Obstetric Transfer

Balancing the Risks

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Tiered levels of care

- Level 0 (no service)
- Level 1 (post-natal only)
- Level 2 (small rural GP service)
- Level 3 (larger rural GP service with OT etc.)
- Level 4 (regional or urban specialist service)
- Level 5 (tertiary care)
- Level 6 (quarternary care incl. surgery, cardiac)
2,500km (1,500m)

Based on Statistical Local Area boundaries. 1 Dot = 1000 people.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preterm</td>
<td>22 to 37 completed weeks (40)</td>
</tr>
<tr>
<td>VLBW</td>
<td>Very Low Birth Weight (&lt; 1,500g)</td>
</tr>
<tr>
<td>In-utero</td>
<td>Maternal transport (carrying fetus)</td>
</tr>
<tr>
<td>Ex-utero</td>
<td>Baby transport (post delivery)</td>
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<tr>
<td>PL</td>
<td>Preterm labour</td>
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<tr>
<td>TPL</td>
<td>Threatened PL</td>
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<tr>
<td>SPL</td>
<td>Spontaneous PL</td>
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<tr>
<td>ROM</td>
<td>Rupture of membranes</td>
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<tr>
<td>PROM</td>
<td>Prolonged ROM</td>
</tr>
<tr>
<td>PPROM</td>
<td>Preterm PROM</td>
</tr>
<tr>
<td>PPH</td>
<td>Post partum hæmorrhage</td>
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</table>
Indications for maternal transport

May relate to the woman or to the unborn baby
• when either requires the advanced skills and resources of a higher Level centre
• when it is expected that the infant will need care in a higher Level

The method and timing of transfer will depend on:
• the clinical circumstances
• distances and, at times, the geographic and climatic conditions.

The most frequent reasons to consider maternal transport are:
• threatened preterm birth due to preterm labour or preterm rupture of membranes
• severe pre-eclampsia or other hypertensive complications of pregnancy
• Antepartum / Postpartum hæmorrhage

Other issues may have a significant bearing on the problem:
• multiple pregnancy
• intrauterine growth restriction
• suspected fetal abnormalities

§ PERS – Perinatal Emergency Referral Service. Victoria. Australia
The dilemma

• Unable to plan for optimal place of birth?
  – Previous history
  – Multiples (twins etc.)

• Emergency transfer of the obstetric patient?

• What is the balance of risk?
  • Lower level of care in transit
  • Maternal complications
  • Neonatal complications - In flight delivery
  • Neonatal resuscitation
  • Two patients
Risk profile

• How long is the window of opportunity?
  – Primipara
  – No labour
  – Good response to tocolysis
  – No pressure to deliver quickly (for mother/baby)
• Lower gestation = Lower risk of immediate birth
• Lower gestation = More difficult resuscitation
• Lower gestation = Closing gap between risks of birth in aircraft and referring hospital
Differences in approach

• In labour = Might deliver
• No fly rule
  – > 3cm cervical dilation
  – No response to tocolysis
• Low gestation (< 28 weeks)
  – Aggressive tocolysis
  – Take a chance
• Case-by-case triage
  – Maternal-fetal-medicine specialist
Balance of Risks?

- Lower level of care in transit
- Maternal complications
- Neonatal complications - In flight delivery
- Neonatal resuscitation
- Two patients
More in utero than ex utero transfers
Ex utero transfers had higher mortality
In utero transfers had lower mortality and shorter length of hospital stay
VLBW Survival

• Preterm births increasing; from 6% to > 8%
• Very low birth weight rates rising§
• Mortality depends on place of birth*
  • From 132.1/1000 to 283/1000 live births
  • Highest death rate for infants born at hospitals offering the lowest level of care

VLBW = Very Low Birth Weight (< 1,500g)
In flight delivery?

- No airborne births in 357 helicopter transfers
  - 315 were in active labour
  - 72 in the accelerated phase of labour
  - Flights were screened
- One airborne birth in 88 fixed wing transfers

§ Journal of Emergency Medicine Volume 6, Issue 1, January-February 1988, Pages 41-48
USA

- 203 programs surveyed
- 133 responders
  - 45.6 missions per year
  - 52% required neonatal resuscitation certificate
  - 56% of aircraft permitted pelvic access
  - 50% involved obstetricians in tasking
  - 22% had specific tasking protocols
  - 60% anxious about in flight delivery

Southern USA

- 80 fixed wing transfers over 2 years
- Complications
  - Nausea and vomiting 80%
  - Increased contractions 8%
  - Hypertension 1.3%
  - Hypotension 1.3%
  - Decreased respiratory drive 1.3%
  - Infiltrated IV line 1.3%
  - In flight deliveries 0

Long-distance Fixed-wing Transport of Obstetrical Patients. O’Brien, Daniel J. MD; et al
Which patients don’t need transfer?

- **Fetal fibronectin§**
- Glycoprotein promoting adhesion between fetal chorion and maternal decidua
- Absent between 24 and 36 weeks
- Positive test suggests delivery < 1 week
- Negative test suggests later delivery (99%)
- 90% reduction in maternal transfer
- Not helpful if cervical dilatation present

Management

- IV x 2§
- Anti-emetic
- Labour suppression (tocolysis)
- Ultrasound evaluation*
  - Fetal heart rate
  - Position, movement & general placental condition

§ PERS – Perinatal Emergency Referral Service. Victoria, Australia
Transferring the patient

- Need to move?
- Appropriate destination?
- Safe to move?
- Manage the risks
  - Triple therapy = Antibiotics, Steroids, Tocolysis
  - Response to suppression
  - Recurring reassessment
- Patient care
  - Consider IDC
  - Anti-emetic +/- nasogastric tube
  - Lateral tilt
  - Supplemental oxygen
  - Transfuse if Hb < 7 g/dL
Western Australia

- 500 consecutive transfers of women in preterm labour to the tertiary centre
- Ruptured & intact membranes
- Established preterm labour (regular contractions $\geq 1:10$ mins with cervical changes)
- Threatened preterm labour (irregular or regular contractions without accompanying cervical changes)
- Gestation 20$^{+0}$ and 36$^{+6}$ weeks

§ Royal Flying Doctor Service – Western Australia 2011
<table>
<thead>
<tr>
<th>Factor</th>
<th>Median (IQR) time to delivery (days)</th>
<th>Multivariable analysis</th>
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<td>Membranes</td>
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<td>1 (0-2)</td>
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432 cases

- Gestational age at transfer = 32 weeks (20.6–36.9) (IQR 29-34)
- No mid-flight deliveries or serious complications
- Median total mission time = 5.5 hours (1.8–40.6) (IQR 3.8–8.2)
- Median total flight time = 76 mins (30–448)
- Median distance = 393 km (131–2811 k)
- 102 transfers (23%) > 1000 km
Reason for referral

- Premature PROM only 103 (23.5)
- Threatened PreTerm Labour only 243 (55.4)
- Spontaneous PTL only 38 (8.7)
- TPTL & Rupture of Membranes 47 (10.7)
- SPTL & ROM 8 (1.8)
Patient locations

[Map of Western Australia with regions indicating numbers of patient locations: Kimberley 44, Pilbara 50, Midwest 86, Goldfields 66, Wheatbelt 40, Great Southern 114, Southwest Southern 39.]
### Infant deaths - Wyoming, USA

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<th>Year</th>
<th>Rate/1,000</th>
<th>Rank</th>
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<tr>
<td>1971</td>
<td>24.5</td>
<td>48th</td>
</tr>
<tr>
<td>1982</td>
<td>6.3</td>
<td>2nd</td>
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- Population 470,000
- Birth rate 10,500
- Hospitals 27

- Sparse population
- Few metro areas
- No tertiary care

- Early recognition of high-risk mothers
- Aggressive maternal transport
- Vigorous resuscitation and stabilisation
- Rapid air transport to a tertiary hospital
- Funding patient transport
- Increased trained practitioners/tertiary experience

Summary

- Preterm outcomes better with in utero transfer
- Know your population and the transfer outcomes
- In flight delivery risk over-stated
- Selecting the appropriate patient
- Process of minimising the risk
- Fear of the unknown
- In-flight delivery no worse than small hospital delivery