‘Sutureless’ repair of pulmonary vein stenosis after TAPV reconstruction

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No Disclosures
Origins of the sutureless approach

Pulmonary vein stenosis

John Coles
Francois Lacouer-Gayet

Post-repair of TAPV
~10-15% develop pulmonary vein stenosis
Incidence of PR-PVS

% Freedom From Reoperation

Events/Year

Years From Complete Repair

Karamlou et al
Post-repair pulmonary vein stenosis

Difficult clinical problem

Two anatomic variants:
- Localized to PV ostia or confluence
- Aggressive retrograde extension
Therapy options

Stents
Transplant
‘Conventional’ surgical repair
  Pulmonary vein included in anastomosis
‘Sutureless’ repairs
  Atrial-pericardial anastomosis
  Pulmonary vein is not part of anastomosis
Objective

Describe application of sutureless techniques to management of pulmonary vein stenosis

Rationale

Technique

- Drawings
- Video

Outcomes
Rationale

Common features of conventional repairs:
- Incision of posterior left atrium
- Corresponding incision into PV confluence
- Direct anastomosis (PV anastomosis)
Hypothesis:
Irregular contour of PV incision $\gg$ fixed distortion when included in a sutureline

- Flow disturbance
- Local injury
- Increased flow velocity/turbulence

Upstream propagation
Sutureless repairs

No direct anastomotic suture

No geometric constraints on tissue

>>> Tissue conforms to local flow patterns
Left sided pulmonary veins

Adapted from Devaney, 2006
Right sided pulmonary veins

Devaney, 2006
Resection techniques

Lacour-Gayet Sem Thor Cardiovasc Surg 2006
Sutureless repairs for TAPV

Konstantinov 2004
Sutureless repairs for TAPV

Positive attributes

Less precision required than conventional techniques >> EASY

Short learning curve

Easier to teach

Less ‘low flow bypass’

Konstantinov 2004
Does it work?
Yun et al

Compared sutureless vs conventional

60 Patients/20 years
73 procedures (40 Sutureless Repairs)
Age: 7 d – 38 m (4.4 m)
Post-Repair PVS

Freedom from reop or death

Sutureless repair

Conventional

p=0.04
PVS score

Grading of PVS

- 0: None
- 1: Mild-Moderate
- 2: Severe
- 3: Occlusion

Summation of 4 PVs
Possible range: 0 - 12
PVS score

P<0.0001

Freedom from Rep or Death

Time (yrs)

PVS score: 0-3

PVS score: 4-7

PVS score: 8-12
Multivariable Analysis

After adjustment for PVS score,

**Sutureless Repairs:**

decreased risk of re-operation or death

\[
\text{HR 0.47} \quad p=0.12
\]

Effect greatest with *Post-Repair PVS*
Conclusions

Freedom from reoperation is diminished with a sutureless repair

….. for patients with post-repair pulmonary vein stenosis

….. but the dominant risk factor is the extent of pulmonary vein stenosis (PVS score)
Prevention of PVS

Should the sutureless technique be used for all pulmonary vein procedures?

Easy to perform
Little morbidity

Additional risks
One patient with air embolism
Prevention of PVS

High risk populations after TAPV repair:
- Small PV confluence
- Pre-operative obstruction / Neonates
- Mixed type
- Small patients (<2 kg)
- Right atrial isomerism

Ease and lack of additional risk and makes the procedure attractive for routine TAPV repair
Conclusions

Sutureless repairs for *treatment* of post-repair pulmonary vein stenosis

>> ‘superior’ midterm results

Sutureless repairs for *prevention* of pulmonary vein stenosis are not (yet) supported with current evidence…

….but can be used with little risk and current evidence strongly suggests that it will offer benefit