Balloon Mitral Valvotomy in Pregnancy: a retrospective case series

National Women’s Hospital and
Green Lane Cardiovascular Service
Auckland
New Zealand
Mitral Stenosis in Pregnancy

Mitral stenosis (MS) poorly tolerated in pregnancy

- Moderate or Severe MS < 1.5 cm²
- Maternal complications - pregnancy & post delivery
  - Heart Failure
  - Acute pulmonary oedema
  - Atrial Fibrillation (up to 15%)
  - Death (up to 3%)
- Fetal Complications
  - Prematurity (20 to 30%)
  - Growth restriction (5-20%)
  - Stillbirth (1-3%)
Mitral Stenosis in Pregnancy: Management

- Medical management
  - rest
  - rate control (b-blockers)
  - diuresis
  - (+/- anticoagulation)

- Interventional
  - percutaneous balloon mitral valvotomy (BMV)
  - surgical closed valvotomy
  - open valvotomy
  - valve replacement
Considerations for BMV

Indications for interventional approach

- **YES**
  - Functionally moderate or severe MS
  - Symptoms refractory to medical management
  - Favourable cardiac features
    - Echo score considering thickening, calcification, mobility and sub-valvular disease

- **NO**
  - LA thrombus
  - Moderate or severe MR
Aims - review of maternal and fetal outcomes following balloon mitral valvotomy in pregnancy

Methodology - retrospective case series review

Case identification - Cardiology records, Hospital database and Catheter Laboratory Records

Inclusion criteria – women who had balloon mitral valvotomy (BMV) during pregnancy at Green Lane Cardiac Centre & National Women’s Health, Auckland City Hospital between 1991 and 2014

Exclusion criteria – women with incomplete cardiac data
Auckland Approach

- Referral from NZ and Pacific Islands
- Multidisciplinary review
  - MFM, cardiology, anaesthesia, obstetric medicine, midwifery
  - Discussion with patient and family
- Procedure ~ 90 mins
  - TOE during procedure
  - 20° left lateral tilt, fetal monitoring
  - Surgical theatre – intensivist, anaesthetist, obstetrician and team immediately available
  - TTE before and after
BMV cases identified (n=34*)

Excluded (n=1) no clinical record

Delivered in NZ (n=28)

Delivered NWH (n=16)

Delivered elsewhere in NZ (n=12)

Delivered in Pacific Islands (n=4)

Auckland BMV in Pregnancy Cohort 1991-2014

33 BMV in 32 women

*1 woman had 2 procedures in same pregnancy
Demographics

- 32 pregnancies (33 episodes BMV)
- 22 women living in NZ
  - 9 from Auckland
- 10 women transferred from Pacific Islands
- Parity – median 2 (range 0-6)
  - 7 of 24 multigravida women symptoms in a previous pregnancy
Domicile and Ethnicity

ETHNICITY
- NZ Maori: 11
- Samoa: 5
- Fiji: 4
- Rarotonga: 3
- European: 2
- Tahiti: 1
- Tonga: 1
- Kiribati: 1
- China: 1
- Pakistan: 1
- Philippines: 1
- India: 1

PACIFIC
- Fiji: 3
- Cook islands: 1
- Kiribata: 1
- Samoa: 3
- Tahiti: 1
- Vanuato: 1

Map showing countries and their locations on a world map.
Cohort – pre BMV

NYHA Class pre BMV

- 3 previous valve surgery
  - 2 surgical valvotomy
  - 1 aortic valve replacement
- 4 left atrial thrombus
  - Treated with enoxaparin until resolved prior to BMV
Cohort – Cardiac Symptoms

- Median gestation at deterioration of symptoms 22 w (range 5-35 w)

Medications

- Diuretics (n=29)
- Rate control (n=25)
  - B-blockers, calcium channel antagonists, digoxin
Cardiac Symptoms Post BMV

- **Median gestation at BMV**
  - 30 weeks (range 13-37 w)

- **91% (n=30) women improved to NYHA I**
  - 1 woman 1\textsuperscript{st} BMV unsuccessful
    - Haemopericardium requiring drain
    - 2\textsuperscript{nd} BMV 3 weeks later NYHA class III\textrightarrow II
    - Complicated by CVA
  - 1 woman NYHA IV\textrightarrow II
## ECHO Results

<table>
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<tr>
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<th>Pre BMV Mean (SD)</th>
<th>Post BMV Mean (SD)</th>
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<tbody>
<tr>
<td>MV Area (cm²)</td>
<td>1.00 (0.23)</td>
<td>2.0 (0.5)</td>
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<tr>
<td>MV Gradient (mmHg)</td>
<td>17.8 (4.1)</td>
<td>7.8 (3.1)</td>
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<td>PAP syst (mmHg)</td>
<td>59 (19)</td>
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BMV Maternal Outcomes

- No complications: n=25 (76%)
- Maternal deaths: n=0
- Outpatient management n=29 (91%)
- Moderate MR: n=1 (3%)
- Unstable arrhythmia: n=1 (3%)
- CVA (dysphasia): n=1 (3%)
  - with 2nd BMV in same pregnancy
- Haemopericardium: n=5 (15%)
Haemopericardium complications

1) Uncomplicated clinical course
2) BMV1 (30 wks) BMV2 (33 wks), CVA (dysphasia), Atrial Fibrillation, Preterm delivery (36 wks) and NICU x 7 days,
3) Proceeded to emergency closed valvotomy
   Good result and delivery in Tahiti
4) Episode fetal distress x 15 minutes & stable post pericardial drain
   Subsequent uncomplicated term delivery
5) Pericarditis + unstable atrial fibrillation on day 8 post-discharge
   Subsequent uncomplicated term delivery
Median gestation at delivery 39 w (range 34-41)

- Spontaneous vaginal delivery n=18
- Induction of labour n=5
  - Vaginal delivery n=2
  - Forceps delivery n=1
  - Emergency CS for fetal distress n=2
- Caesarean section n=5
  - Emergency
    - Spontaneous labour with failure to progress (n=3)
    - PPROM/chorioamnionitis @ 34 w (n=1)
  - Elective for previous CS (n=1)
- Unknown - returned to Pacific Island (n=4)
Infant Outcomes

- **Mean birthweight 3180g (+691)**
  - unknown in 2
- **SGA infants 5 (15.6%) bw <10th centile**
- **NICU admissions 4 (12.5%) unrelated to BMV**
  - 1 preterm + chorioamnionitis
  - 2 SGA + preterm
  - 1 SGA
- **No fetal loss or neonatal deaths**
Discussion and Conclusion

- Good maternal and fetal outcomes
- Majority of women significant and rapid improvement in symptoms
- Facilitated uncomplicated delivery
- Haemopericardium in 15% but good outcome once stabilized
- Identification and treatment pre-pregnancy preferable
- BMV recommended in women with symptomatic severe MS in pregnancy
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