Maternity Critical Care – The Obstetricians' Agenda

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Liverpool Women’s

- Stand alone site around 8 000 deliveries per year
- Tertiary referral centre
- Well developed Maternal HDU
- All needing ventilation need inter-hospital transfer
- Collects CCMDS data on all HDU admissions
  - The only maternity unit to do so
- We do not currently submit ICNARC data
Population
Past

CEMACH

88 - 90 “properly equipped, staffed and supervised high dependency area in every consultant obstetric unit”

SAFER CHILDBIRTH - 2007

“all obstetric units should be able to provide some high dependency care”

1 in 100 deliveries
CEMACH 00-02

- Early consultant-to-consultant referral is needed.

- Referral to the intensive care unit is not of itself a treatment.

- Intensive care should start as soon as it is needed and does not need to wait for admission to an intensive care unit.

- Early intensive care admission will not cure everybody but delays cannot help.

- Intensivists should be part of the multidisciplinary team planning care for patients with serious co-morbidity.

- Elective admissions should be prearranged.
The recognition of life threatening illness is challenging.

Physiological reserves increase in pregnancy and may further conceal the development of serious pathology.

Modified early warning scoring systems improve the detection of life threatening illness.

It is the subsequent management that will alter the outcome.
The unit was known to take women whose pregnancies represented a high risk, yet it did not have a high dependency unit.
Present

- Survey of Provision of Obstetric High dependency care
- 2 (1.2%) units were unable to provide any form of HD
- 72 units (43%) have no formal obstetric HD bed provision
- 96 (57%) have designated obstetric HD bed provision
- 142 units (84.5%) have an on site ITU
- 83% of units with obstetric HD bed provision had an on site ITU
- Four of those units with designated obstetric HD beds are stand alone units (mean number of deliveries 5375 +/- SD 2496).
Where is high dependency care for obstetric patients provided?

<table>
<thead>
<tr>
<th>Location of HD care</th>
<th>Number of units (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooms on delivery suite</td>
<td>40</td>
</tr>
<tr>
<td>Designated obstetric HD unit</td>
<td>40</td>
</tr>
<tr>
<td>Surgical HD unit</td>
<td>3</td>
</tr>
<tr>
<td>Obstetric theatre/recovery</td>
<td>7</td>
</tr>
<tr>
<td>Delivery suite/surgical HD unit</td>
<td>6</td>
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</tbody>
</table>
Who cares for the woman?

![Bar chart showing percentage of units for different roles in caring for women during labor.](chart.png)

- **Midwives**: 78.1%
- **Nurses**: 11.3%
- **Midwives/nurses**: 8.9%
- **Midwives/theatre outreach team**: 12.5%
- **No response**: 2.4%
- **Not applicable**: 1.8%

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**Legend**

- All units
- Units with >=1 HD bed
Midwifery training in for HDU

• 57 (59%) maternity units employ midwives with formal training in the care of HD patients.

• 44 (77%) of these this training is provided in house.

• Mean weekly provision of formal high dependency nursing care is 91.9 hrs (range 0-168).

• 38 (40%) units provide 168 hour per week formal high dependency midwifery/nursing care/week.
Who provides medical care?

- Obstetricians and anaesthetists
- Anaesthetists
- Obstetricians
- Obstetricians, anaesthetists and intensivists
Has obstetric high dependency care changed in the UK?

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designated Obs HDU beds</td>
<td>42%</td>
<td>41%</td>
</tr>
<tr>
<td>O₂ Sats monitoring</td>
<td>92%</td>
<td>86%</td>
</tr>
<tr>
<td>CVP</td>
<td>80%</td>
<td>81%</td>
</tr>
<tr>
<td>Arterial Line</td>
<td>58%</td>
<td>36%</td>
</tr>
<tr>
<td>Swan Ganz</td>
<td>16%</td>
<td>7%</td>
</tr>
<tr>
<td>Blood bank on site</td>
<td>92%</td>
<td>88%</td>
</tr>
<tr>
<td>ITU on site</td>
<td>92%</td>
<td>81%</td>
</tr>
</tbody>
</table>

Is Obstetric ‘High Dependency’ the same as ‘Critical Care’?
What is critical care

Comprehensive Critical Care - 2000

Division into “high dependency” and “intensive care” be replaced by classification based on severity of illness and **level of care** needed **regardless of location**

Levels of Care - revised 2009

- Original definition (2000) excluded care on labour ward - now included
Levels of Care

- **Level 0** - normal ward care
- **Level 1** - needing more observation

Critical Care:

- **Level 2** - support of one organ
  - Basic respiratory &/or cardiovascular support
- **Level 3** - advanced support
  - Advanced respiratory support alone
  - Support of 2 or more organs
What is in our HDU’s on LW?

**Placenta Praevia, slight PV bleed, observation?**
- Level 1 – not critical care

**Diabetic, post delivery, blood glucose monitoring?**
- Level 1 – not critical care

**Morbidly obese, post GA Caesarean section, kept overnight?**
- On O2 >50% to maintain saturation – Level 2 - BRS
- +/- arterial line to measure BP – Level 2 - BCVS
34 weeks, severe PET, fluid restriction. IV Hydrallazine and Magnesium Sulphate

Level 1

...then needing IV labetalol and arterial line

- Level 2

..... Eclamptic convulsions

- Level 3 (CVS + Neuro support)

...CS

...Intrapartum haemorrhage
- Instrumental delivery
- Collapse - haemorrhage
- Syntocinon/carboprost/ergometrine
- Level 1
- Hysterectomy invasive CVS monitoring
- Level 2 (BCVS)
- Kept ventilated few hours – waiting ICU bed (ARS)
- Level 3
The power of numbers
Why Maternal HDU?

- ITU admissions 2-4/1000 \(^1\)
- Half of women admitted to ICU were suitable for intermediate or high dependency (HDU) care \(^2, 3\)
- An obstetric HDU reduced admissions to ICU by half \(^4\)
- 15% transferred from Obstetric HDU to ICU
- 70% for ventilation
- 30% underlying medical condition
- 97% Transferred back to HDU
- 50% < 24 hours on ICU

\(^1\) Zeeman Crit Care Med 2006
\(^2\) Hazelgrove et al Crit Care Med 2001
\(^3\) Mirgahani et al Int J Anesth 2004
\(^4\) Ryan et al Anaesthesia 2000
Quantification

• We have excellent data regarding
  – maternal death rates (14/100,000)
  – critical care utilisation (260/100,000).
• LWH is the only maternity unit to submit CCMDS so nationally difficult to quantify rates for women who require
  – a higher level of monitoring
  – single organ support
• Consistent rates of 5% have been published
  
  Saravanakumar K et al. *Anaesthesia* 2008;**63**(10):**1081–1086.*
ICNARC 2008-11
Female Critical Care Admissions aged 16-50
36,244 (28% of all critical care admissions)

Currently Pregnant
798 (2.2%)
Non Obstetric reason for CC admission
734 (92%)

Recently Pregnant
3551 (9.8%)
Obstetric reason for CC admission
3266 (92%)
Calendar days (00:00 to 23:59) of care, by Level of care, for female admissions to critical care, aged 16-50 years, reported either “currently pregnant”, “recently pregnant” or neither on admission to the critical care unit (see: Appendix 2 for definitions)
Maternal HDU admissions LWH 07-10

- 32000 Births
- 1559 Maternal HDU admissions - 3191 bed days
- 697 Level 1 admissions
- 862 Level 2/3 admissions - 1890 bed days
- 32 (2%) of all HDU admissions transferred out
- 4% of Level 2/3 critical care admissions transferred out
  - 15 Level 3 ITU transfers (0.04:1000 of maternities)
  - 17 Level 2 transfers for specialist care
- No deaths.
Reasons for Admission

- Haemorrhage: 36%
- PIH: 34%
- Diabetic: 9%
- Sepsis: 5%
- Monitoring: 2%
- Cardiac: 1%
- Resp: 1%
- Other: 3%
Future- Extrapolating to England and Wales

- 700,000 births per year
- 38,000 Maternal HDU admissions
  - 79,000 bed days
- 21,000 Level 2/3 admissions
  - 47,000 bed days
- ICNARC report had 500 admissions
- Would existing Critical Care Services be able to provide care for this number of additional patients?
- Should Maternity Services provide this for common obstetric complications?
Advantages of Obstetric HDU over ITU

• Concurrent availability of obstetric and critical care management
• Awareness of physiology and pathology of the maternity patient
• Fetal monitoring in antenatal patients
• Avoiding hazards of transfer
• Keeping mum and baby together
• Improved continuity of antenatal and postnatal care

Disadvantages of a designated obstetric HDU - Medical Issues

• Included in Obstetric SSMs and Subspecialty Training
• Critical care is included in anaesthetic training
• Consultant Anaesthetists need ICM Step 1 competencies
• Juniors may have less experience of ill patients
• Structured obstetric critical care curriculum improved knowledge from 30%-69% ¹

¹ Plante; Crit Care Med
Competencies

• Defined within ‘Competencies for Recognising and Responding to Acutely Ill Patients in Hospital’ (DH, 2008).

• Define the knowledge, skills and attitudes required for safe and effective treatment and care along the Chain of Response.
Maternal and critical care aspects of the pathway should be delivered equitably, always remembering the goal of keeping mother and baby together unless precluded by a clinical indication.
The quality of critical care should not be compromised by providing this where the required competencies are not available within the maternity units staff or through critical care outreach.

The quality of her maternity care is should not be compromised if circumstances require transfer to a general critical care setting.
Future - Model 1

- Suitable area within the maternity service
- Appropriate dedicated equipment
- Medical input from consultant anaesthetic staff with the minimum of Step 1 competencies in ICM, and consultant obstetricians
- Midwives with the necessary critical care competencies.
- Local arrangements for input from other disciplines
- Escalation protocols for level 3 care.
The Maternal Critical Care Team
Future- Other models

• Importing critical care skills onto labour ward
  – Critical Care Outreach
  – other arrangements with local critical care services.

• Transferring women to a general level 2 unit
  with local arrangements for:
  – providing obstetric and midwifery input and competences
  – maintaining direct contact with their baby.
I get by with a little help from my friends.

John Lennon
Maternity Critical Care - where best?

• Critical Care Services do not have the capacity to take on straightforward level 2 care for common obstetric complications
• There is evidence to support specialist maternal critical care on LW
• We need to use same nomenclature and provide the same level of critical care competencies
• There are obstacles.
• The challenge is to overcome these.
Acknowledgements

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