Mother, Babies and Blood
South West Regional Study Day
28th Jan 2015
Obstetric Cell Salvage

Mr John Faulds
Patient Blood Management Manager
Royal Cornwall Hospital
What is Patient Blood Management?

Patient blood management (PBM) views a patient’s own blood as a valuable and unique natural resource that should be conserved and managed appropriately.

PBM is a multidisciplinary, multimodal, evidence based, patient centred approach to optimising, conserving and managing the patient’s own blood.

PBM puts the patient at the centre of decisions made about transfusion
Patient Blood Management – The Future of Blood Transfusion
A joint initiative with The Department of Health and The National Blood Transfusion Committee

What is being done?
A panel of experts and influencers in the field are being invited to consider international best practice and what can be done to ensure a Patient Blood Management approach is adopted across England and North Wales.

Blood Matters: doing nothing is not an option
Sir Bruce Keogh, NHS Medical Director

Sustainability of the blood supply
While the demand for red cells is stable, the demand for platelets increased by 8% in the last year. The recent increase in the use of platelets is projected to continue due to a number of factors such as medical advances and an aging population. Only 4% of the eligible population give blood, and new donors are always needed to replace regular donors who can no longer donate.
Six Key Points

- Intra Operative Cell Salvage (ICS) is an efficacious technique for blood replacement.
- ICS should be seen as part of a Blood Conservation program.
- ICS should be undertaken regularly in obstetrics, allowing teams to gain ICS experience.
- Patients should be informed of theoretical issues around ICS prior to surgery.
- Teams should consider following up patients, to evaluate the risk of alloimmunisation.
- Teams should consider implementing a Quality Control program, when offering an ICS service.
Intraoperative Cell Salvage in the Emergency Situation

When used in unfamiliar / emergency situations, cell salvage may lead to a poor outcome! Resulting from lack of knowledge and confidence in the equipment, therefore producing a reduced quality end product?
RCHT - Three “A” Principal (PBM)

Alternatives – Algorithms supporting transfusion, Intravenous Iron, erythropoietin

Autologous – Intra/post operative Cell Salvage

Allogeneic - Appropriate transfusion
Blood Conservation Service Pledge
Royal Cornwall Hospital

The Royal Cornwall Hospital employs and supports a patient blood management programme.

Background
Since 2003 Blood Conservation strategies have been implemented within the Royal Cornwall Hospital to support the reduction of allogeneic (donor) blood transfusion peri-operatively. Initially focussed on conserving blood during orthopaedic surgery, the service has since expanded to include all surgical specialities, and evolved into a Patient Blood Management Programme.

The current blood management programme aims to reduce the consumption of allogeneic blood in the surgical setting, in the following ways

1. Optimise patients’ Hb (blood count) levels before surgery.
2. Use appropriate cell salvage techniques to collect patients’ own blood for re-infusion peri-operatively.
3. Implement a comprehensive blood conservation, competency based training program for all staff involved in cell salvage and blood conservation.
4. When indicated, support the use of blood transfusions, ensuring that updated and current practice is employed and patient consent is sought whenever possible.
5. Educate staff to always consider the use of alternatives to blood transfusion when appropriate.
6. Monitor the use of cell salvage, audit interventions, collect and disseminate data relating to blood conservation.
7. Undertake research and publish outcomes in relevant areas of blood conservation.
CONSENT FORM 1
PATIENT AGREEMENT

Name of Proposed Procedure or Course of Treatment (including brief explanation if medical term not clear): C/S

Statement of Health Professional (to be filled in by health professional with appropriate knowledge of proposed procedure as specified in consent policy):

I have explained the procedure to the patient/parent. In particular, I have explained:
The intended benefits: To deliver baby safely.

Serious or frequently occurring risks: Infection, bleeding (more than is expected), blood clots, wound problems (e.g., bruising, pain, or very minor breaking down), damage to other organs (e.g., bladder or bowel), baby can get bruised or cut, baby can have breathing problems (and need admission to the special care unit, especially when delivery occurs before 39 weeks). In the future, increased chance of needed a C/S and of the placenta being abnormal or low. Very rarely, the scar in the uterus can rupture in a future pregnancy or labour.

Any extra procedures which may become necessary during the procedure:

X blood transfusion: Sometimes required if there is particularly heavy bleeding. We may be able to offer "blood salvage" where any own blood can be recycled. This should offer advantages over using donated blood, but there are theoretical risks of reacting against cells that originally came from the baby. Whilst we think these are extremely unlikely, it could cause allergic reactions or make antibodies affect future pregnancies.

X other procedure: In the case event of other organs being damaged, any injury may need repair (please specify). Severe bleeding may need to be controlled by surgery, extremely rarely this can require a hysterectomy. If other problems are found (e.g., a cyst on the ovary), we can also address this.

I have also discussed what the procedure is likely to involve, the benefits and risks of any available alternative treatments (including no treatment) and any particular concerns of this patient.

☐ The following leaflet/tape has been provided:

This procedure will involve:

X general anaesthesia ☐ local anaesthesia ☐ sedation

Signed _______________________ Date ________________________

Name (PRINT) _______________________ job title ________________________

Contact Details (if patient wishes to discuss options later): Delivery Suite (01672 252361)

Statement of Interpreter (where appropriate):

I have interpreted the information above to the patient to the best of my ability and in a way in which I believe she can understand.

Signed _______________________ Date ________________________ Name (PRINT) ________________________

YELLOW TOP COPY - HEALTH RECORDS White copy accepted by patient: yes or no (please ring)
Patients have to Opt out not in!

Any extra procedures which may become necessary during the procedure

- blood transfusion: Sometimes required if there is particularly heavy bleeding. We may be able to offer “blood salvage” where your own blood can be recycled. This should offer advantages over using donated blood, but there are theoretical risks of reacting against cells that originally come from the baby. Whilst we think these are extremely unlikely, it could cause allergic reactions or mean antibodies could affect future pregnancies.

- other procedure: In the rare event of other organs being damaged, any injury may need repair.

(please specify) Severe bleeding may need to be controlled by surgery; extremely rarely this can require a hysterectomy. If other problems are found (e.g. a cyst on the ovary) we can also address this.
Cell salvage: How Does it Work?
Haemonetics
Cell Saver 5+
Intraoperative Cell Salvage Disposable set

Next step

- Control Panel
- Reinfusion Bag
- Reservoir Line
- Saline Line
- Tubing Manifold
- Centrifuge Bowl
- Waste Bag Weigher Hooks
- Effluent Line Sensor
- Waste Bag
- Reinfusion Line
- Centrifuge with bowl, optics and fluid sensors
- Fluid deck (with valves, air detectors and pump)
- Reservoir holder with level sensor
- Waste bag
Once the preset reservoir level has been reached, the machine will enter the fill state.

Drip rate should be set at 1-2 drops per second.
Fill Cycle
Washing Cycle
Empty Cycle
Intraoperative Cell Salvage at RCHT in maternity from 2011

- Routine collection of blood to cell saver - not targeted to high risk cases
- Usage increased to over 90% by end 2011, 95% 2012, 96% 2013 and >98% so far 2014
- Competency based training for all anaesthetic assistants
- Blood processed in 1/3rd all collections and only when adequate volumes collected
- Re-infusions offered to all women
- Invited for 4 - 6 month follow up
Risks and benefits

RISKS
Amniotic fluid embolism
Fetal red cell contamination and risk of alloimmunisation
Use 1 suction device

BENEFITS
Autologous blood
Avoid or reduce allogeneic blood consumption
Alloimmunisation

- Fetal red cell contamination in cell salvage blood
- Transplacental haemorrhages result in maternal contamination
- Clinically significant antibodies other than anti-D
- Incidence of antibody formation unknown
- Follow up 4-6 months post re-infusion
Results 2014

- Service established as routine
- $853/869 = 98\%$ of cases had blood collected
- 30\% processed (226 cases)
- 146 women were re-infused (64\% of processed collections)
- Average volume 221 mls
- Follow up cases 2014 - ?
- New Abs detected
### Transfusion/ICS rates

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<th>2007</th>
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</thead>
<tbody>
<tr>
<td>Total obstetric patients - allogeneic tx’s</td>
<td>60</td>
<td>79</td>
<td>64</td>
<td>59</td>
<td>58</td>
<td>48</td>
<td>39</td>
</tr>
<tr>
<td>Del Suite patients - allogeneic tx’s</td>
<td>46</td>
<td>58</td>
<td>43</td>
<td>44</td>
<td>40</td>
<td>35</td>
<td>31</td>
</tr>
<tr>
<td>ICS cases</td>
<td>9</td>
<td>20</td>
<td>25</td>
<td>34</td>
<td>79</td>
<td>120</td>
<td>142</td>
</tr>
</tbody>
</table>
Allogeneic and autologous transfusions

YEAR

NO. OF CASES

Total obstetric patients transfused ALLOGENEIC
Total Delivery Suite patients transfused ALLOGENEIC
Cell salvage cases
# Number of units transfused in Obstetrics

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<th>2013</th>
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</thead>
<tbody>
<tr>
<td>Total Obstetric units tx’ed</td>
<td>173</td>
<td>259</td>
<td>192</td>
<td>155</td>
<td>167</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Ante-natal units</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Post-natal units</td>
<td>27</td>
<td>45</td>
<td>48</td>
<td>25</td>
<td>30</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Delivery Suite units</td>
<td>143</td>
<td>214</td>
<td>142</td>
<td>130</td>
<td>134</td>
<td>82</td>
<td>61</td>
</tr>
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## Obstetric transfusion rate per delivery

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<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>No of deliveries in Cornwall</td>
<td>4349</td>
<td>4354</td>
<td>4428</td>
<td>4688</td>
<td>4628</td>
<td>4612</td>
</tr>
<tr>
<td>Obstetric patients tx’d per delivery (%)</td>
<td>1.8</td>
<td>1.5</td>
<td>1.3</td>
<td>1.2</td>
<td>1.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Delivery Suite patients tx’d per delivery (%)</td>
<td>1.3</td>
<td>1.0</td>
<td>1.0</td>
<td>0.9</td>
<td>0.8</td>
<td>0.6</td>
</tr>
</tbody>
</table>
Treated for infection

**Blood**
- Cell salvage
- Allogeneic
- No transfusion

**Infections treated post op**
- 29%
- 42%
- 30%

**EBL**
- 750ml
- 1450ml
- 575ml
Reasons salvaged blood is not reinfused back?

Two main Reasons

- Partial Bowls
- Patients decline – WHY?

- Misunderstanding?
Benefit of ICS in Obs

- Reduction in Tx rate seen from 2008.
- Cost consumables (processing)
- Partial bowls – use of LDF – reduce costs further
- Reduction in costs of producing blood and treatment ATR
- Reduction in post operative infections, readmissions and potentially LOS
- Future....less risk of exposure to mothers of infection from emerging pathogens
Conclusion

The present
- The routine use of ICS in the maternity operating theatre is part of RCHT’s blood conservation strategy.
- Autologous blood is a suitable and safe alternative to allogeneic blood.
- Using autologous blood has reduced the number of units used and % women who have received donor blood.
- Using ICS routinely in maternity saves money

The future
- Establish the incidence of antibody formation following re-infusions from IOCS.
- ?Salvage and re-infuse vaginal blood
Thank You To The
Patient Blood Management Team
At RCHT

- Dr C Ralph
- Mr I Sullivan
- Carol McGovern

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