

**Percutaneous balloon angioplasty for
aortic coarctation in newborns and infants:
Is it still an option ?**

MO Galal
King Fahad Medical City
Riyadh, KSA

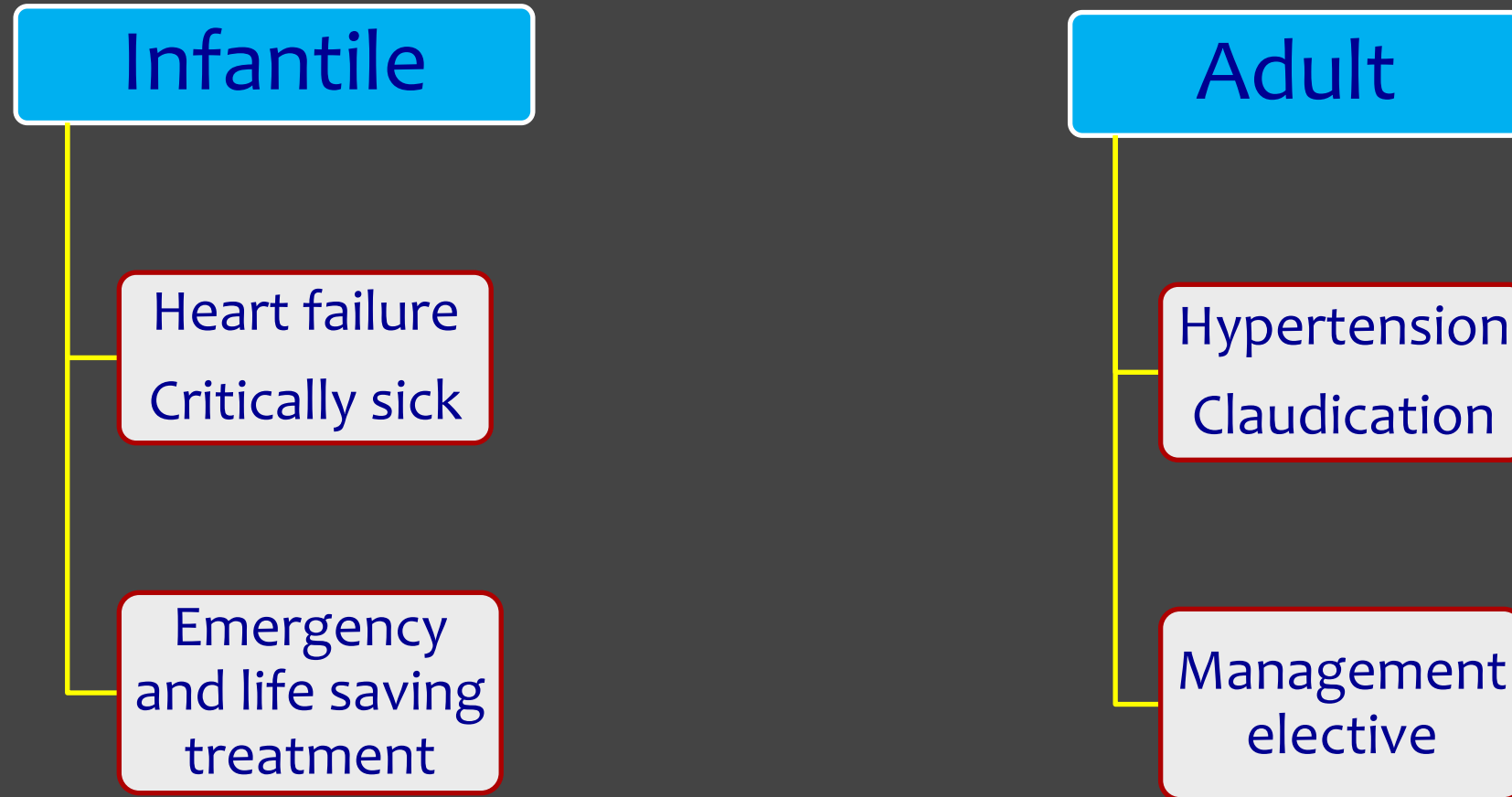
Outline

- **History / Background**
- **Literature review / Our choice to
balloon neonatal aortic coarctation**
- **Our experience**
- **Conclusions**

History

- 1945 - Surgical repair by Crafoord
- 1984 - First reported balloon dilatation by Lababidi

Infantile coarctation vs. adult coarctation



Treatment options in small age group

Surgical repair

Balloon dilation

Balloon dilation: higher restenosis rate
in infants and newborns

Surgical repair remains the **gold
standard** for treatment of neonatal
coarctation

N = 10 neonates
after balloon coarctation

Within few weeks: **very high recurrence rate**

Conclusions:

**Surgery only therapy for
neonatal coarctation**

N = 80 <1 year of age

4 age groups

Infants < 3 months of age: high recurrence rate !

Z Kardiol 92:735–741 (2003)
DOI 10.1007/s00392-003-0956-x

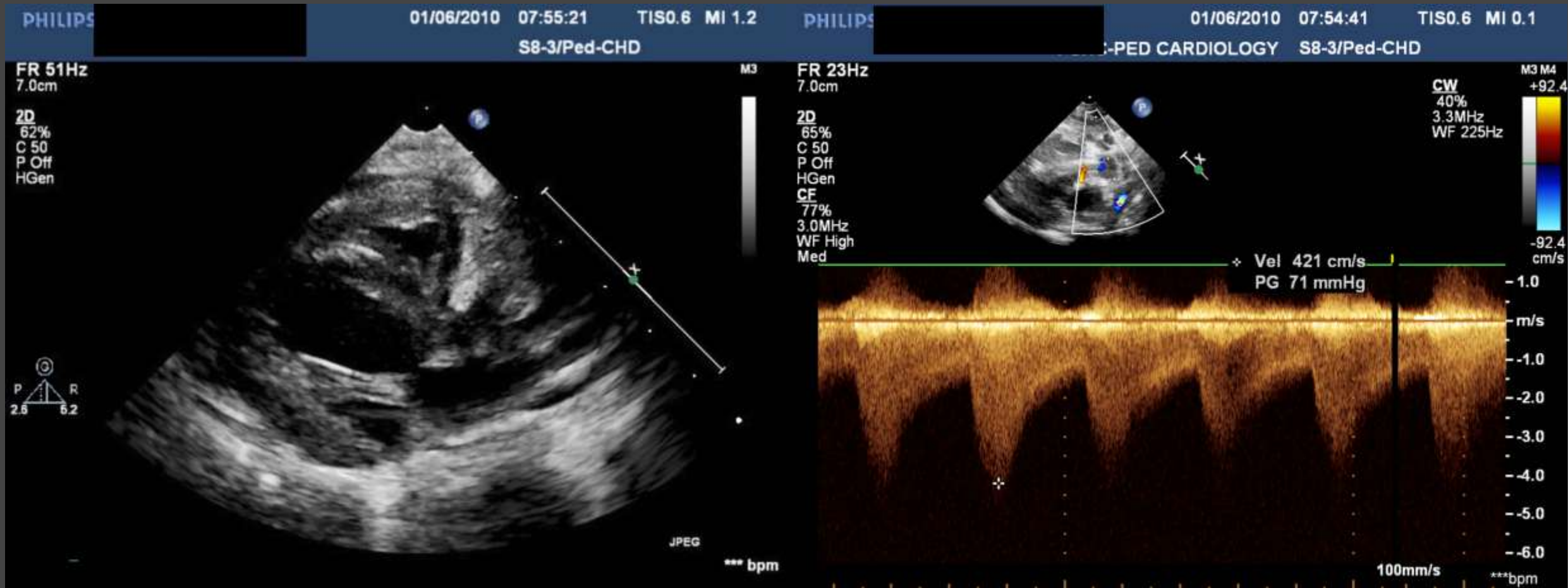
CONGENITAL HEART DEFECT

**Balloon dilation
of native aortic coarctation in infancy**

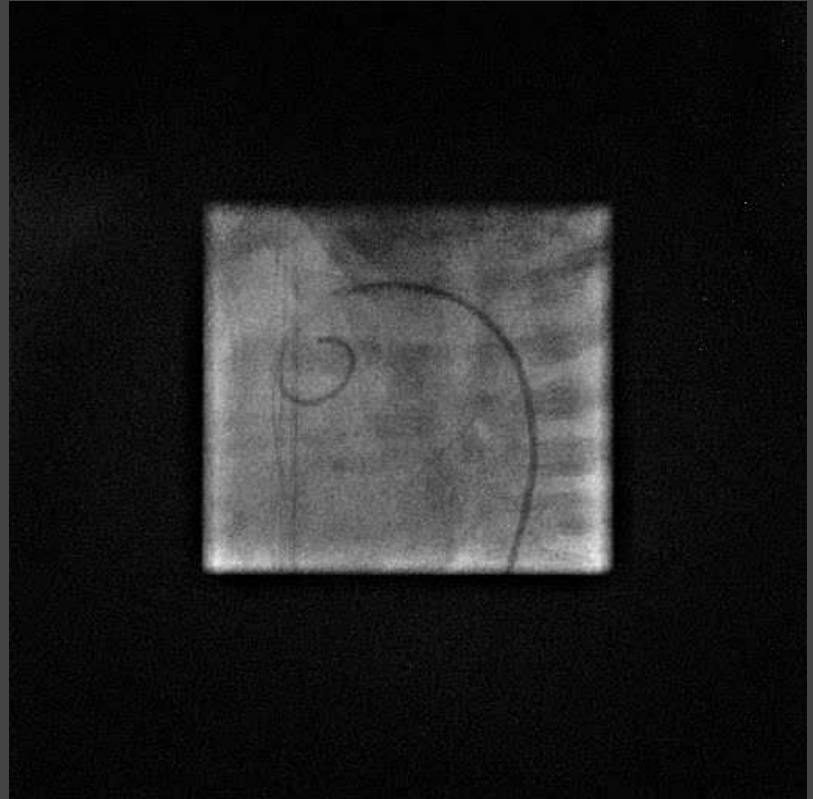
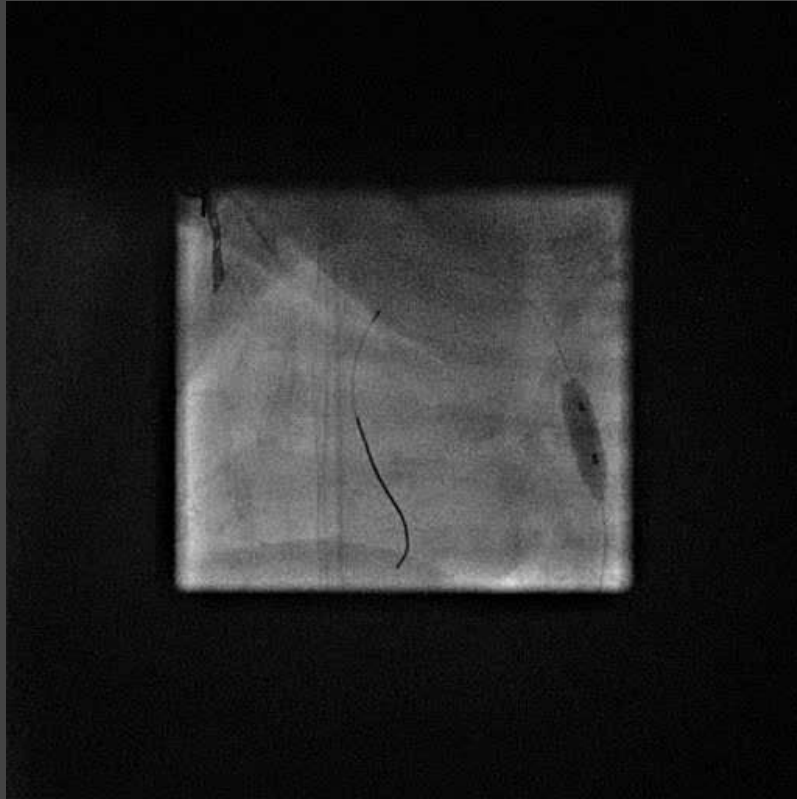
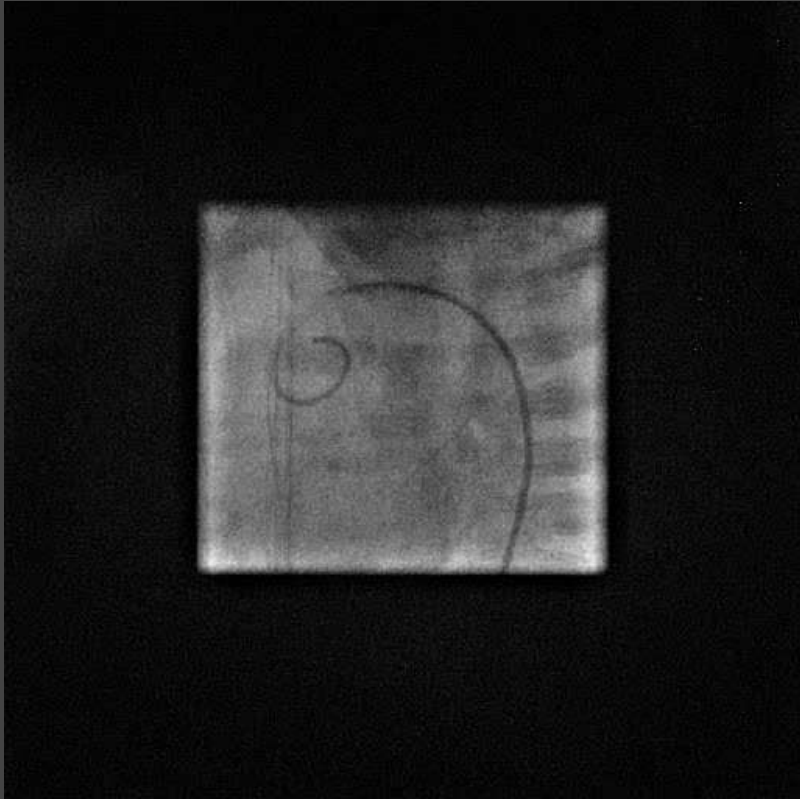
M. O. Galal
A. A. Schmaltz
M. Joufan
L. Benson
L. Samatou
Z. Halees

Galal MO et al : 2003

3 wks, 3.5 kg, m - Balloon Dilation ?



3 wks, 3.5 kg, m - During Balloon Dilation



3 wks, 3.5 kg, m – **After** Balloon Dilation

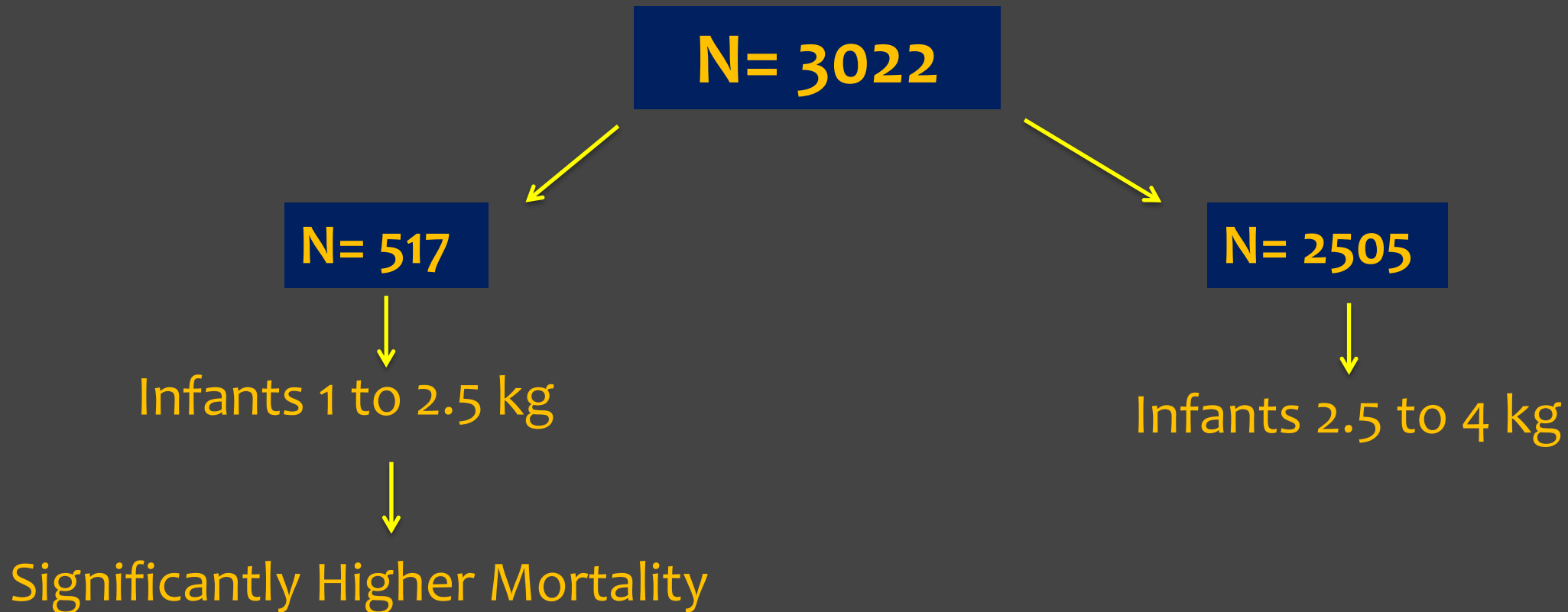


Our Question

**Why not offer balloon dilation to neonates
and infants in poor clinical condition ?**

**BAP should be understood as a palliation in
preparation for safer surgery**

Cardiac surgery in infants with low birth weight is associated with increased mortality: Analysis of the Society of Thoracic Surgeons Congenital Heart Database



Repair of Coarctation in Infants weighing < 2 kg

N = 24



Summary:

- Critical preoperative clinical status
- associated complex cardiac lesions

**= most important risk factors
to influence surgical mortality**

Surgical Results in Infants coarctation

- **Mortality: extremely low**
 - usually related to serious technical mistake or co-morbid condition (prematurity, extremely low birth weight, lung disease)
- **Morbidity: low**
 - chylothorax, nerve damage or residual and/or recurrent CoA

Results in Infants -Recurrent CoA-

- ~ 15-20% in neonates
- ~ 10% in Infants
- ~ 5% in > 6 month old

(results compiled from meta-analysis)

Role of catheter interventions

- Re-CoA
- Premature and sick babies (?)

Effectiveness and Safety of Balloon Dilation of Native Aortic Coarctation in Infants < 3 months

N= 17

- Responded acutely to balloon dilation
- Restenosis rate higher than older infants
- Artery injury still a concern

Effectiveness and Safety of Balloon Dilation of Native Aortic Coarctation in newborn

N= 51

40 % recoarctation within 3.2 months

45 % reballoon dilation

55 % surgical repair

Conclusions:

BAP to ensure survival in neonates
with poor clinical condition

Coarctation of Aorta-Management Options and Decision Making

Comparison: surgery, balloon angioplasty, stents

- Mortality rates are similar
- Morbidity and complication rates are lower with balloon

**Balloon angioplasty:
effective alternative to surgery**

Our Experience

Methods

- 14 patients 2009-2014
- Age < 6 months

- Inclusion:

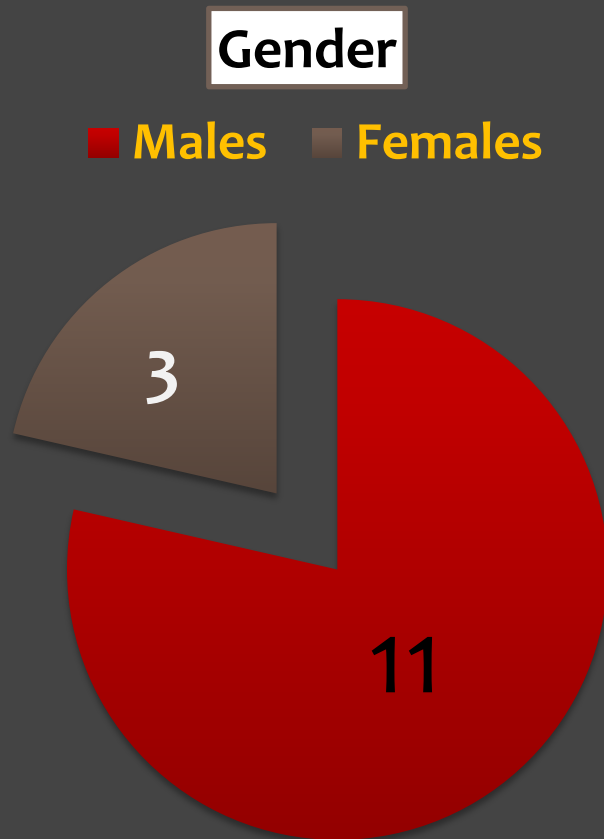
- Hemodynamic instability

- Left ventricular impairment

- ICU admission

- Inotropes or ventilator support

Demographics



Mean age: **67 days**
(4 – 142 days)

Mean weight : **3.5 kg**
(1.9 – 5 kg)

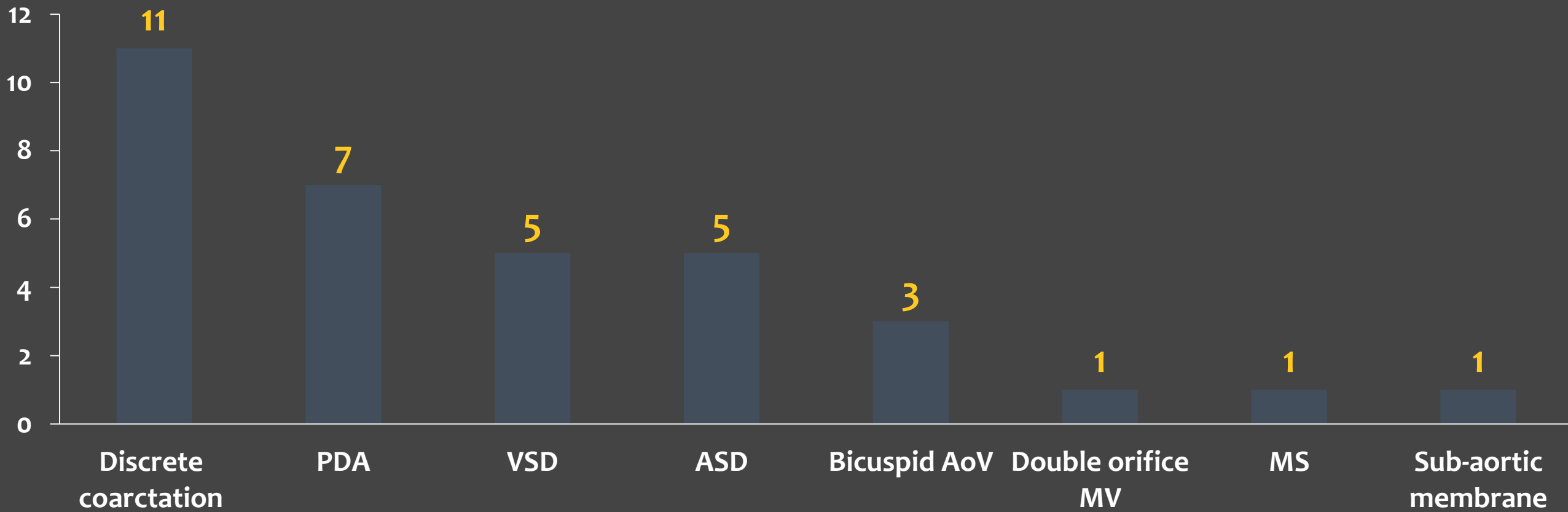
Clinical Status



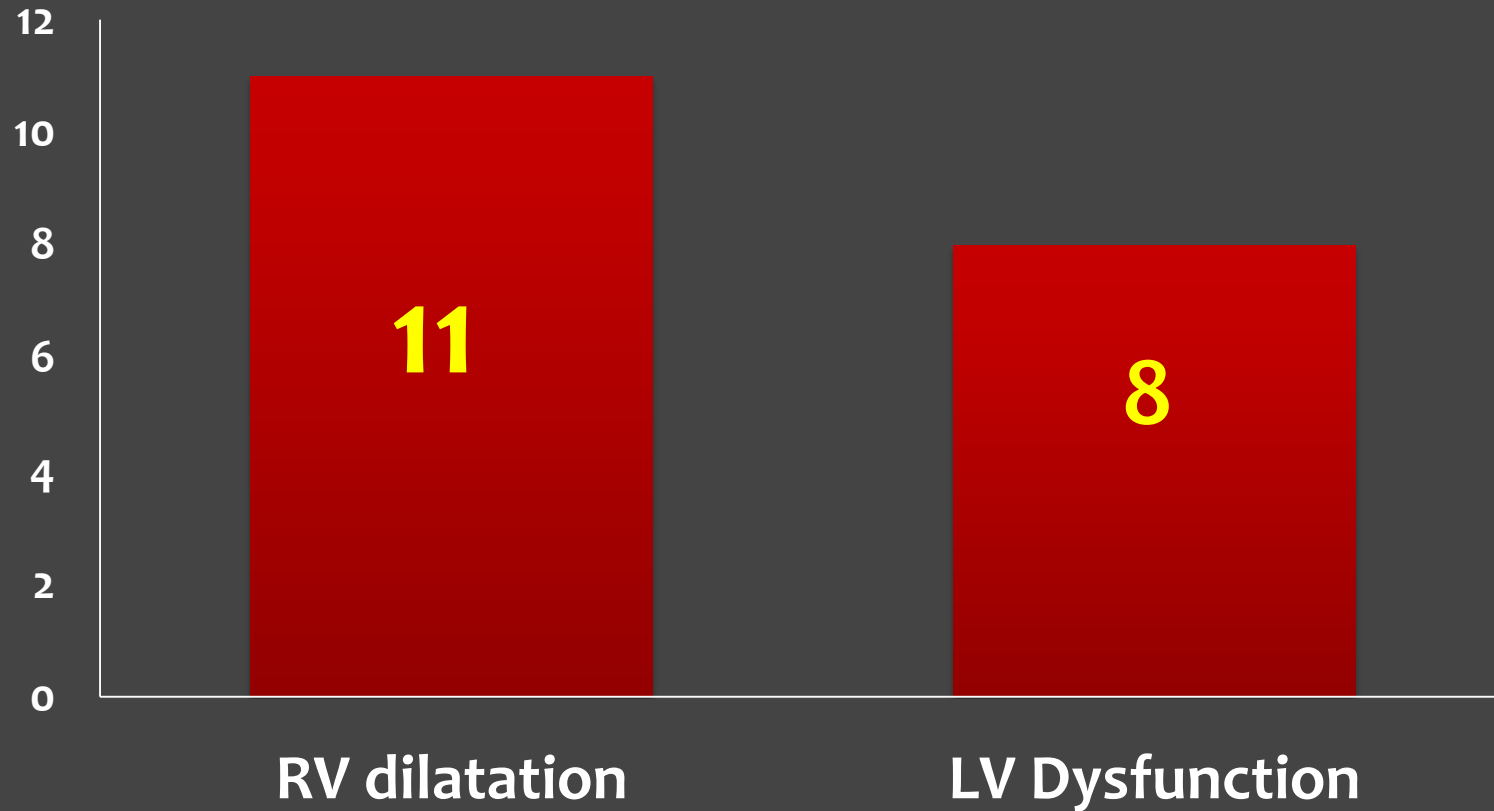
Associated non-cardiac diseases

- Sickle cell disease
- Sepsis with staph and pseudomonas
- Down syndrome
- VACTERAL association
- Thrombus in the left atrial appendage

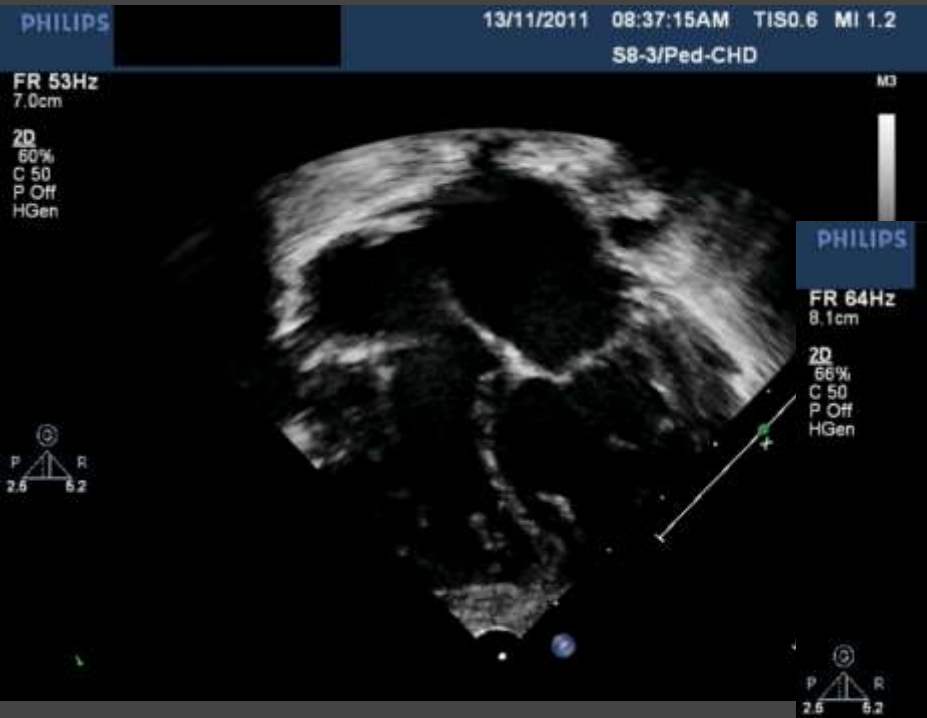
Associated cardiac lesions



Ventricular function



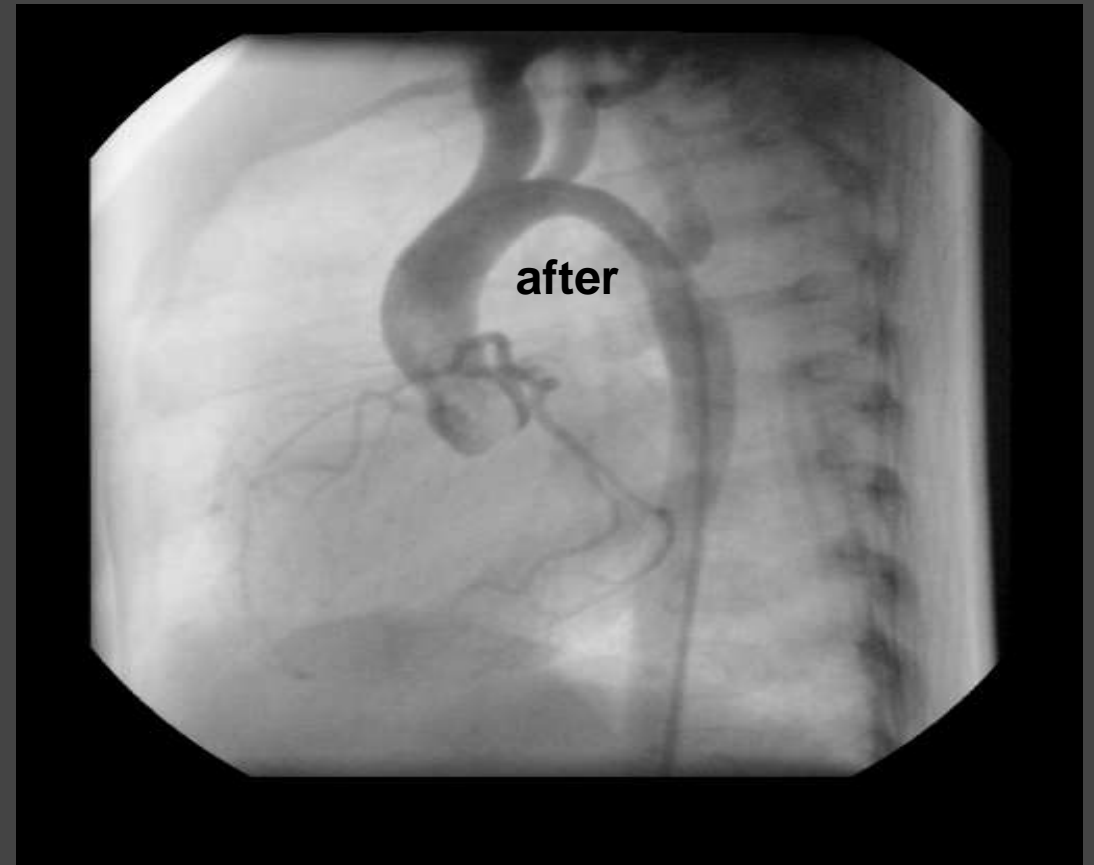
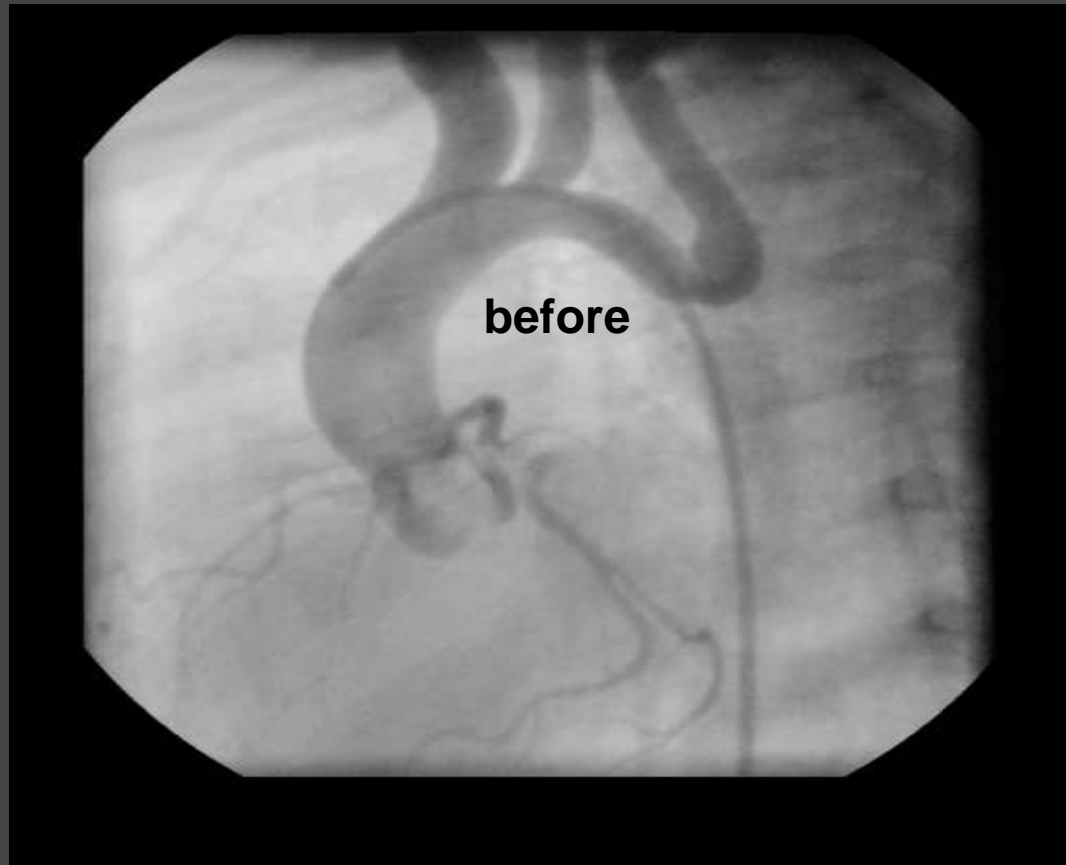
2 mo, m, CHF - LV fx **before**



Procedure of balloon dilation

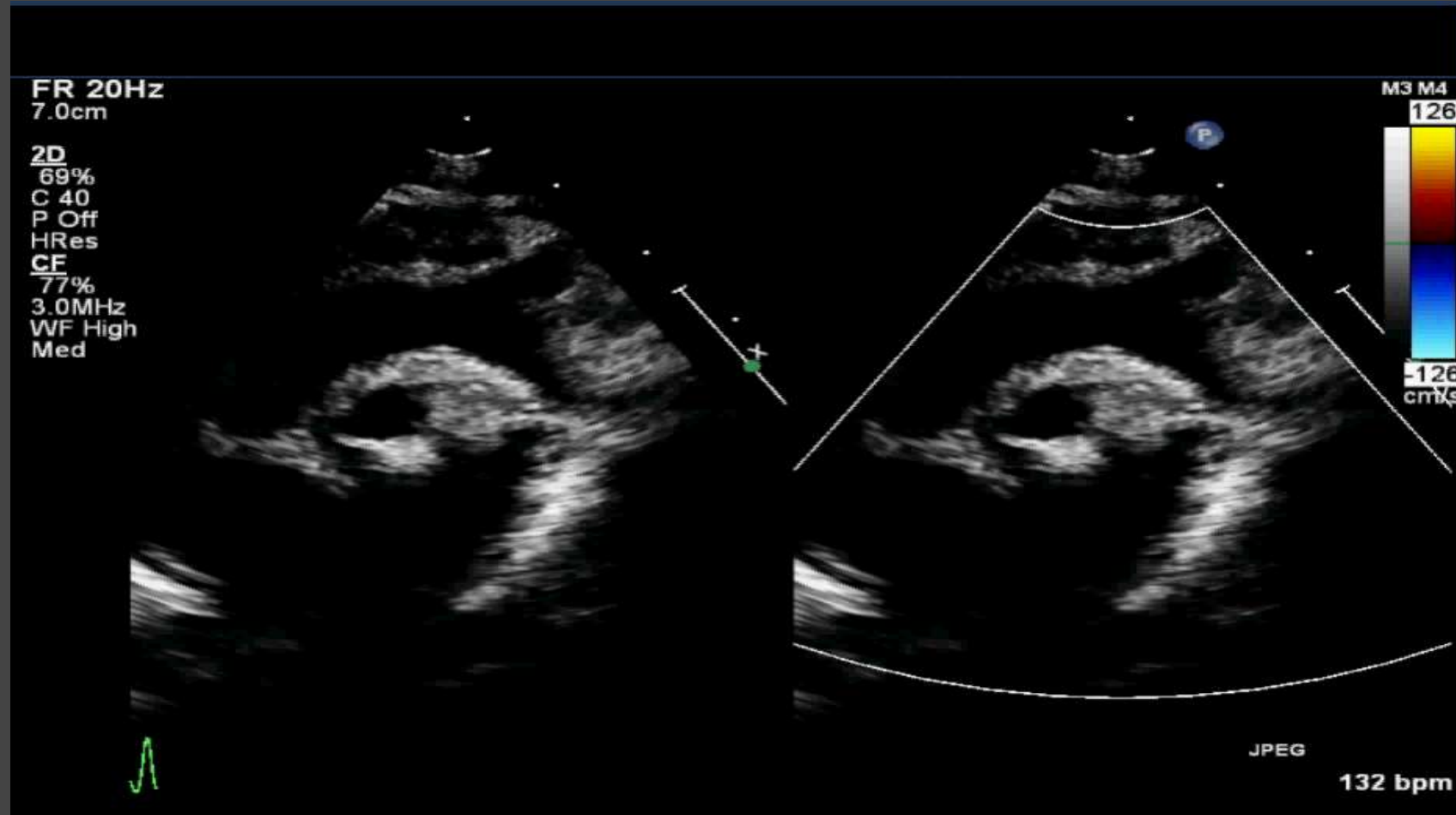
- Under conscious sedation (n = 9)
- 4 Fr sheath
- PTCA / Tyshak / Osypka balloon 4 – 6 mm
- Gradient dropped in all except one

Angio before after BAP coarctation



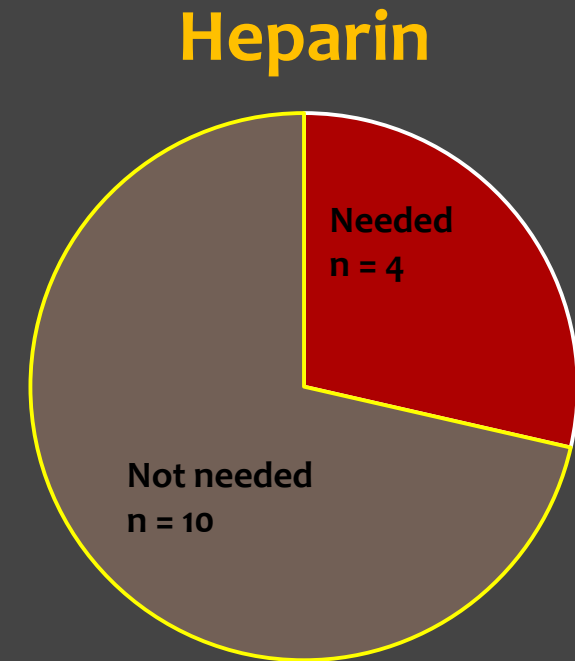
..., 4mo, f, 21 jul 99

Aortic arch Doppler after balloon dilatation



Complications of procedure

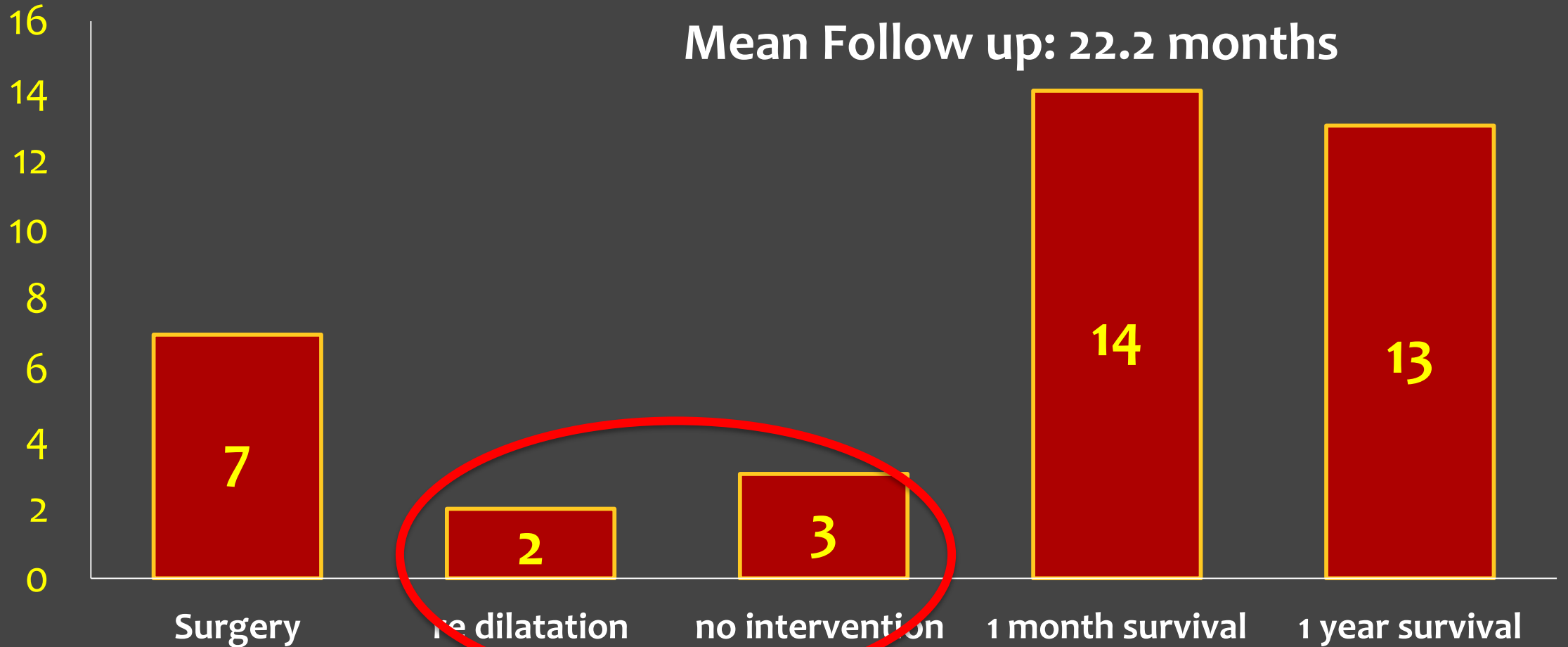
- Transfusion needed in 2 patients
- Absent lower limb pulses in 4



Post procedure

- PGE stopped within 24 hours
- Inotropes weaned within 48 hours
- Respiratory support stopped within 72 hours
- Urine output increased $> 2.3\text{ml/kg/hr}$
- ICU stay 7 - 10 days

Outcome



Sickle cell crisis

Conclusions

Candidates for balloon dilatation in neonatal coarctation

- Late presenter in poor clinical status
- Severe cardiac decompensation and shock
- Multi-organ failure / Cerebral hemorrhage
- Surgeon not available

Take home message

- BAP is an emergency palliative procedure
- Life saving
- Safe and effective
- As a bridge to surgery