

Neonate with Severe Aortic Stenosis, Dysplastic AV, LV Mild Dysfunction

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SEOUL NATIONAL UNIVERSITY
HOSPITAL

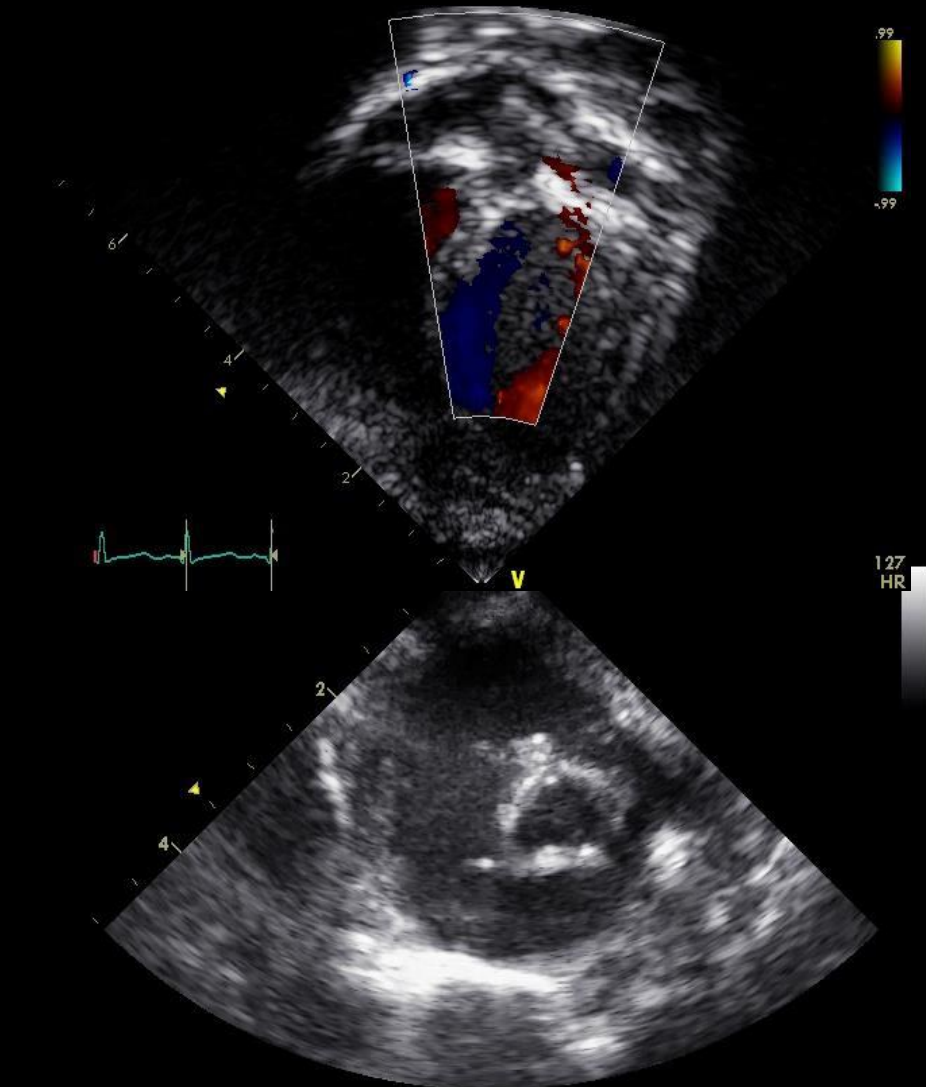
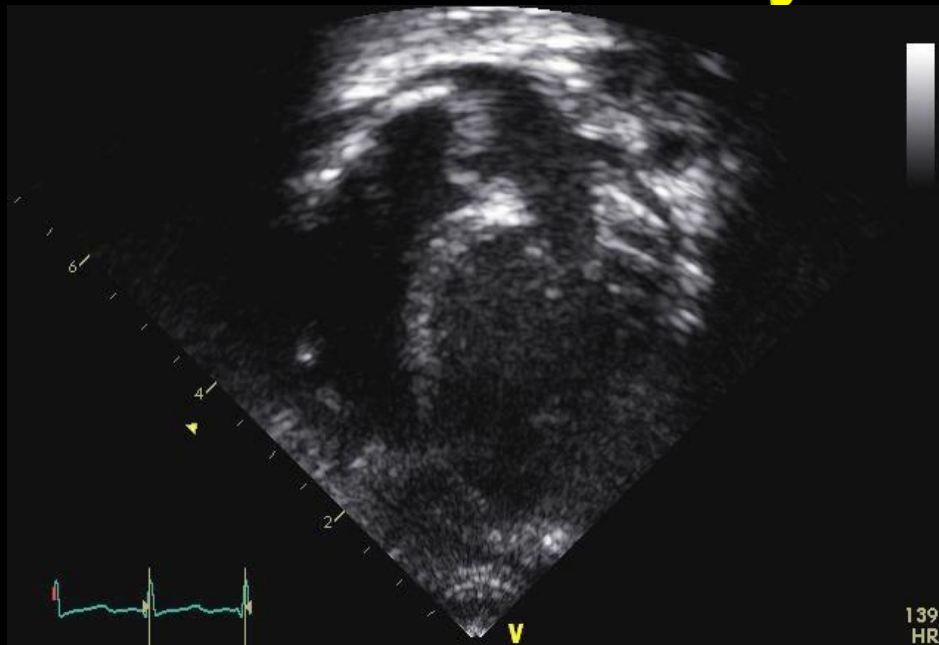
What option for this baby?

**Neonate with Severe Aortic
Stenosis, Dysplastic AV, LV Mild**

Dysfunction

- **Several considering points!**
 - Patient's general condition
 - Valve morphology
 - Each center's clinical competence
 - surgical vs catheter-intervention
 - Technical advancement in both field

Neonate with Severe Aortic Stenosis, Dysplastic AV, LV Mild Dysfunction

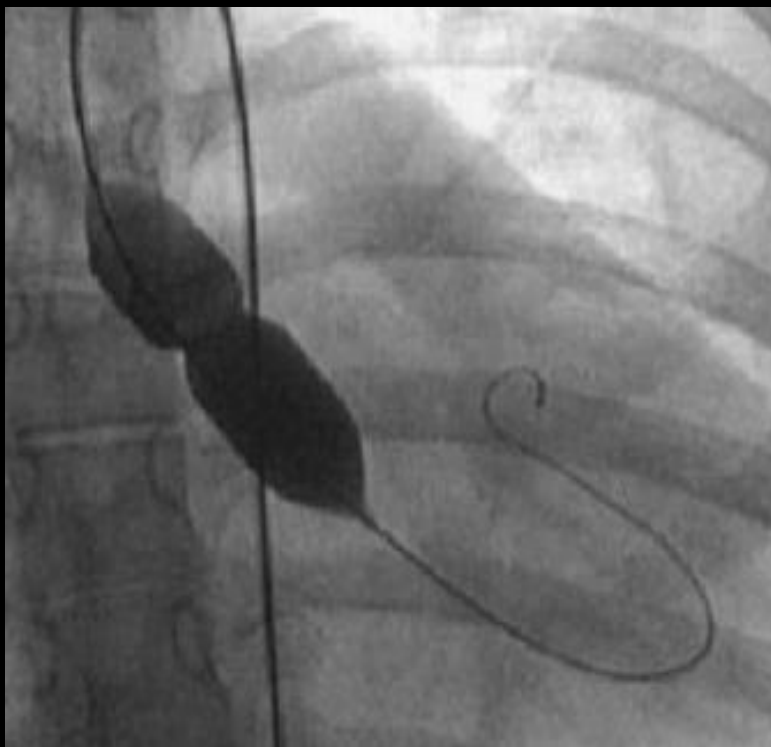


GA 37+4wks, 1840g

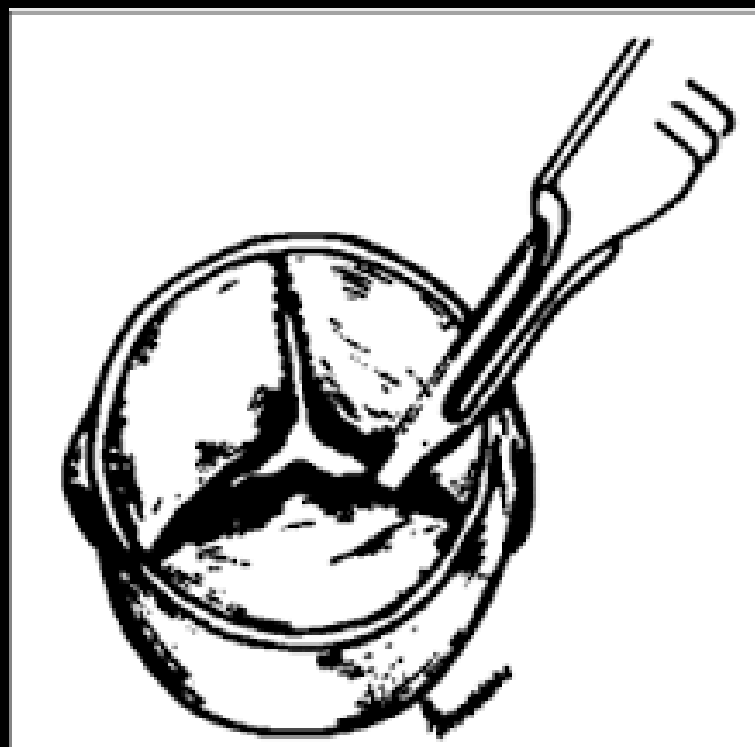
- 3.2 kg, Severe AS
- peak velocity: 5.14 m/s
- peak PG: 105.49 mmHg
- LV EF: about 50%

What option for this baby?

①



②



What option for this baby?

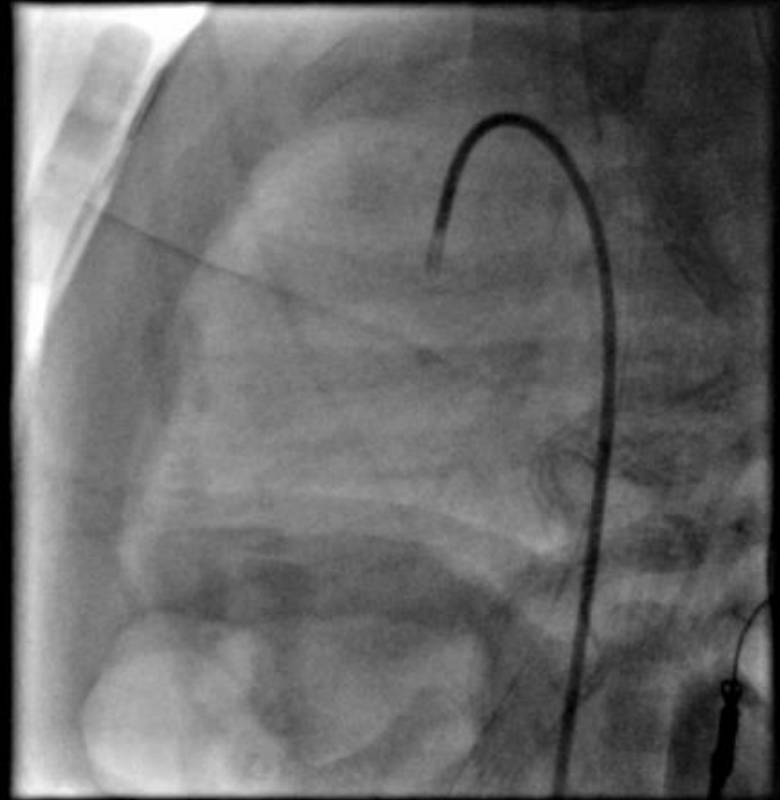
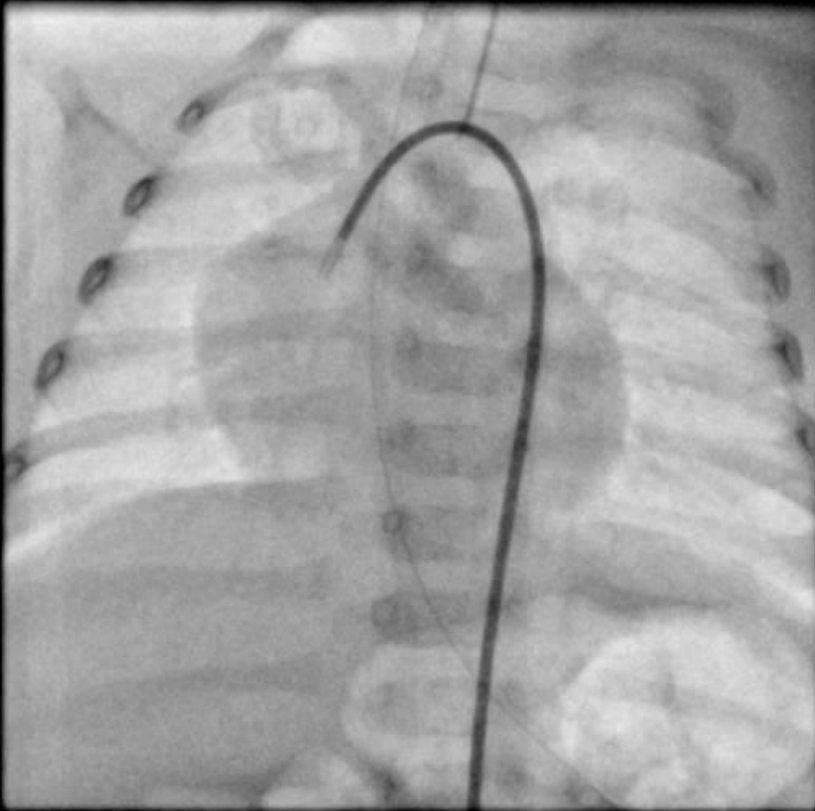


Recommendation in the textbook?

- For the neonate or young infant where the left ventricle is deemed adequate to support the systemic circulation, **balloon dilatation** of left ventricular outflow tract has become the mainstay of initial therapy. (Pediatric Cardiology, 3rd edition)
- With the development of **low-profile balloons and smaller catheters** that cause less injury to peripheral arteries, **balloon valvuloplasty has become the procedure of choice** even in the neonatal period. Surgical treatment is usually reserved for stenotic aortic valves that are not amenable to balloon therapy, generally those that are extremely thickened, or in patients who also have subvalvar or supra-valvar stenosis. (Nelson, 18th edition)

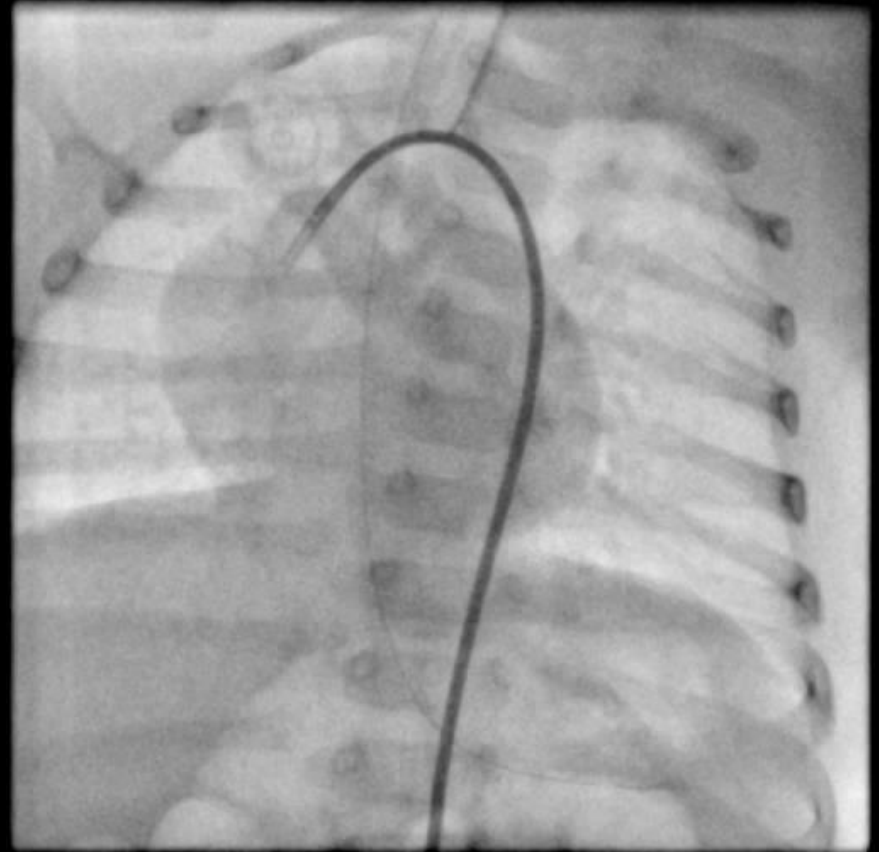
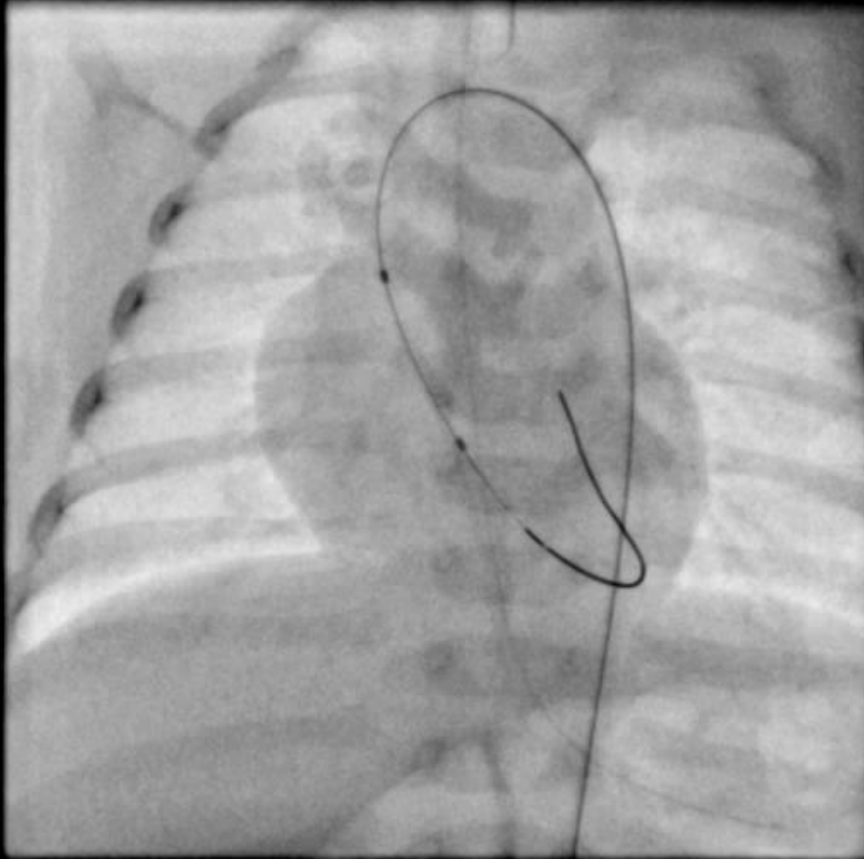
Previous patient

- Balloon aortic valvuloplasty -



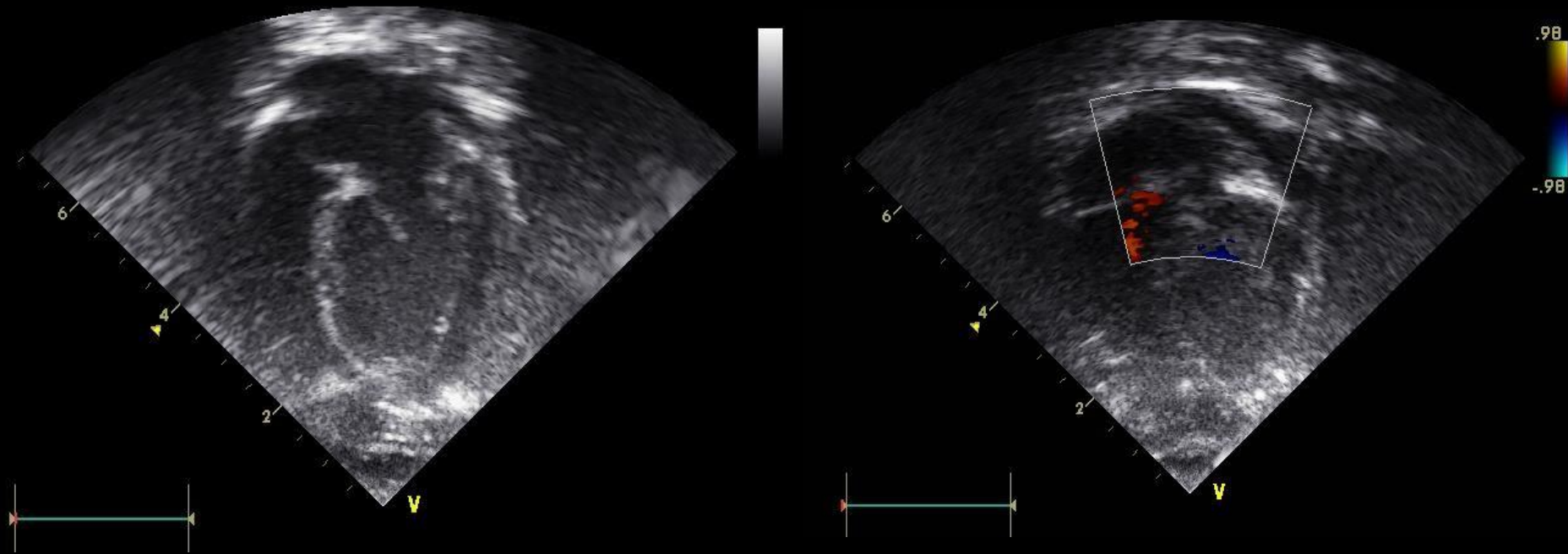
- **LV pressure: 155 (17) mmHg, Ao. pressure: 62/39/49 mmHg**
- peak PG: **93 mmHg**

Balloon aortic valvuloplasty with 6 mm Sterling balloon (14 ATM), 4 Fr. sheath



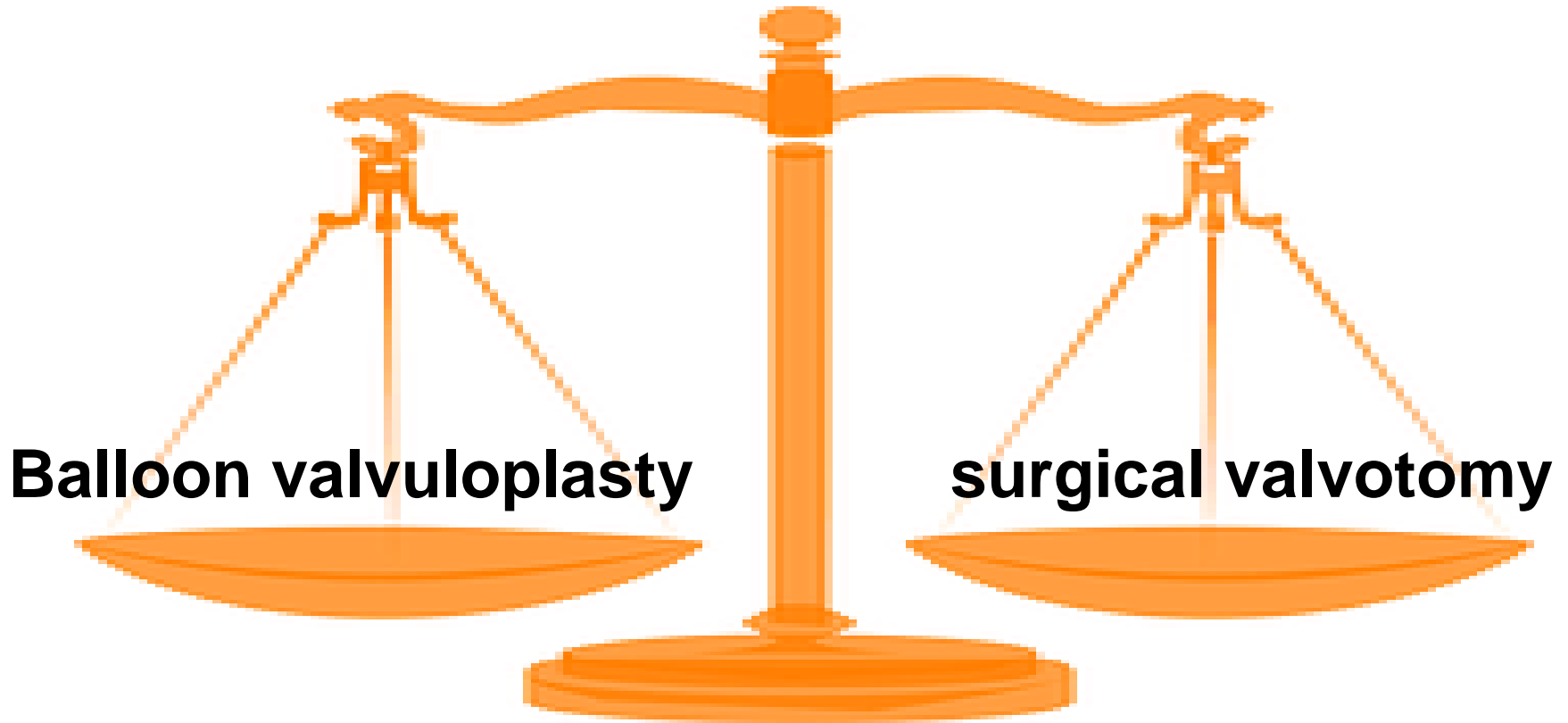
- LV pressure: 128 (12) mmHg, Ao. pressure: 74/47/57 mmHg
- peak PG: 54 mmHg

After balloon aortic valvuloplasty



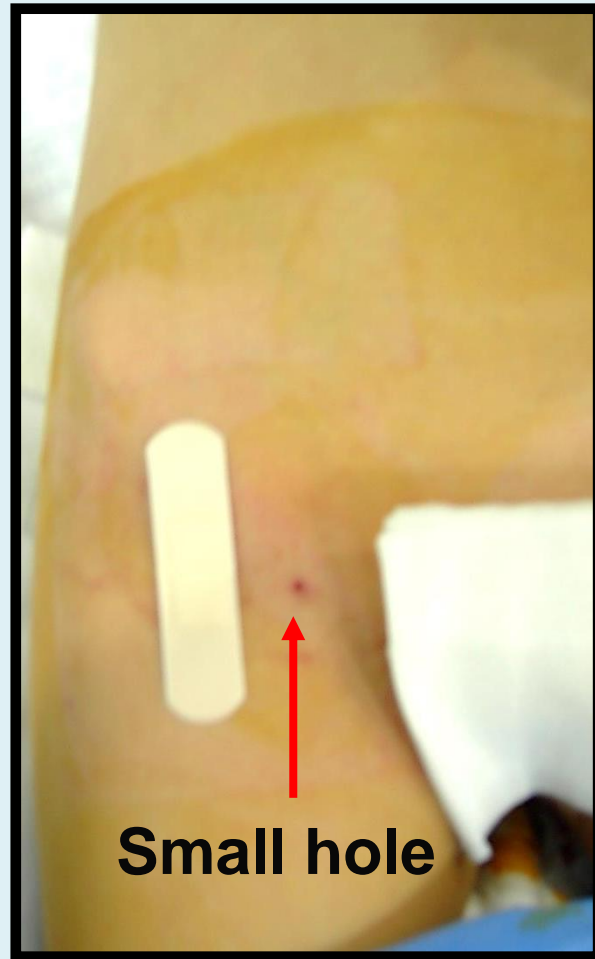
moderate to severe AS
- peak velocity: 3.78 m/s
- peak PG: 57 mmHg

What options would be better in this patient?



- **No randomized clinical trial**
- **Several retrospective single institutional report**
 - **Morbidity and Mortality, reintervention rate,**
 - **degree of AR, surgical AVR, etc**

Minimal invasiveness is very important in the treatment of disease !

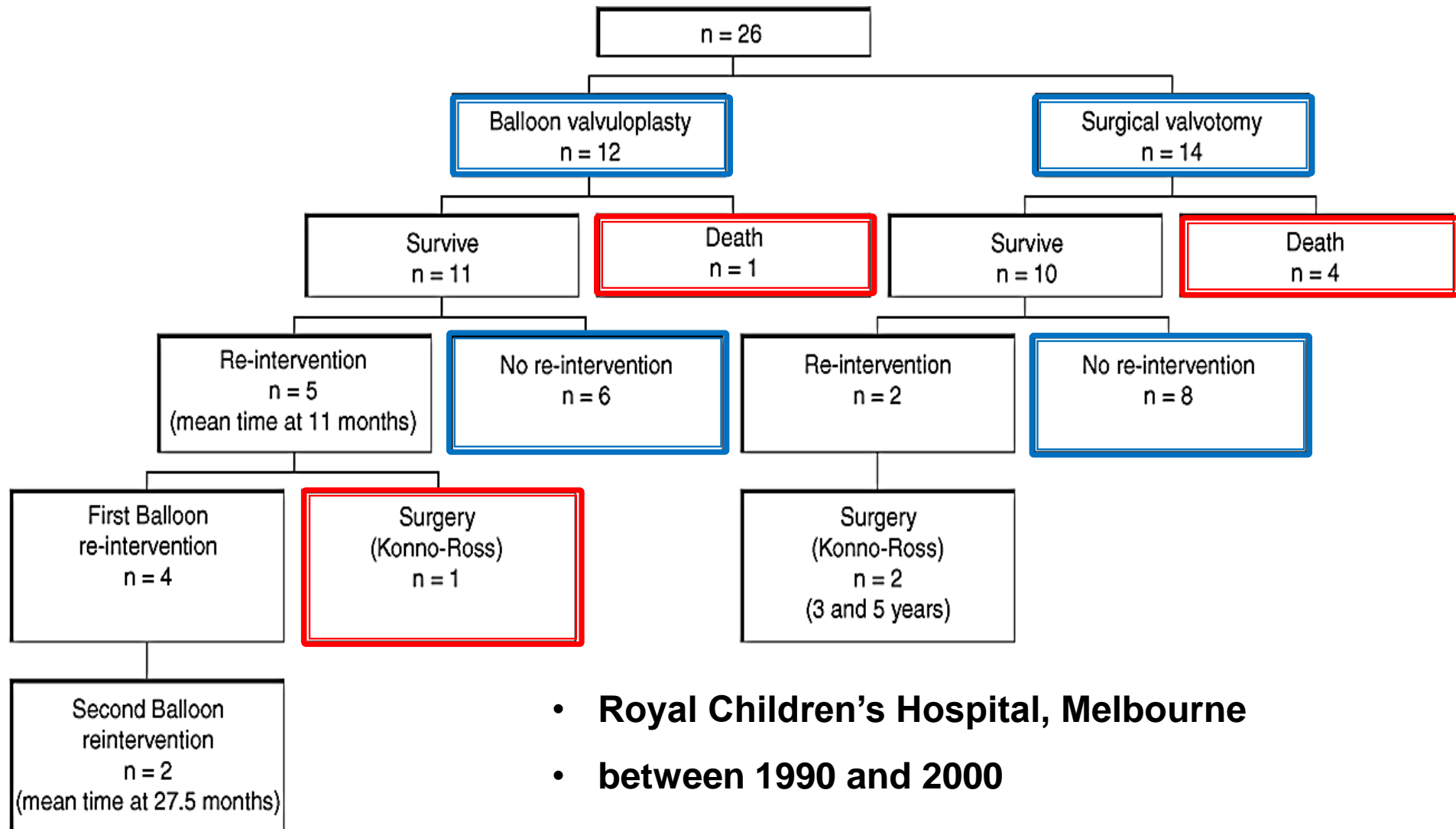


Balloon valvuloplasty



Surgical valvotomy

Neonatal Isolated Critical Aortic Valve Stenosis: Balloon Valvuloplasty or Surgical Valvotomy[☆]



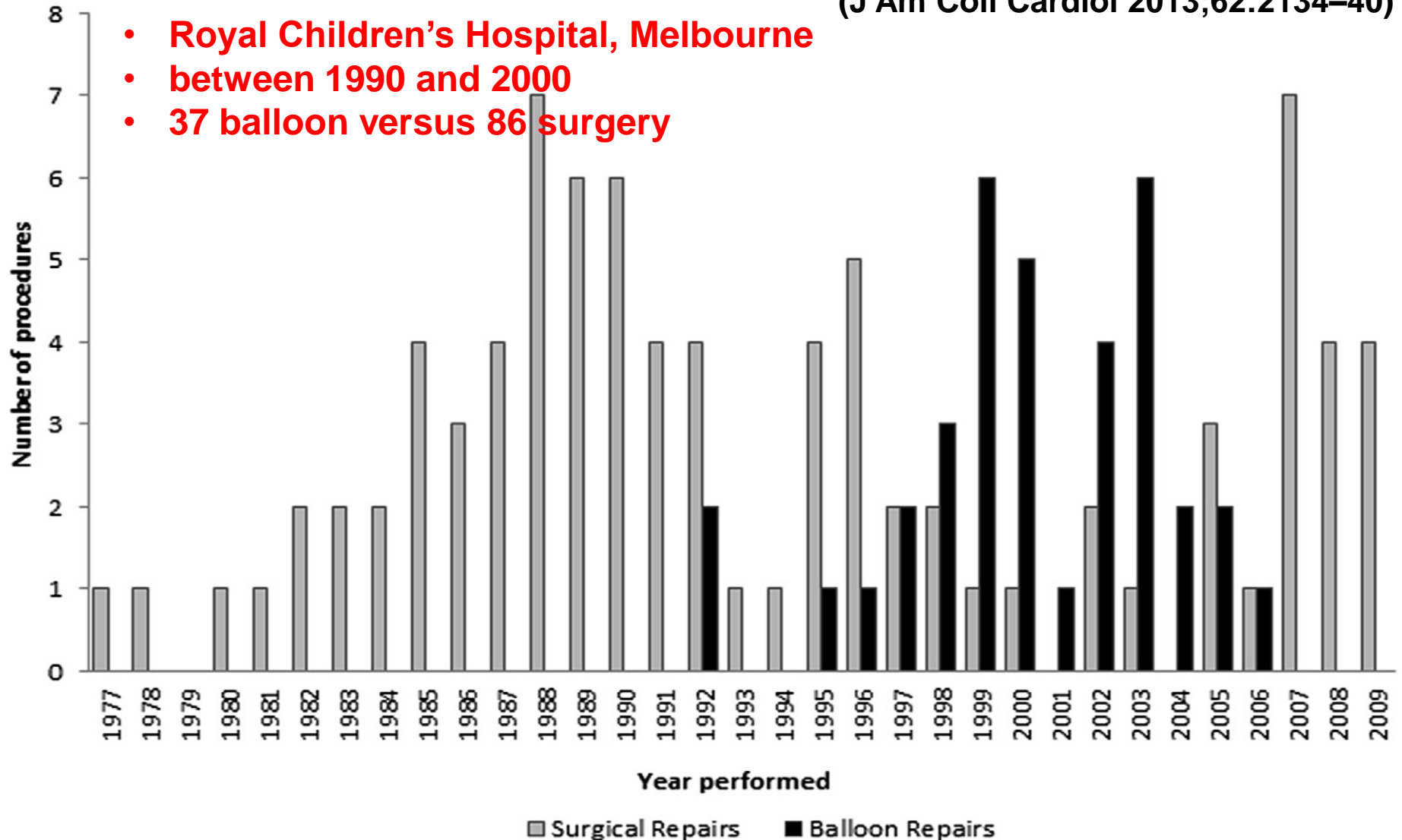
- Royal Children's Hospital, Melbourne
- between 1990 and 2000

(Heart Lung and Circulation 2006;15:18–23)

Surgical Valvotomy and Repair for Neonatal and Infant Congenital Aortic Stenosis Achieves Better Results Than Interventional Catheterization

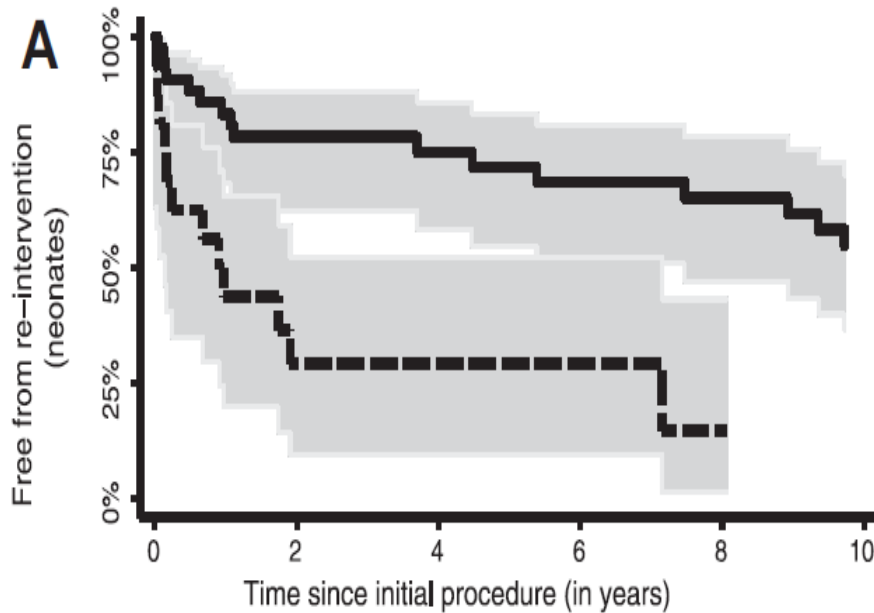
(J Am Coll Cardiol 2013;62:2134–40)

- Royal Children's Hospital, Melbourne
- between 1990 and 2000
- 37 balloon versus 86 surgery



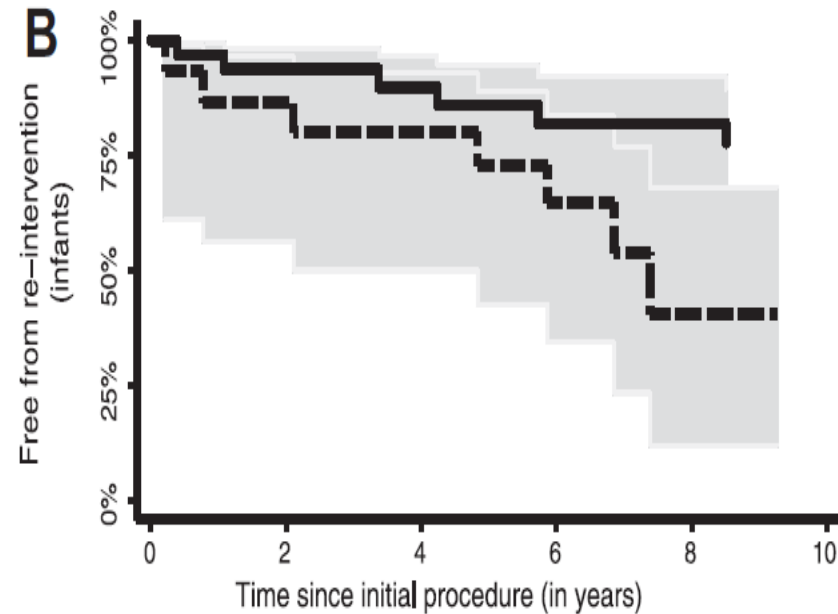
Surgical Valvotomy and Repair for Neonatal and Infant Congenital Aortic Stenosis Achieves Better Results Than Interventional Catheterization

(J Am Coll Cardiol 2013;62:2134–40)



# at Risk (# Fail)	0	1	2	3	4	5	6	7	8	9	10
Surgery	44 (9)	26 (1)	23 (2)	21 (1)	19 (3)	16					
Balloon Valv.	16 (11)	4 (0)	3 (0)	2 (1)	1 (0)	0					

— Surgery - - - Balloon Valvuloplasty 95% CI



# at Risk (# Fail)	0	1	2	3	4	5	6	7	8	9	10
Surgery	38 (2)	27 (1)	23 (2)	20 (0)	20 (1)	19					
Balloon Valv.	16 (2)	13 (1)	11 (2)	7 (2)	3 (0)	1					

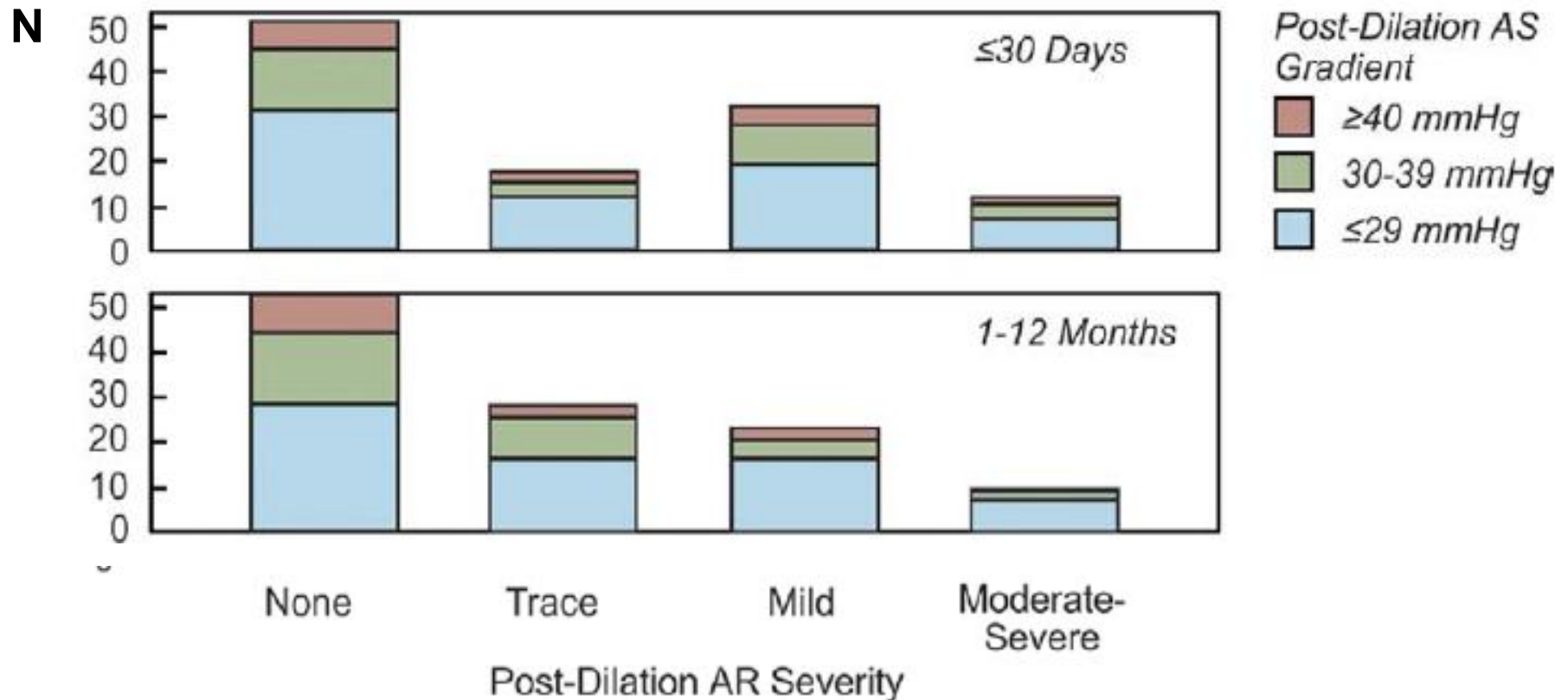
— Surgery - - - Balloon Valvuloplasty 95% CI

Additional surgical procedures: resection of nodular dysplasia, thinning of the leaflets, re-creation of interleaflet triangles, and the creation of neocommissures

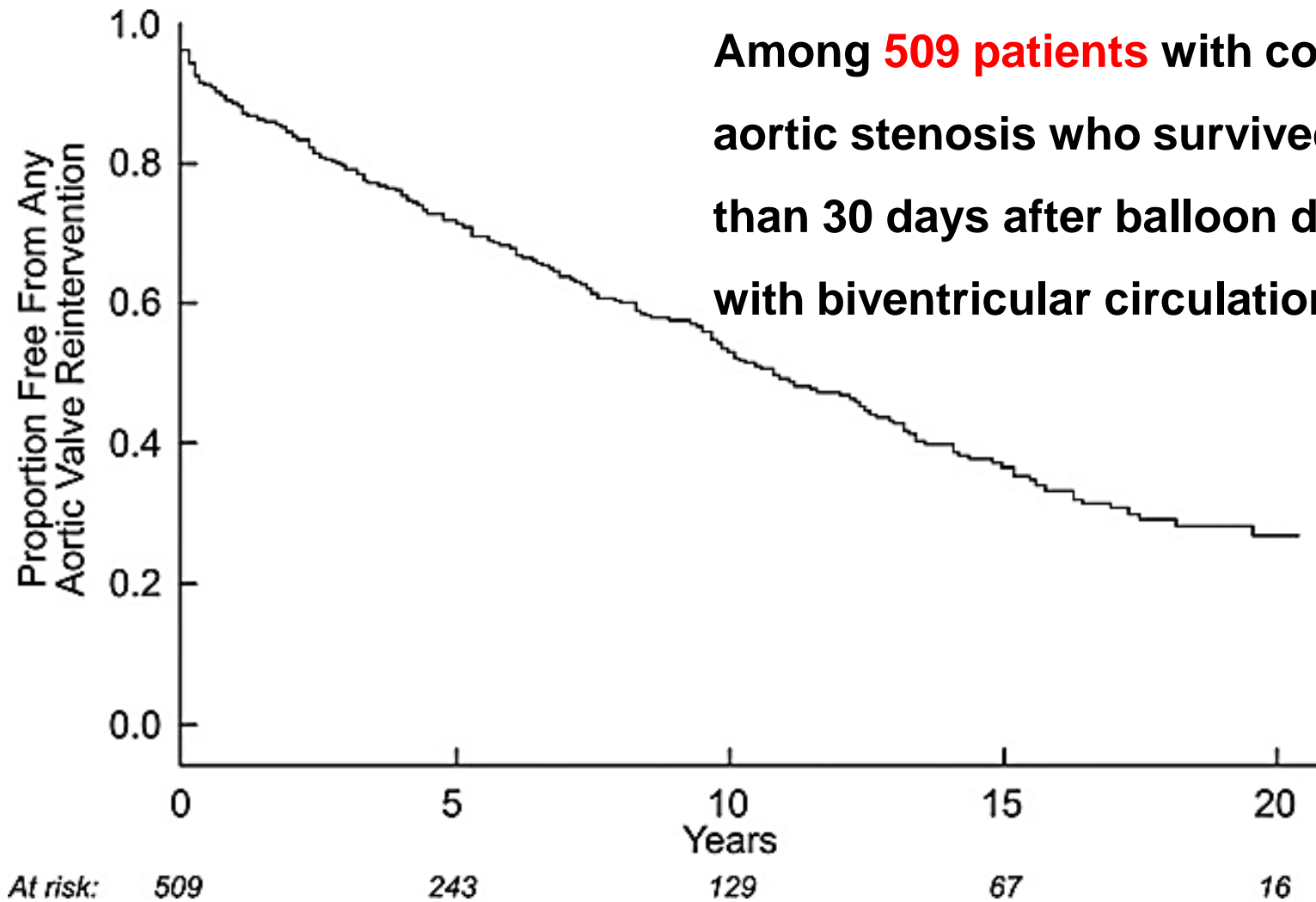
Balloon valvuloplasty from Boston Children's Hospital

- From 1985 to 2008
- 563 patients underwent balloon dilation for congenital AS.

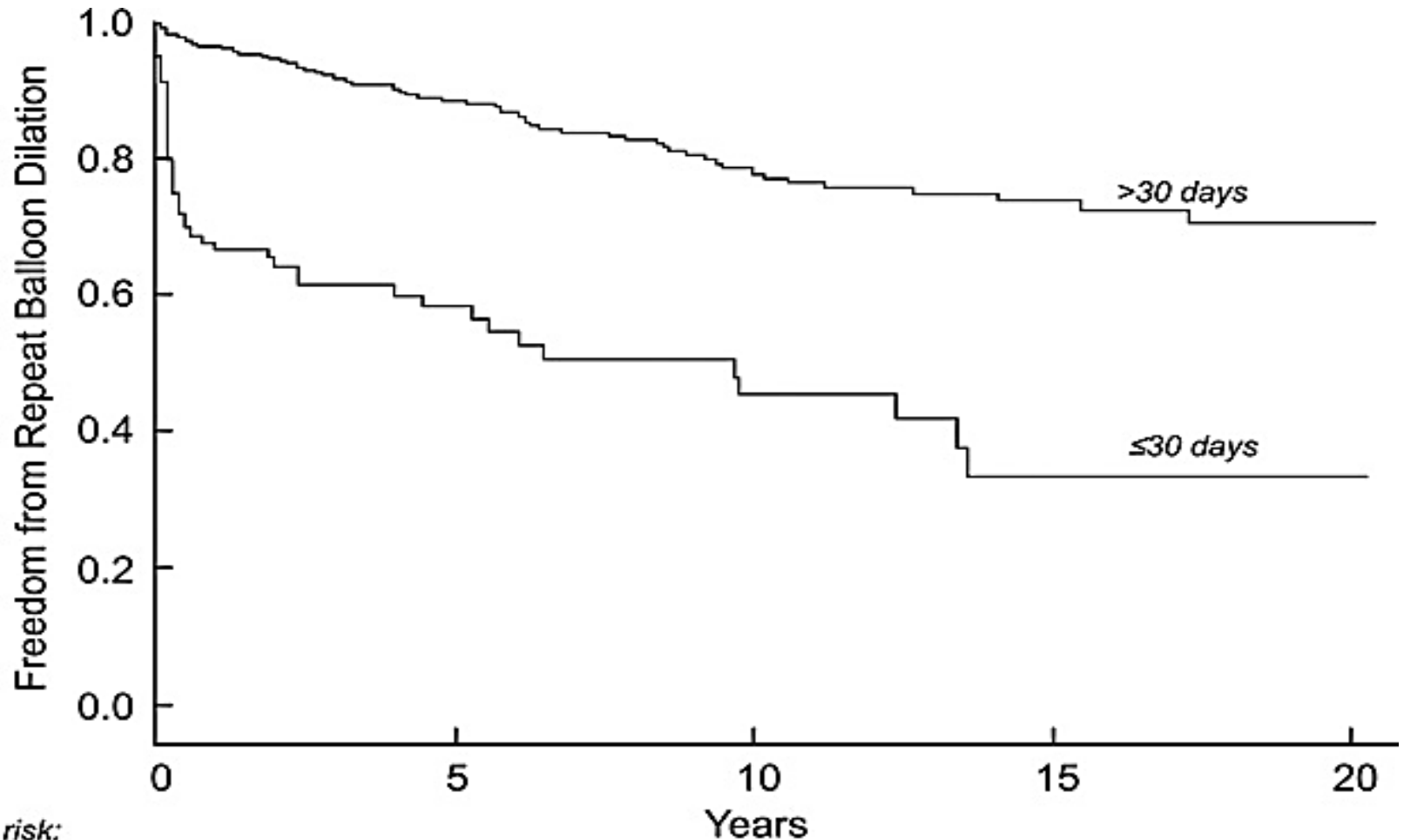
Distribution of post-balloon dilation AR



Freedom From Any Aortic Valve Reintervention



Freedom From Repeat Balloon Dilation



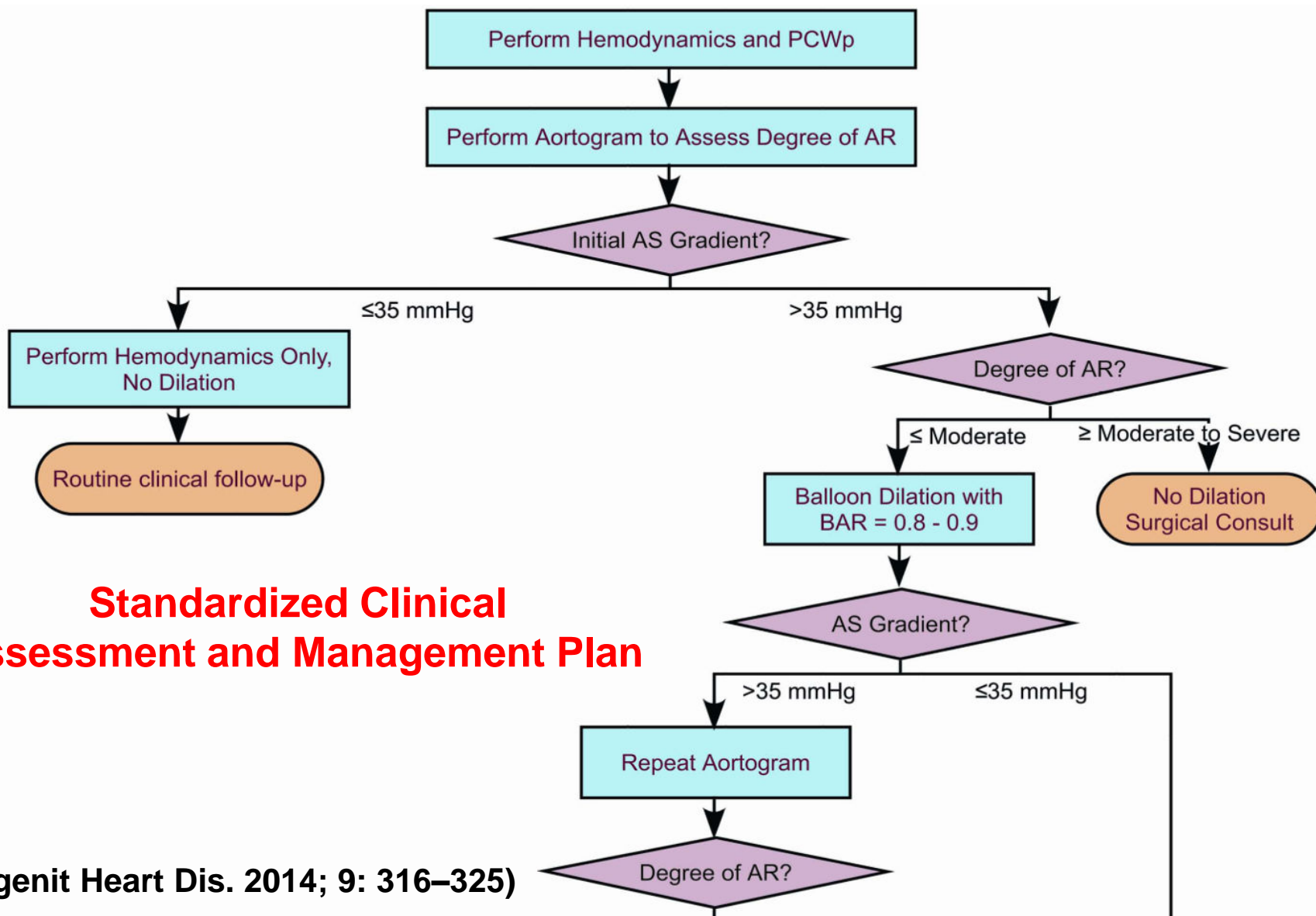
At risk:

	0	5	10	15	20
≤30 days	113	35	16	7	1
>30 days	394	211	115	62	15

Balloon valvuloplasty from Boston Children's Hospital

Although **balloon aortic valvuloplasty** is highly effective for acute relief of congenital AS, there are steady long-term hazards for surgical aortic valve reintervention and for AVR that are independent of age at balloon dilation and severity of presenting AS. Although **neonates are at higher risk for repeat balloon dilation**, they are at no higher risk for AVR than older patients. These findings should inform counseling and evaluation of patients before and after treatment of congenital AS.

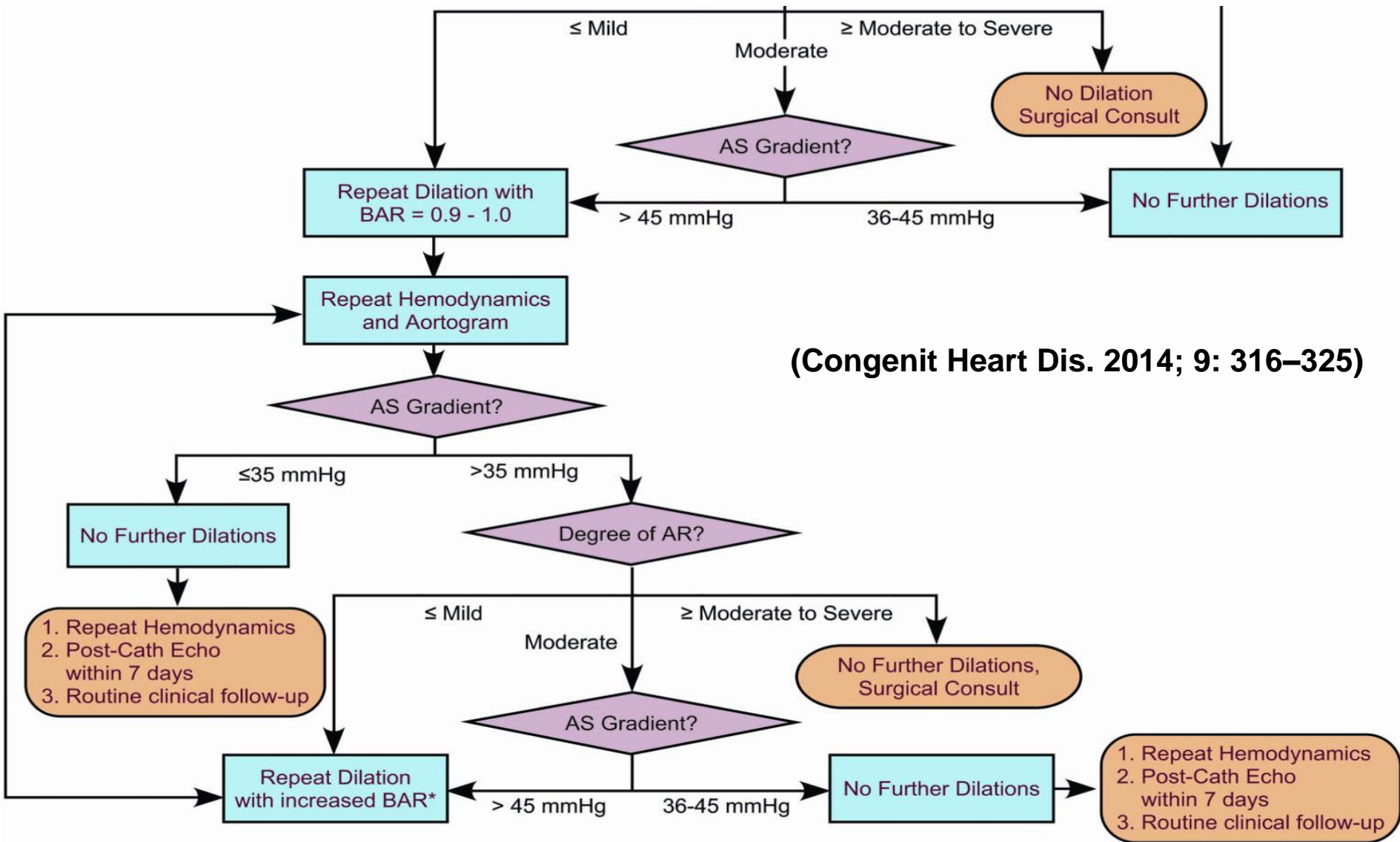
Decision Support Algorithm for the Balloon Aortic Valvuloplasty in Boston Children's Hospital



Standardized Clinical Assessment and Management Plan

(Congenit Heart Dis. 2014; 9: 316–325)

Decision Support Algorithm for the Balloon Aortic Valvuloplasty in Boston Children's Hospital



Acute Outcomes after Balloon Aortic Valvuloplasty for Congenital Aortic Stenosis in SCAMP patients and historical controls

Variable	SCAMP	Control	p value
N	23	92	
AS gradient post BD (mmHg)			
Median (range)	25 (10–35)	30 (0–65)	0.005
≤35	23 (100%)	74 (80%)	0.02*
>35	0 (0%)	18 (20%)	
AR Post BD			
Unable to evaluate	0 (0%)	1 (1%)	
None/trivial	12 (52%)	38 (41%)	0.33
Mild	7 (30%)	25 (27%)	
Moderate or severe	4 (18%)	28 (31%)	
Final result Category (AS gradient, AR grade)			0.02
Unable to evaluate	0 (0%)	1 (1%)	
Optimal (≤35 mmHg, none/trivial)	12 (52%)	31 (34%)	
Adequate (≤35 mmHg, Mild)	7 (30%)	19 (21%)	
Inadequate (>35 mmHg ± moderate or severe)	4 (17%)	41 (45%)	

(Congenit Heart Dis. 2014; 9: 316–325)

My opinion !

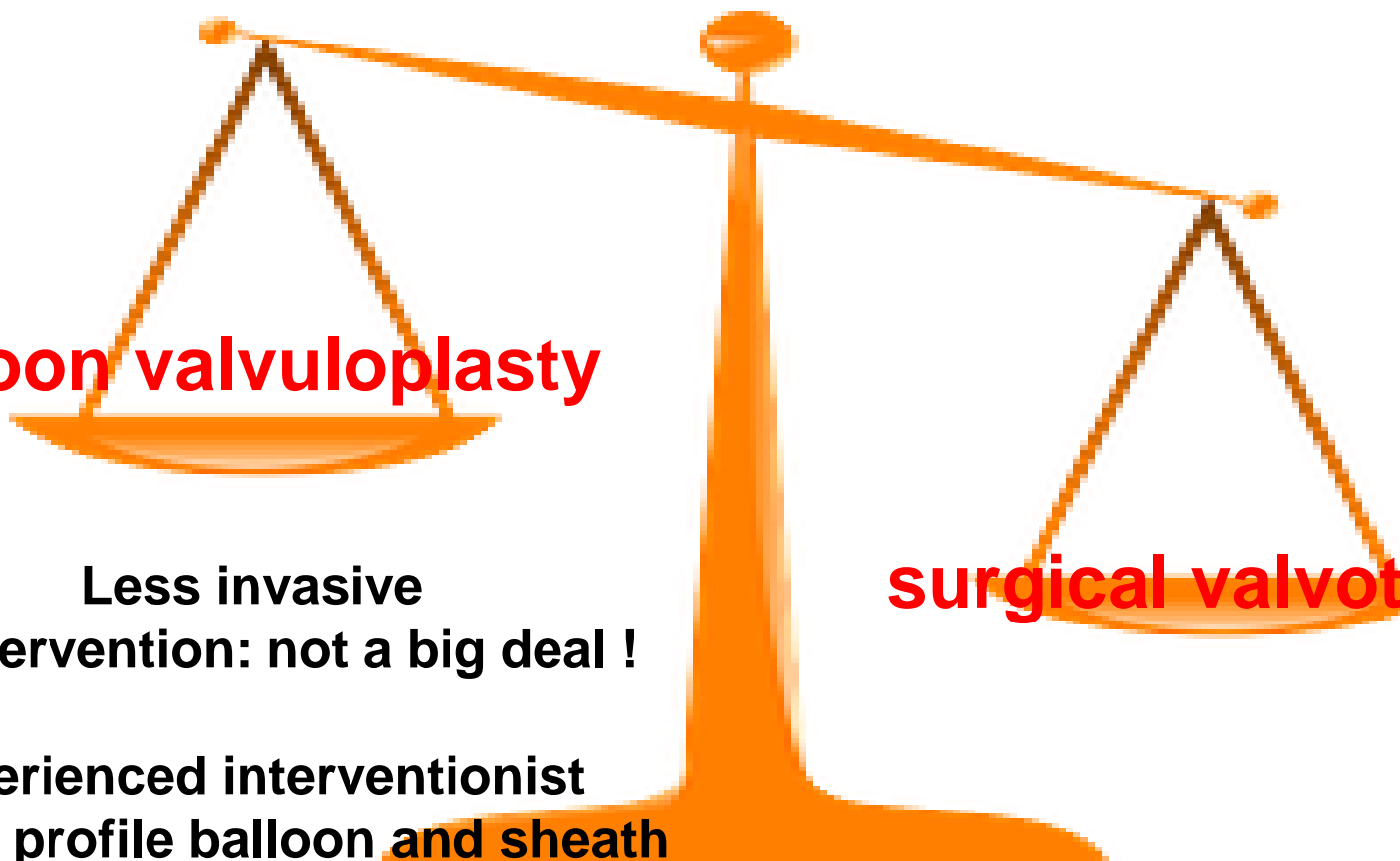
Balloon valvuloplasty

Less invasive

Reintervention: not a big deal !

- **Experienced interventionist**
- **Low profile balloon and sheath**
- **Good patient selection**
 - **Valve morphology**
 - **Pre-procedure condition**

surgical valvotomy



Rebuttal

Infant Congenital Aortic Valve Stenosis

The Pendulum Swings*

Carl L. Backer, MD
Chicago, Illinois



At our institution it would be much more likely for a patient with a unicuspid aortic valve or an aortic valve that is severely dysplastic to be referred for balloon dilation over a surgical intervention. We had a recent patient present to us as

(JACC 2013;62:2141–3)

Discussion and cooperation !!

Cardiologist

Cardiac surgeon



**Decision depends on each center's
best clinical practice !**

Thank You for Attention !