Treatment of congenital aortic valve disease:

Neonatal surgical management

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Challenges

. valvar lesions

. associated lesions

. status of left ventricle

Valvar lesions

. bicuspid or unicuspid valve
. rarely, tricuspid valve
. usually, one normal commissure

. thick dysplastic leaflets
. excressent fibrous nodular tissue

. size of annulus : + or - hypoplastic

Associated lesions

. LVOT lesions
  - subvalvar stenosis
  - supravalvar stenosis

. mitral stenosis (parachute mitral valve)
. aortic coarctation

Standard surgical procedure

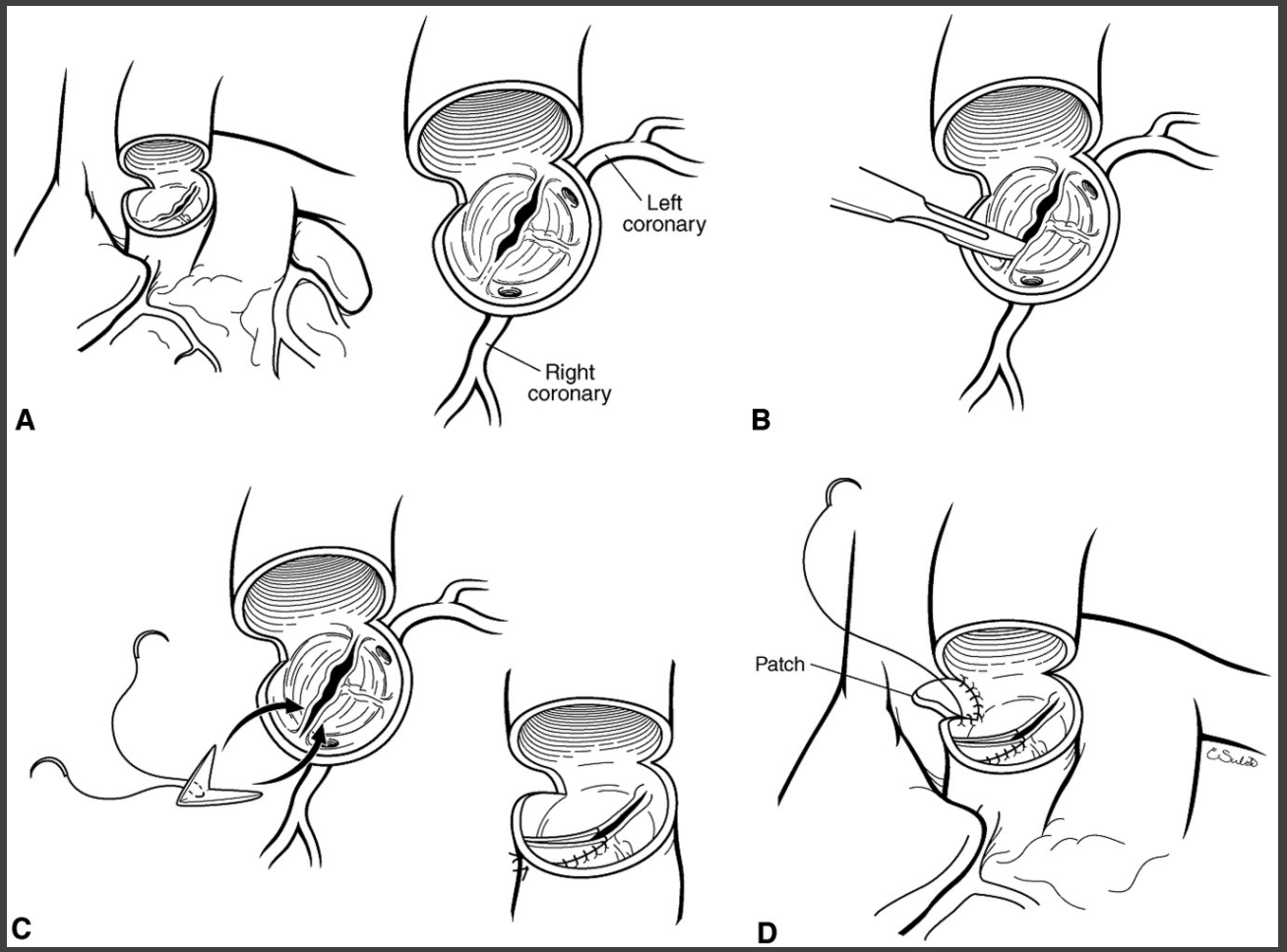
. extended commissurotomy (bicuspid)
. aggressive shaving of leaflets
. excision of fibrous nodules

. commissural reconstruction
. supravalvar enlargement

. ligature of PDA
. complete / partial closure of ASD
. coarctation repair if needed

Neonatal aortic valve surgery

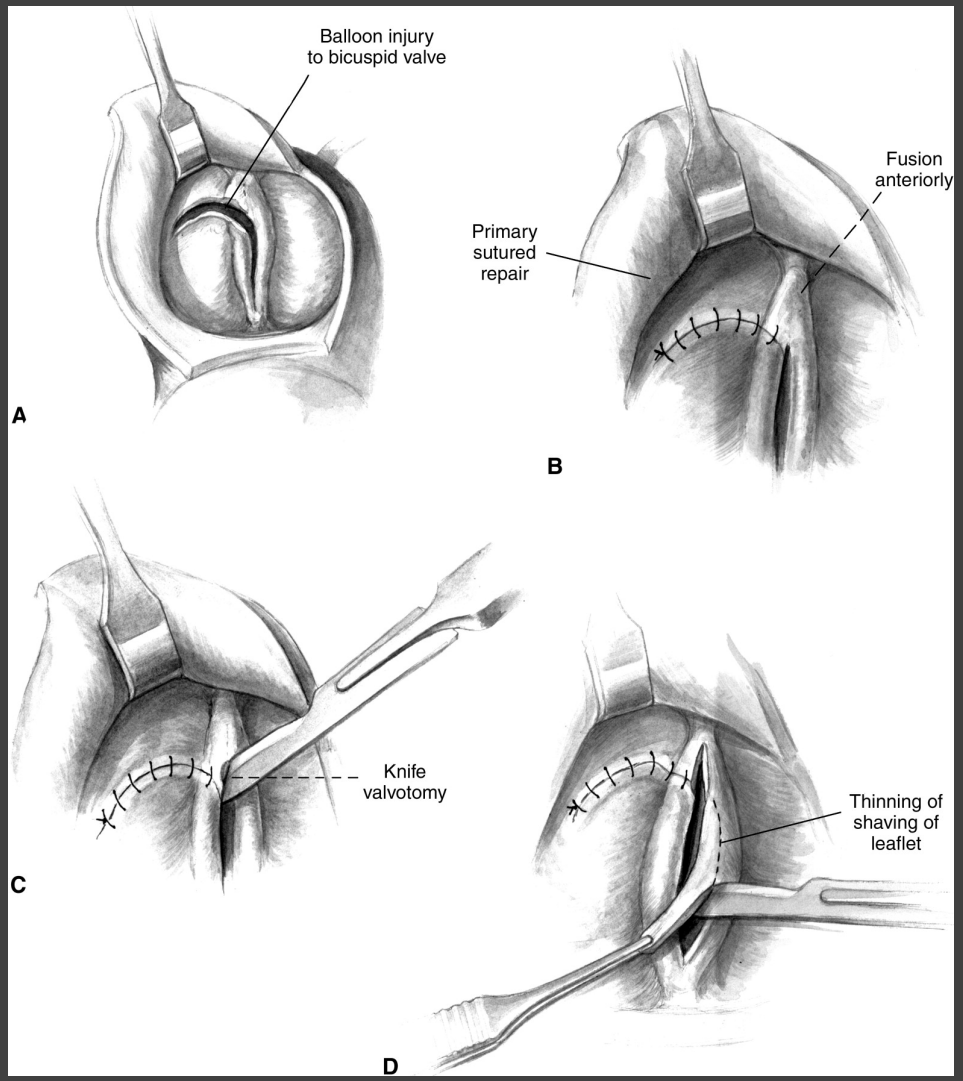
Standard surgical procedure



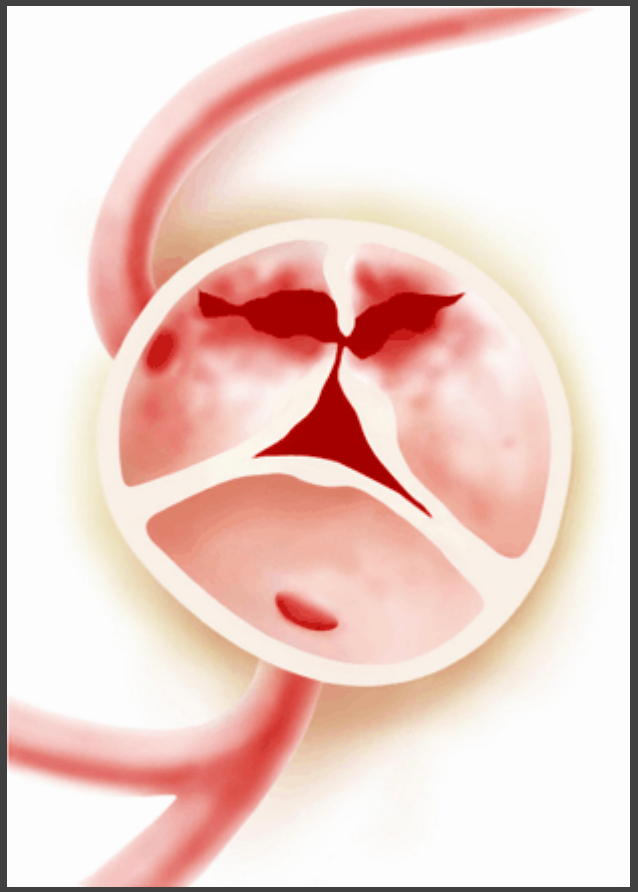
Tweddell JS et al. J Thorac Cardiovasc Surg 2005;129:551

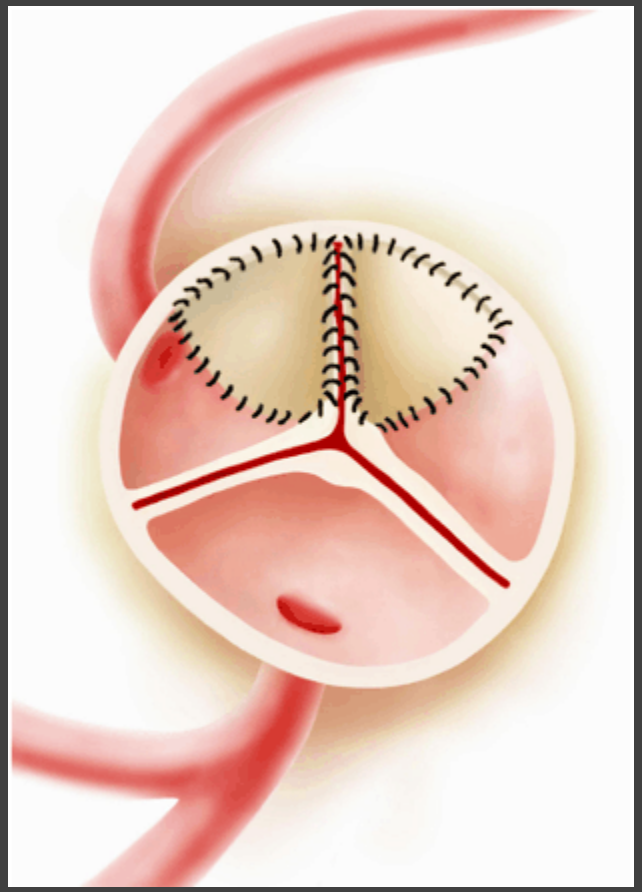
Neonatal aortic valve surgery

Standard surgical procedure



Tear repair + leaflet reconstruction





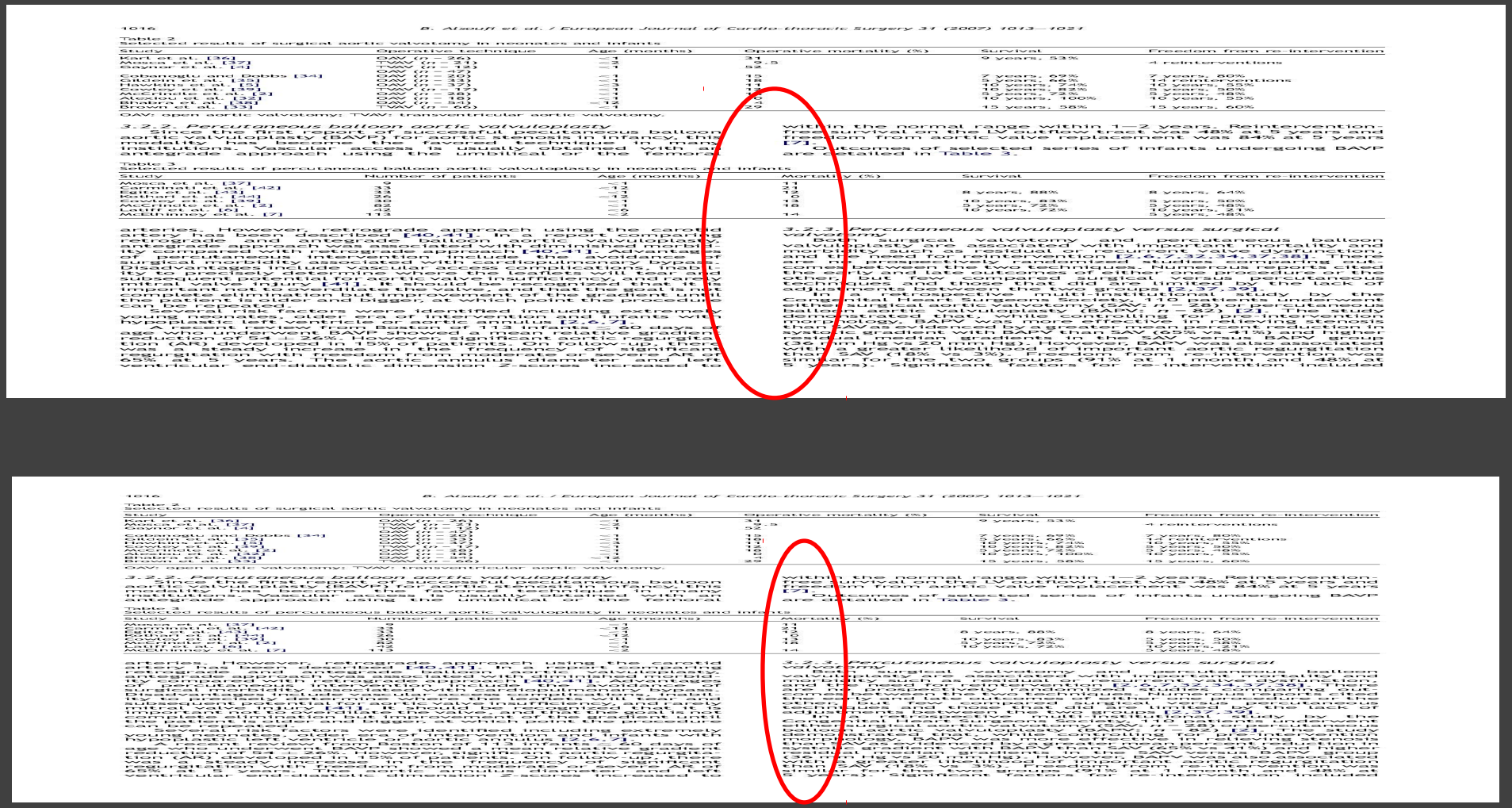
Dave H, Prêtre R MMCTS doi:10.1510/mmcts.2005.001354

Valvuloplasty in neonates: results

2008 - 2011

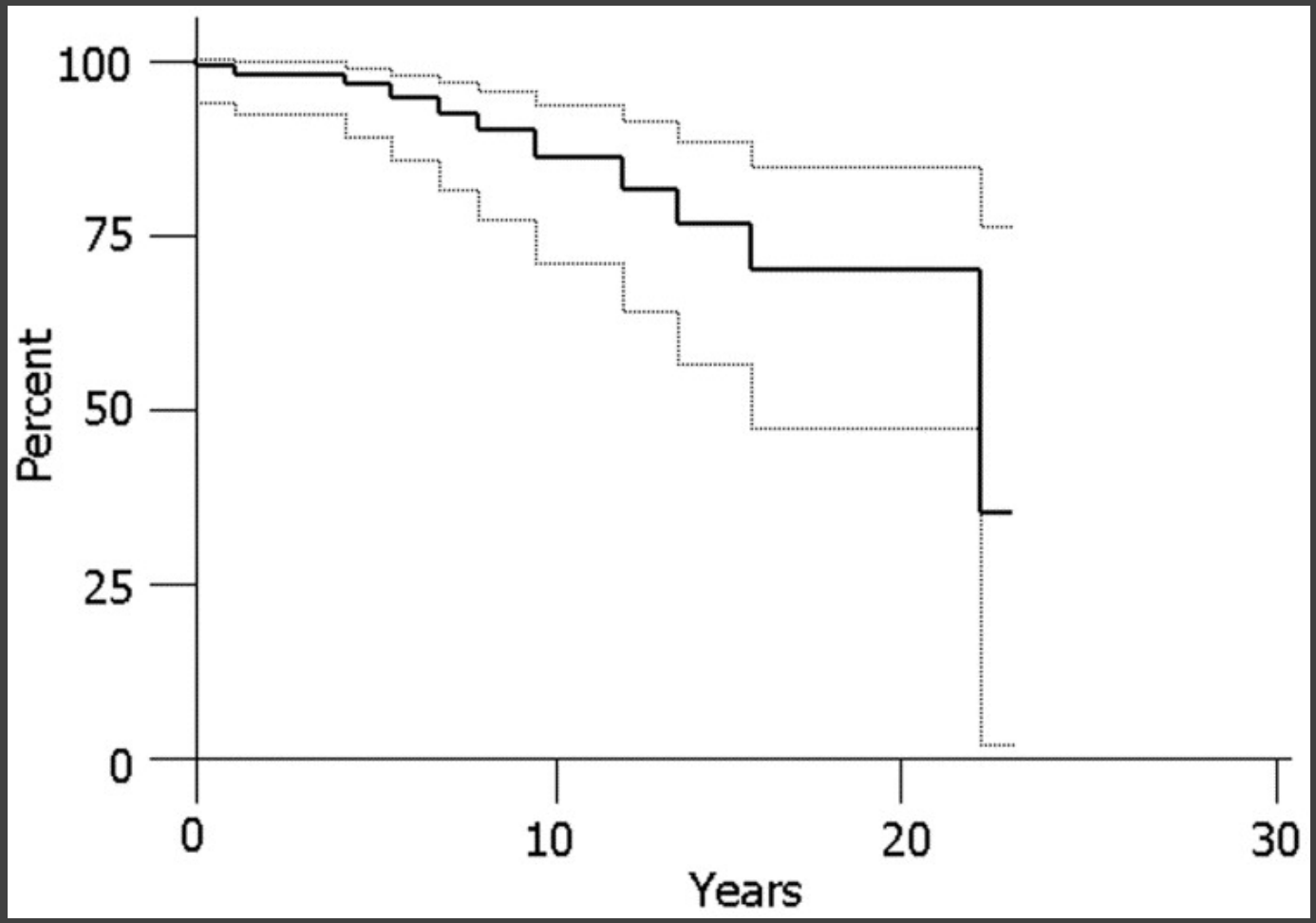
		early mortality	
Necker-Enfants Malades (19 patients)		1/19	(5.3%)
EACTS database (71 patients)		6/71	(8.5%)

Neonatal aortic valve surgery



Alsoufi B et al. Eur J CardioThor Surg 2007;31:1013

Simple aortic valve repair : freedom from reintervention



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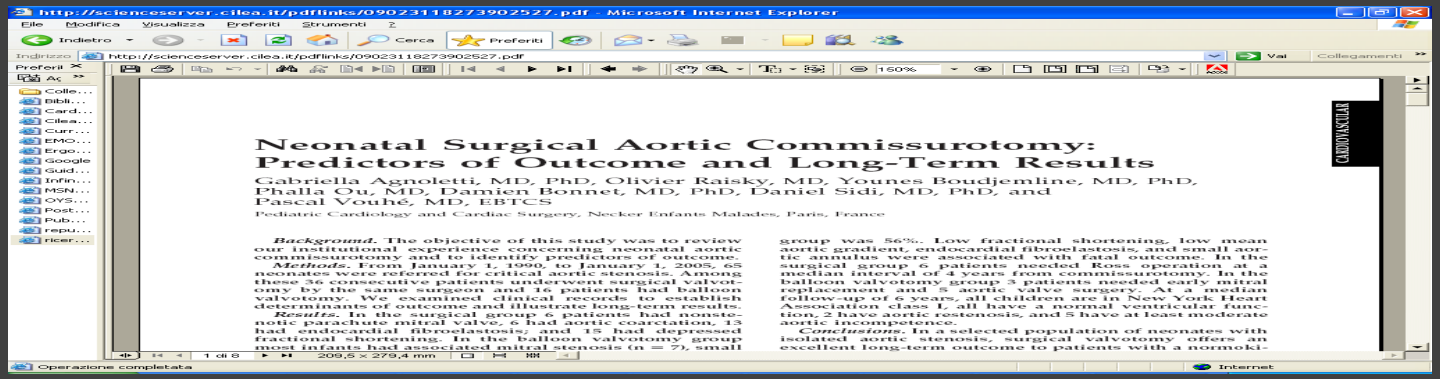
Neonatal aortic valve surgery



Neonatal Surgical Aortic Commissurotomy: Predictors of Outcome and Long-Term Results

Gabriella Agnoletti, MD, PhD, Olivier Raisky, MD, Younes Boudjemline, MD, PhD, Phalla Ou, MD, Damien Bonnet, MD, PhD, Daniel Sidi, MD, PhD, and Pascal Vouhé, MD, EBTCS

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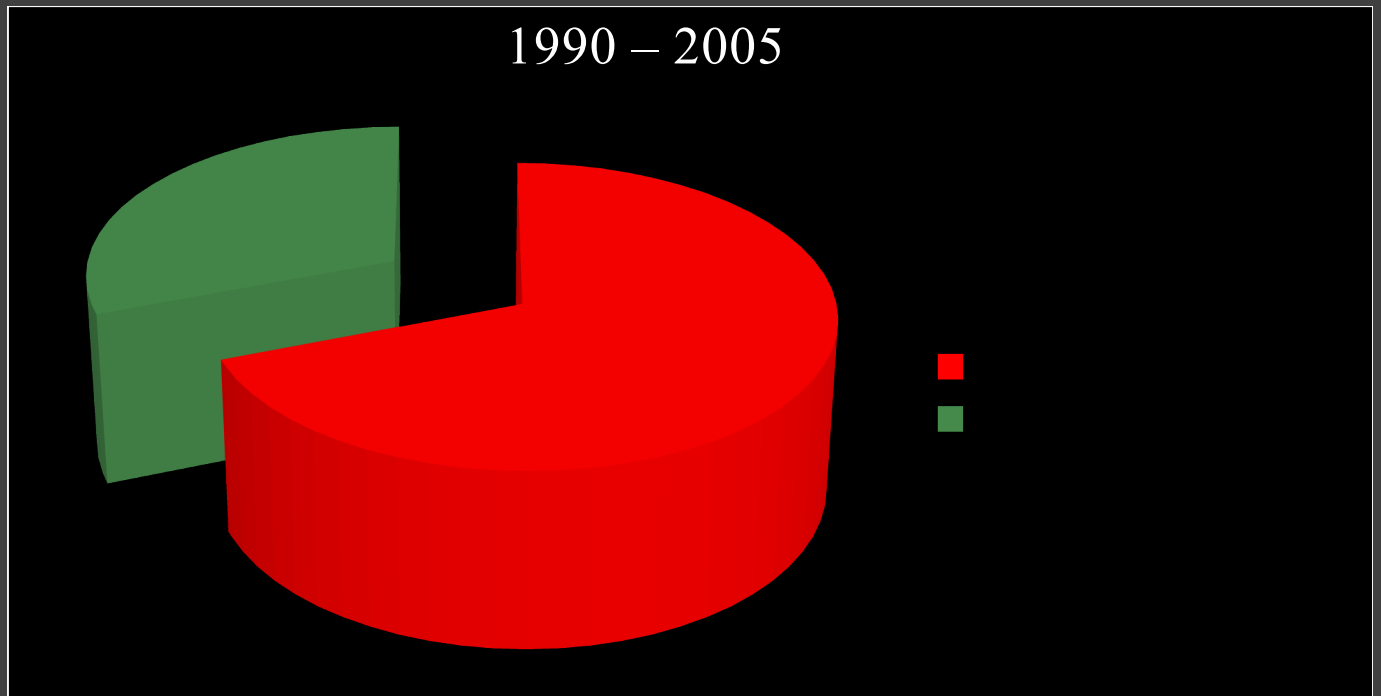
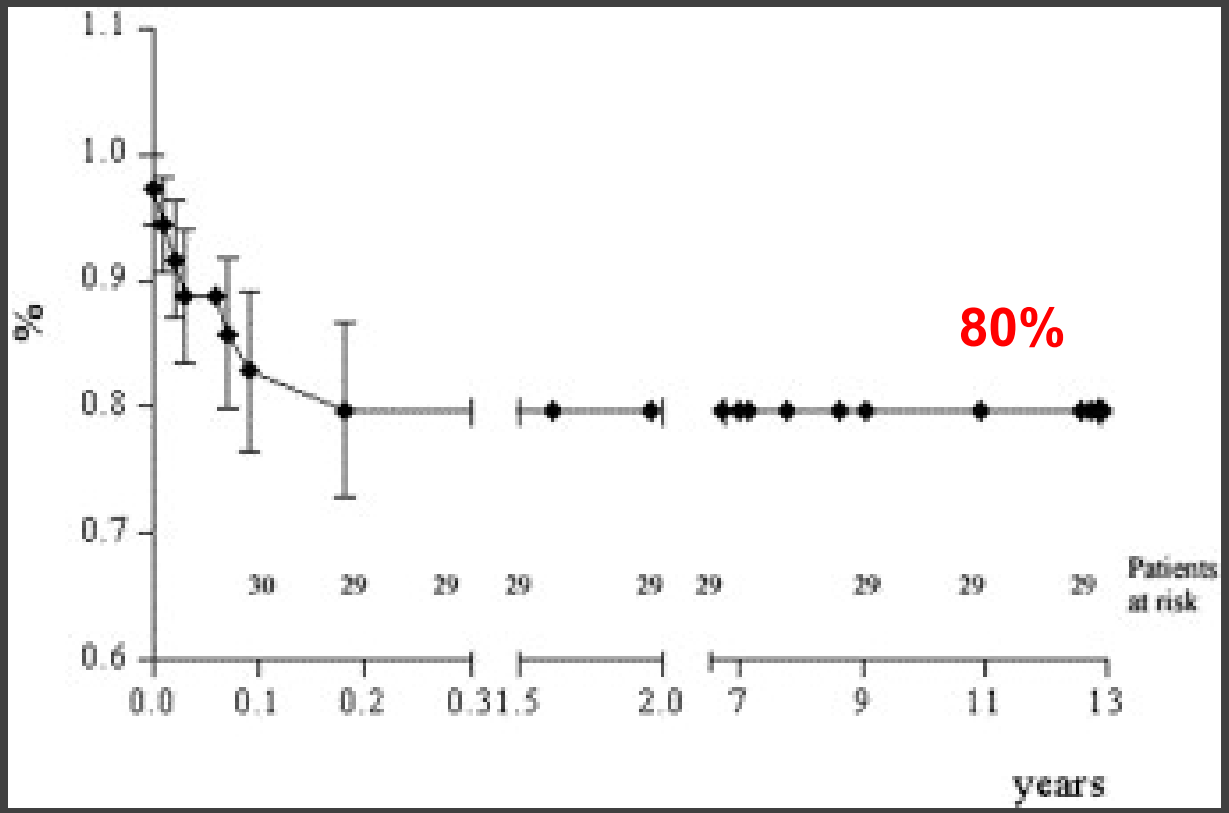
Ann Thorac Surg 2006; 82: 1585-93



Neonatal aortic valve surgery

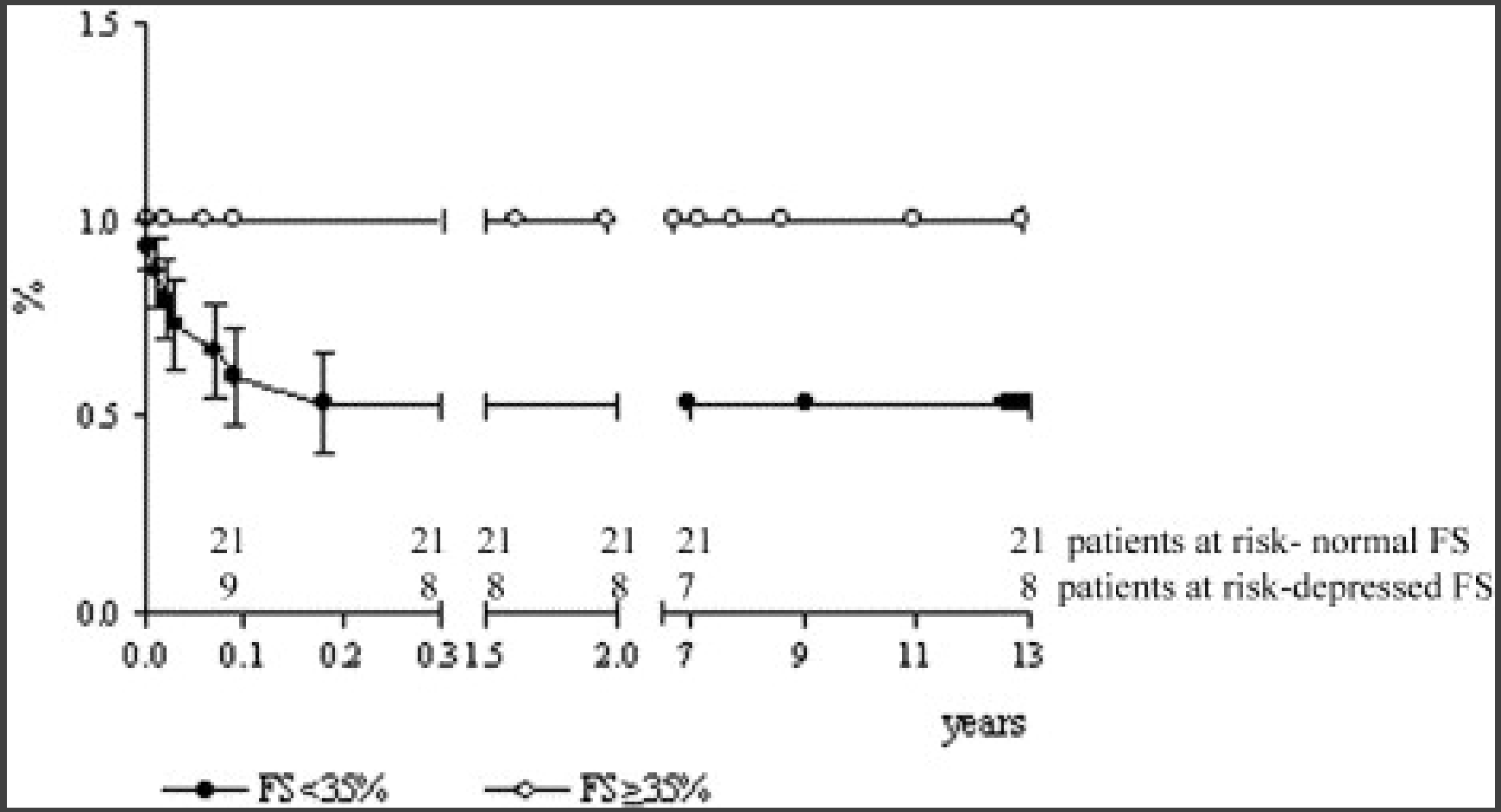
* Survival



* Reintervention : 27% of survivors (6 Ross, 2 balloon dilatation)

Agnoletti G. et al. Ann Thorac Surg 2006;82:1585

Neonatal aortic valve surgery



Agnoletti G. et al. Ann Thorac Surg 2006;82:1585

Challenges

. valvar lesions

. associated lesions

. left ventricle: function and size

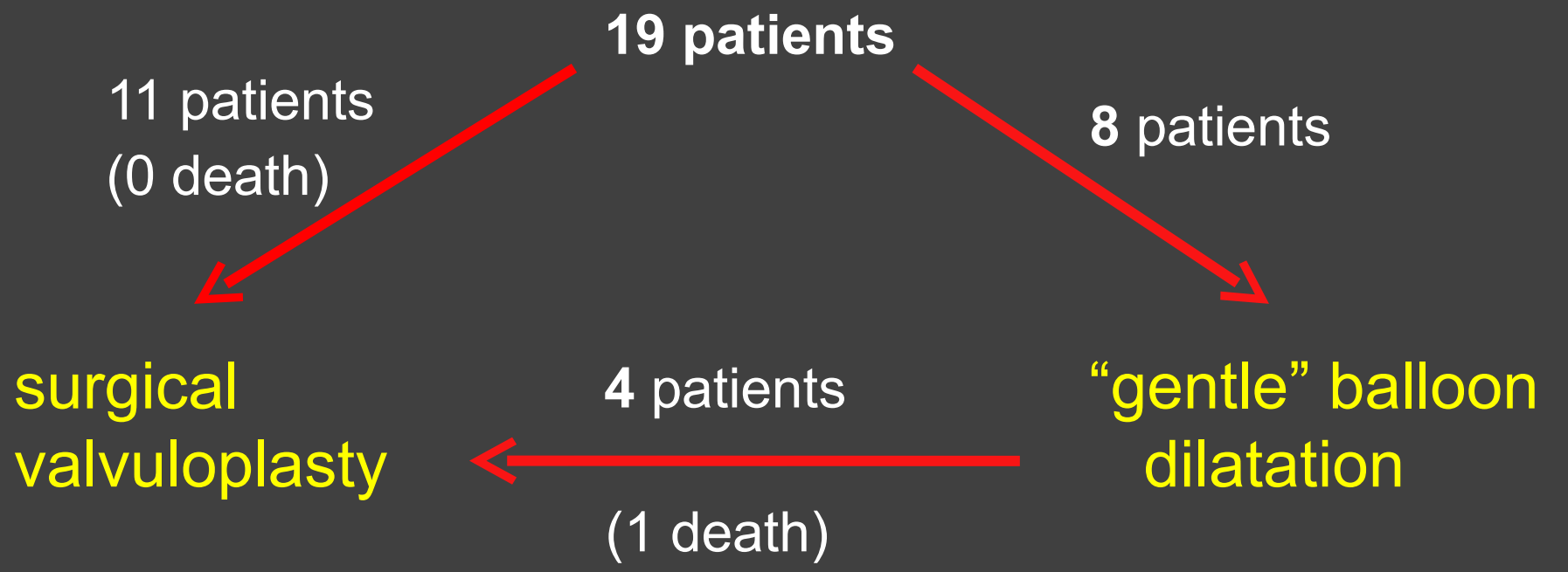
left ventricle

. left ventricular dysfunction
- endocardial fibroelastosis
- impaired systolic / diastolic function
- potentially reversible

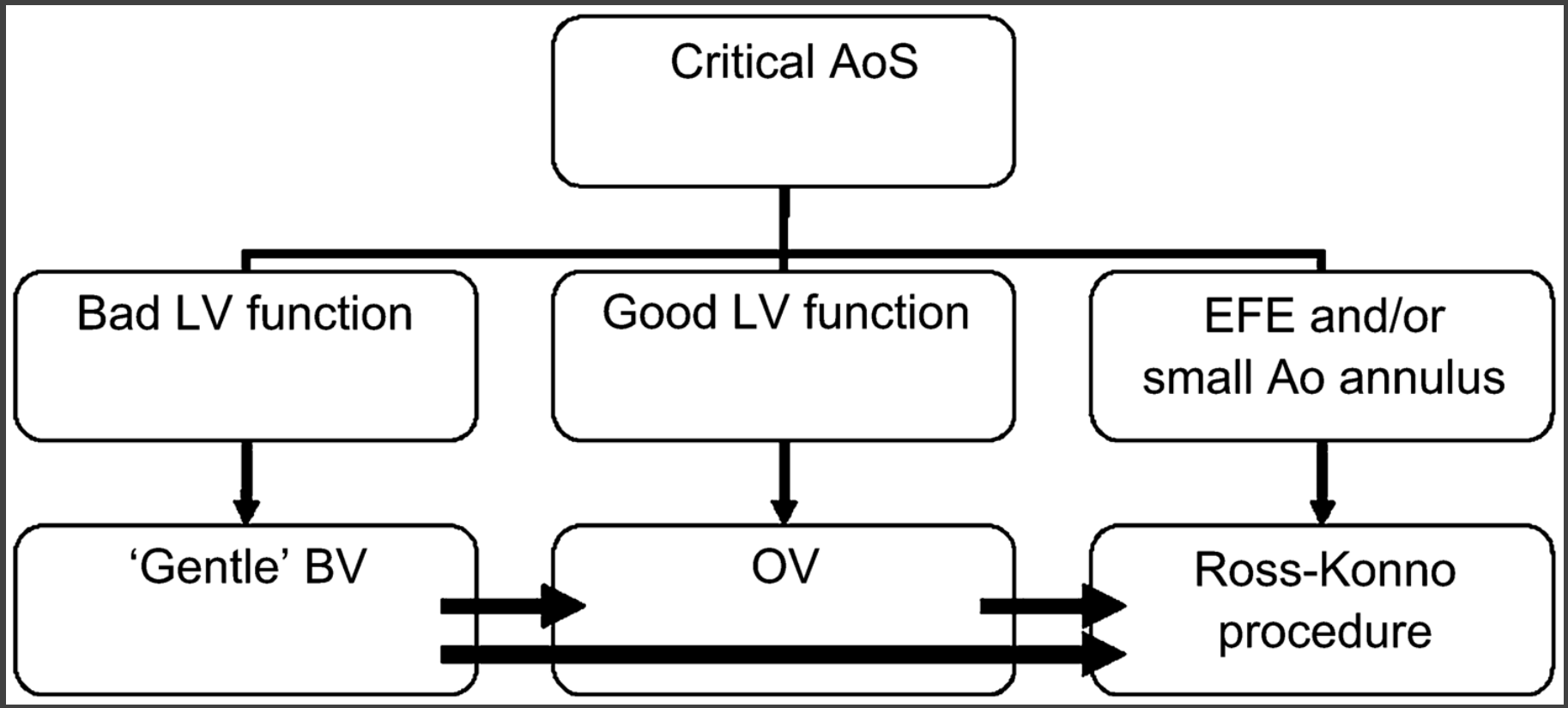
- indication for "partial" balloon dilatation

. left ventricular hypoplasia

Necker-Enfants Malades 2005 - 2010

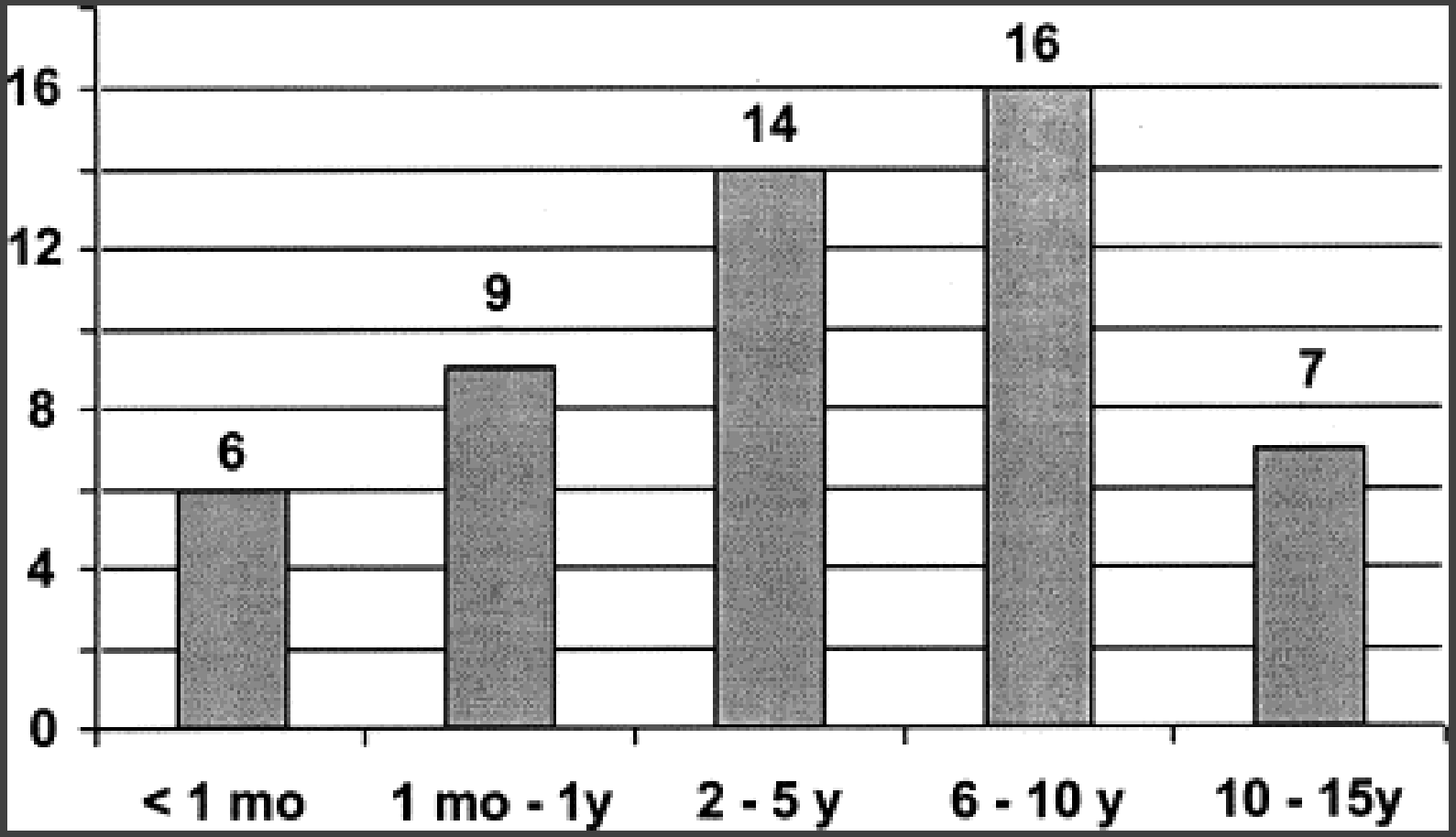


left ventricular dysfunction



Hraska V et al. MMCTS doi:10.1510/mmcts.2006.002311

Ross procedure in children



Kadner A et al. Ann Thorac Surg 2008;8

Ross / Ross-Konno procedures : mortality

	> 1 month	< 1 month
Ross	2/3	1/29
Ross - Konno	2/3	0/17
Total (52 pts)	4/6 (67%) *	1/46 (2.2%)

* all deaths in rescue Ross for failed dilatation

Kadner A et al. Ann Thorac Surg 2008;8

left ventricle

. left ventricular dysfunction

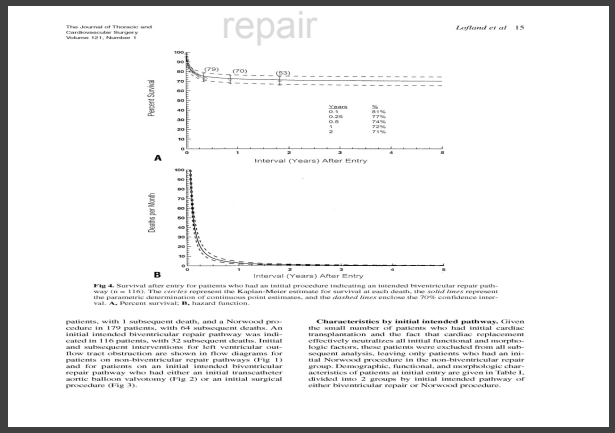
. left ventricular hypoplasia

- absence of absolute criteria for biventricular repair
- univentricular approach
- hybrid approach

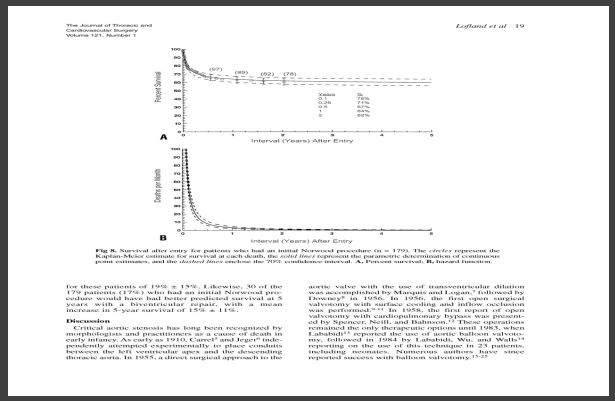
Neonatal aortic valve surgery

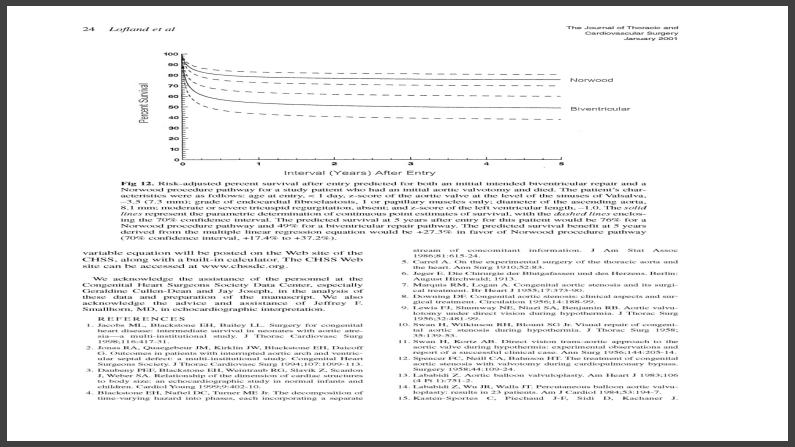
cohort results → individual prediction

Biventricular repair



Norwood pathway





age < 1 month

aortic valve z score < - 3.5

moderate fibroelastosis

ascending aorta > 8 mm

LV length z score < - 1

Lofland GK et al. J Thorac Cardiovasc Surg 2001;121:10

hybrid approach

. initial procedure
  - bilateral PA banding
  - duct stenting
  - balloon aortic valvuloplasty
  - ASD size calibration

. "buys" time for improvement
. allows delayed decision-making

Conclusions

1. subnormal LV function and size (most patients)
   - surgical valvuloplasty provides excellent results
   - there is no place for balloon dilatation

2. severe LV dysfunction
   - "gentle" balloon dilatation
   - followed by surgical valvuloplasty or Ross-Konno

3. LV hypoplasia
   - individualized management
   - potential place for hybrid approach.