ± 6.6 years (3 days - 24.9 years. Median : 11.2 years)
    - DSO 4.9 ± 3.7 years (22 days - 11.9 years. Median : 4.1 years)
  - NYHA Fc
    - Con
      - I 94/105 (87.8%)
      - II 10/105 (10.2%)
      - III 1/105 (2.0%)
    - DSO
      - I 40/43 (92.9%)
      - II 1/43
      - Bedridden for neurologic damage 1
      - Hypoxic brain damage 1
- ] p-value : 0.51

# RV function - last follow up

## Con

- Follow up duration  $9.9 \pm 6.6$  years (8 days - 24.0 years. Median : 10.9 years)
  - RV function
    - Good 44/104
    - Fair 44/104
    - Poor 16/104
  - TR :  $1.89 \pm 1.23$  (0-4, median 1.5)
    - s/p TVR 19/104
    - 0 8/104
    - I 24/104
    - II 29/104
    - III 8/104
    - IV 16/104

vs Preop TR  
 $1.25 \pm 1.43$  (0-4,  
median 1)  
p-value=0.001

# LV/RV function -Last Follow up DSO

- Follow up duration  $4.5 \pm 3.8$  years (0 - 11.5 years. Median : 3.7 years)
  - RV function
    - Good 38/43
    - Fair 5/43
  - TR :  $0.84 \pm 0.90$  (0-3, median 1)
    - 0 18/43
    - I 16/43
    - II 5/43
    - III 4/43

vs Preop TR  $0.99 \pm 1.04$  (0-4, median 1)  
p-value=0.43
  - LV function
    - good 36/43
    - Fair 7/43
  - MR :  $0.64 \pm 0.71$  (0-2, median 0)
    - 0 22/43
    - I 11/43
    - II 11/43

# Arrhythmia-Last Follow up

- Duration
  - Con 10.1 ± 6.6years (3 days - 24.9 years. Median : 11.2 years)
  - DSO 4.9 ± 3.7 years (22 days - 11.9 years. Median : 4.1 years)
- Rhythm
  - Con
    - Sinus 76/105 (73.5%)
    - intermittent PSVT 2
    - Pacing 25/105 (22.5%)
    - Af 4/105 (4.1%)
  - DSO
    - Sinus 39/43 (92.9%)
    - Pacing 4/43 (7.1%)

p-value : 0.015

# DSO-Message (1)

## 1. Wishful optimism:

- LV as a pump (minus alpha)

## 2. Situation:

- Too high op. mortality - no improvement
- Shorter FU
- Systemic ventricular function good

## 3. Selection failure:

- Good LV/MV as well as good RV/TV
- Early-stage progressive TR  
before irreversible RV dysfunction

## DSO-Message (2)

### 4. Op :

- Inborn problems of septation of limited space
- Leakage problem
- Long operation time
- Arrhythmia
- Inevitable redo

### 5. Long-term(?) FU:

- Excellent LVF/RVF
- MRG2
- TR no change
- Arrhythmia free 10y(48.9% vs 71.2% p=0.86)
- Reop free 10y(47.5% vs 39.3% p=0.64)

## DSO-Message (3)

### 6. Position:

- DSO with selection
- Skill is not risk factor
- Other option is still open.