Mothers, babies and blood
8th March 2012
South West Regional Transfusion Committee
Obstetric Cell Salvage

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ICS is being increasingly used in the UK in obstetrics for women at risk from massive obstetric Haemorrhage during caesarean section. In the year 2005-2006, 38% of UK maternity units used ICS, and 28% included the use of ICS in their Massive Obstetric Haemorrhage (MOH) protocol.


Objective

- Ensure the appropriate use of blood and the use of effective alternatives in every clinical practice where blood is transfused
- Secure appropriate and cost-effective provision of blood transfusion and alternatives in surgical care
- Ensure patients who are likely to receive a blood transfusion are informed of their choices

Action

- Develop a blood conservation strategy including the use of point-of-care testing for haemoglobin concentration and haemostasis and alternatives to donor blood such as peri-operative cell salvage and pharmacological agents such as anti-fibrinolytics and intravenous iron
- Ensure that the blood conservation strategy is implemented
- Ensure that timely information is made available to patients, informing them of the indication for transfusion, the risks and benefits of blood transfusion, and any alternatives available
ICS Thought?

- 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?
Six Key Points

1. Intra Operative Cell Salvage (ICS) is an efficacious technique for blood replacement.
2. Patients should be informed of theoretical issues around ICS prior to surgery.
3. ICS should be undertaken regularly in obstetrics, allowing teams to gain ICS experience.
4. ICS should be seen as part of a Blood Conservation program.
5. Teams should consider following up patients, to evaluate the risk of alloimmunisation.
6. Teams should consider implementing a Quality Control program, when offering an ICS service.
The Principles of Intra Operative Cell salvage
Disposable set components

- Control Panel
- Reservoir Holder with Level Sensor
- Centrifuge with Bowl
- Optics and Fluid Sensors
- Waste Bag Weighers
- Hooks
- Fluid Deck (with Valves, Air Detectors and Pump)
- Effluent Line Sensor
- Waste Bag
- Reinfusion Bag
- Centrifuge Bowl
- Tubing Manifold
- Saline Line
- Reinfusion Line

Next step
Cell Saver 5+
Donated by Friends
Of Hospital – Dedicated
Machine for Obs
1. Intra Operative Cell Salvage (ICS) is an efficacious technique for blood replacement?
Intraoperative blood cell salvage is an efficacious technique for blood replacement and its use is well established in other areas of medicine, but there are theoretical safety concerns when it is used in obstetric practice. Data collection is therefore important and clinicians should report all complications to the Medicines and Healthcare products Regulatory Agency.

National Institute for Clinical Excellence
What are the theoretical risks in OBS?

Amniotic Fluid Embolus

- Also known as anaphylactoid syndrome of pregnancy
- Possibly caused by Amniotic Fluid (AF) entering the maternal circulation, and so could be initiated by re-infusing any AF aspirated by the cell salvage machine

Alloimmunisation

- Fetal RBCs cannot be distinguished from maternal RBCs by cell salvage machines.
- Could theoretically cause haemolytic disease of the newborn and fetal hyperbilirubinemia and anaemia
Obstetric haemorrhage: Learning Points

Any decision to give women blood should be made carefully, and all clinicians involved in blood transfusion should be aware of the potential adverse effects of transfusion and signs and symptoms of transfusion-related complications. Women known to be at risk of major haemorrhage, e.g. those with placenta accreta and those who decline blood and blood products, should be delivered in maternity units with access to critical care, interventional radiology and cell salvage.

Amniotic fluid embolism: Learning Points

Amniotic fluid embolism (AFE) should no longer be regarded as a condition with near universal maternal mortality. High-quality supportive care can result in good outcomes for both mother and baby depending on the place of collapse.
RCHT Tx rates

• Transfusion Rates at RCHT in Obs pre Cell Salvage/Blood Conservation = 2.30%

• Tx rates 2010 = 1%
  • 2011?
2. Patients should be informed of theoretical issues around ICS prior to surgery
Risks of Red Cell Transfusion

- Acute Haemolytic Reactions 1 in 250,000 to 1 in 1,000,000
- Hepatitis B 1 in 450,000
- Hepatitis C 1 in 32,000,000
- HIV 1 in 5,000,000
- HTLV 1 in 12,500,000

Bacterial Contamination of
- Red Cell Concentrates 1 in 500,000
CONSENT FORM 1

PATIENT AGREEMENT

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

Gastrectomy, Delivery (LBCS)__________________________

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 rarely, 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 needing a Caesarean and of the placenta being abnormally low. Very rarely the scar in the womb 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 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 make antibodies could affect future pregnancies.

X 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.

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 and/or regional anaesthesia ☐ Local anaesthesia ☐ Sedation

Signed __________________ Date __________________

Name (PRINT) ____________________ job title ________________

Contact Details (if patient wishes to discuss options later) Delivery Suite (01872) 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/he can understand.

Signed __________________ Date __________________

Name (PRINT) ____________________

YELLOW TOP COPY - HEALTH RECORDS White copy accepted by patient: yes or no (please ring)
Any extra procedures which may become necessary during the procedure

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- Other procedure  In the rare event of other organs being damaged, any injury may need repair. 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.
3. ICS should be undertaken regularly in obstetrics, allowing teams to gain ICS experience
80% of maternity units identified lack of training, rather than safety concerns, as the barrier to more frequent use of ICS.

ICS Set Up

- Should we only use cell salvage when there is a predicted blood loss of 1000mls?
  - WHY NOT
- Set up a collection set for cases at risk to Tx
- Make it the norm not exception
Why Routine?

- Allows the user to become familiar with the machine
- Ability to understand the situation
- Ability to make decisions during the case
- Move from independent IOCS user to integrated user – supporting both anaesthetist and operating the IOCS machine.
Obs Transfusion Rates when using ICS
April 2011 to Date

- 8 patients have had a tx, when using ICS
  \[= 23 \text{ RBC units}\]
- 12 patients, where the blood was requested and returned unused
Blood Requested but not Used!

- 12 patients
- Total - 44 red cell units
  - 44 x £125 = £5,550
- Average reinfused ICS blood 331 mls
  - ICS costs = £1200
RCHT ICS Usage

- April – Dec 2011
- OrthoPat – 369
- Electa – 340
- Cell Saver 5+ (Obs) - 502
  (Gen) – 16

- Total – 1227 ICS cases
  (Collection and processing)
Current figures show that on average 96.5% of elective lists are covered by an appropriately trained anaesthetic practitioner.
Obstetric cases using ICS figures

- Approx 400 cases from July 11 – Aug Dec 11
- Approx 100 cases processed
- Reinfused 50% (approx)
- 25% cases processed for training
- 25% not appropriate
- 2 Elective cases where ICS was not used for the above time frame
- Approx 60 emergency cases where ICS was not used
- Last three months have shown emergency cases not using ICS down to single figures on a monthly basis.
4. ICS should be seen as part of a Blood Conservation program
Key benefits of Introducing a Blood Conservation service

- Reduced risk for patients and improved patient care
- Reduced demand on blood banks and associated costs
- Reduction in last minute cancelled operations
- Reduced risk of peri-operative operative complications leading to reduce length of stay.
RCHT Blood Conservation Service

- Optimisation – Pre surgery
- Intra Operative Cell Salvage
- Quality assurance
- Point of care testing
- Research
- Advice

  - Audit
  - Total Cost Service?
5. Teams should consider following up patients, to evaluate the risk of alloimmunisation
Patient Follow up’s

- Re infusion data entered into database
- Letter to GP and patient
- Patient asked to make appointment for follow up bloods.
- Full antibody screen
- Data entered onto database
  - Current data shows approx 36% follow up!!
6. Teams should consider implementing a Quality Control program, when offering an ICS service
Quality control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer.

In order to implement an effective QC program, an enterprise must first decide which specific standards the product or service must meet.

The QC process must be ongoing to ensure that remedial efforts, if required, have produced satisfactory results and to immediately detect recurrences or new instances of trouble.
QA Samples

- Full Blood Count (Hb/Hct)
  - Marker of quality of blood returned to patient
- Micro-albumin
  - Marker of washing efficiency
- Heparin testing
  - Marker of washing efficiency and to ensure blood returned to patient is not grossly contaminated with heparin
- Plasma free Hb
  - Not compulsory if equipment not available
ICS Obstetrics at RCHT

- Routinely used for all sections – elective and emergency
- Dedicated machine
- Tx rates decreasing
- Patients have to opt out not in – IOCS built into consent form
- Further research??
“Minimise the need for allogeneic transfusion, and maintain or improve the probability of a good clinical outcome, but don’t forget: transfusion has risks, but bleeding to death is fatal”

(McClelland, Brian: A manual for blood conservation 2005)