Midwives Study Day
27th Jan 2016
South West Regional Transfusion Committee
Obstetric Cell Salvage

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Outcome from today's presentation

1. Key Points of intraoperative cell salvage
2. How does Cell Salvage work?
3. Perceived Risks and Benefits
4. Patient information
Key points when introducing Intra Operative Cell Salvage

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.
Demographics
Population 450,000 - almost doubles in summer
County delivery rate of 4,000 deliveries per annum
C/S rate <20% currently approx 18% equiv 70-80 C/S per month
The Principles of Intra Operative
Cell salvage
Haemonetics Cell
Saver 5+ - Intra
Operative Cell Sa
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
Reinfusion using a Leucodepletion Filter
ICS setting the scene!

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?
Patients should be informed of theoretical issues and benefits around ICS prior to surgery?
ICS Risks in Obs

Two main concerns

- Amniotic fluid embolism.
- Fetal red cell contamination and risk of alloimmunisation

Perceived risk of AFE

Amniotic fluid is removed through the washing process regardless of use of 1 or 2 suction devices.

Fetal squames are present in post wash samples but almost completely removed post filtration. We use a leucodepletion filter (Pall Leuko Guard RS filter, Pall Europe Europa house Portsmouth). The significance of fetal squames in the circulation is unknown.

No cases have been reported of AFE following ICS

Entirely theoretical

Fetal red cell contamination. Fetal RBCs are present in the re-infusion and may result in red cell antigen incompatibilities between mother and baby – will discuss further

BENEFITS

Autologous blood - No incompatibility, warm, maintain 2,3 DPG levels

Avoid allogeneic blood - expensive limited resource.(£140 = $221) Carries potential risk of infection and incompatibility reactions and associated with increase in post-op wound infections and LO Hosp stay.

DoH Better blood transfusion health circular suggests to consider use of alternatives - . Salvaged blood is a suitable alternative to allogeneic blood
Within our trust we are working towards making Cell Salvage the norm and not the exception! and hope to introduce it fully into the consent form where patients will have to opt out of not having cell salvage? CONTRAVERSIAL
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
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 red cell contamination in cell salvage blood is comparable to that found in maternal circulation following delivery.
- Trans placental 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

Fetal red cell contamination. Fetal RBCs are present in the re-infusion in volumes comparable to that found in the maternal circulation after delivery.(0.2mls-12.9mls- our study 2010).

TPH more likely in 3rd trimester and on delivery.

We do not know the critical volume vol required to provoke an Ab response

Rh D negative women routinely receiving AntiD prophylaxis throughout pregnancy which has reduced the formation of anti-D immunization BUT there are other clinically significant. Abs include anti-K, anti-C c, anti-E, anti-S

These too have been implicated in haemolytic disease of the newborn

Data from 2007 at RCHT indicates incidence of other significant Abs in maternal pop =0.4% - origin pregnancy or allogeneic blood Tx

Before women receive a reinfusion we take a sample to test for fetal red cells contamination( using the Kleihaur –Betke technique).

We invite all women for a follow up test of Ab formation to attempt to test for Abs. If antibodies are found in the f/u sample and the pre-infusion sample did not detect fetal cells than we can conclude the cell salvage blood caused the immunisation. As the incidence is low we are currently unable to assess if incidence of Ab formaition is increased or the same as that which occurs in pregnancy and during delivery.
ICS benefits in Obs

- Autologous blood
- Avoid or reduce allogeneic blood consumption
Nice Guidelines

1. 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.

1.2 Whenever possible, patients should be fully informed of the potential complications

1.3 This procedure should only be performed by multidisciplinary teams who develop regular experience of intraoperative blood cell salvage.

Guidance
https://www.nice.org.uk/guidance/IPG144/chapter/1-
Teams should consider following up patients, to evaluate the risk of alloimmunisation
Patient Follow up’s

- Re infusion data entered into data base
- Letter to GP and patient
- Patient asked to make appointment for follow up bloods.
- Full antibody screen
- Outcome data entered onto database

Current data shows approx **50%** follow up!
ICS in obstetrics should be seen as part of a PBM Programme
Key benefits of Introducing a PBM service

- Reduced risk for patients and improved patient care
- Reduced demand on blood banks and associated costs
- Reduced risk of peri-operative operative complications leading to reduce length of stay
- Reduction in last minute cancelled operations
Teams should consider implementing a Quality Control program, when offering an ICS service?
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?