Guidelines For The Use of Cell Salvage In Obstetrics

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Intraoperative Cell Salvage (ICS) is a technique for the collection, processing/washing and re-transfusion of autologous blood during surgical procedures.

Benefits of cell salvage

- To avoid the risks associated with conventional donor blood:
  - Infection (viruses, bacteria, prions)
  - Incompatibility reactions
  - Hypothermia
  - Cost
- Cell saved blood has improved survival and oxygen carrying ability compared to banked blood[2]
- To enhance the safety of Caesarean Section for patients who refuse donated blood products
- To reduce the reliance on increasingly scarce donated blood

Indications for cell salvage

Cell salvage should be considered in all patients. However, particular consideration should be given for patients in the following groups:

- Increased risk of bleeding / anticipated blood loss > 1000ml, e.g.
  - Placenta praevia
  - Placenta accreta
  - Lower segment uterine fibroids
  - Multiple (three or more) repeat caesarean sections
  - Coagulation disorders
- All Emergency Caesarean Sections
- Low preoperative Hb (<105 g/L at term)
- Patients with rare blood groups / multiple antibodies and therefore difficulty with cross-matching
- Patients with objections to receiving allogenic blood e.g., Jehovah's Witnesses
- Discretion of the team
- Following vaginal birth - Life threatening vaginal haemorrhage in women who are unable to receive allogenic blood (due to antibodies or patient refusal)
  - The following factors must be ensured before its use:
    - AVOID frank faecal contamination.
    - Use of an additional "wash" cycle during processing.
    - Administration of salvaged blood via a leucocyte depletion filter.
    - The simultaneous administration of broad spectrum antibiotics is recommended.

Absolute Contraindications to Cell Salvage

- Pharmacological
  - Clotting agents (Surgicel, Gelfoam, etc.)
  - Irrigation solution (betadine, antibiotics meant for topical use)
- Contaminants e.g.
  - Urine
  - Bowel contents
  - Infection (chorioamnionitis)
  - Meconium
- Patient Refusal

Relative contraindications to cell salvage

- Malignancy
- Haematological disorders
  - Sickle cell trait and disease
  - Thalassaemia
  - Rhesus negative status

Pre blood collection

The ODA preparing the ICS must be adequately trained and competent in its use[1].

Patients should be consented verbally for cell salvage by the anaesthetist wherever possible and it should be documented that this has been done on the anaesthetic chart. The advantages and risks of ICS and allogenic blood transfusion should be discussed with the patient prior to surgery. If verbal consent is not possible e.g., in emergencies, use of cell salvage is at the discretion of the surgeon and anaesthetist responsible for the patient's care.

Specific risks that should be discussed include

- Theoretical risk of amniotic fluid embolus,
- Risk of antibody formation from foetal cell contamination (especially in RhD negative mothers/RhD positive foetuses). In Singleton, we have a robust system of Keilhauer testing and Anti-D delivery, preventing any ongoing concerns.

Jehovah's Witnesses may request a continuous circuit and the use of swab washing should be discussed with them.

Technical aspects of blood collection

Never delay the start of emergency surgery to set up the cell saver.

Initially, only the collection part of the cell salvage disposables should be set up, with the processing setup nearby but unopened. (NB If the patient is a Jehovah's Witness who has requested a continuous circuit, the full cell salvage disposable must be set up, primed with saline and connected to the patients IV access using the appropriate filter before blood collection commences, by an operator who has been trained to do this)

During surgery, blood loss can be suctioned from the operative site and from washed swabs. Blood loss to swabs has been estimated at 30-50% of the total surgical blood loss.[1] By washing swabs, the blood that is normally discarded can be collected and the overall efficiency of red cell recovery improved.

Only 0.9% saline for intravenous use must be used for the washing of swabs (see box below.)

Swab Washing

Blood loss is calculated by the weighing of swabs - this should be done aseptically before washing the swabs.

Set up a sterile bowel with 2000ml IV grade 0.9% saline (not saline for wash)

Soak blood soiled swabs for a few minutes in the saline to extract red cells. Gently compress the swabs to express any residual solution before discarding.

At the end of the procedure aspirate the swab wash solution into the cell salvage reservoir using the suction line. The swab wash should not be left for more than six hours without processing.

ICS should be discontinued when contamination or substances not licensed for intravenous (IV) use are present within the surgical field[1]. Examples of substances that should not be aspirated include:

- Betadine / iodine / chlorhexidine
- Antibiotics not licensed for IV use
- Topical clotting agents
- Meconium
- Urine
- Bowel Contents

If clinically indicated, the anaesthetist will instruct to process the blood.

Salvaged blood should always be labelled immediately with a patient's details taken from the patient's ID band. Addressograph labels should not be used as these are known to be a source of error in blood transfusion (e.g., wrong blood, wrong patient). The salvaged blood should also be labelled with the collection start time and the expiry time of the salvaged blood.

<u>Re-infusion of blood</u>

Re-infusion should start before the patient leaves theatre to avoid "wrong blood, wrong patient" errors and positive patient identification between the label on the salvaged blood and the patient's ID band must be confirmed before reinfusion commences.

Processed blood should not be infused under pressure because of risk of air embolism.

The use of a leukocyte depletion filter for reinfusion of cell salvaged blood is no longer routinely recommended.

Re-infusion should be completed within four hours from the completion of processing. The sticker included in the cell salvage equipment pack should be completed and attached to a pink blood product transfusion form. Patient, infusion, and consent details should be recorded on here.

Only red blood cells suspended in saline are given back to the patient. Clotting factors and platelets are removed by cell salvage. When patients are transfused large volumes of cell salvaged blood, this is often accompanied by a coagulopathy, therefore consider taking an FBC and coagulation screen and giving other blood products. Consider use of ROTEM for more rapid assessment of coagulation product deficiencies.

Hand over to the midwife that cell salvage has been used. If cell salvage blood is being given at the point of hand over then the time by which the blood should be completed should be clearly handed over and documented.

If the mother is Rh(D) negative, a Kleihauer count should be obtained and the result of this test should be a guide as to whether additional Anti-D prophylaxis is needed[1,3,4,5]. The Kleihauer blood sample must not be taken until the reinfusion of salvaged blood has been completed to ensure the levels of foetal red cell contamination of the salvaged blood can be established. Anti-D immunoglobulin must be administered in accordance with the recognized guidelines (i.e., within 72 hours).

An audit form must be completed for every case by the ODA – found in the folder on the cell salvage machine.

Adverse event reporting

Any adverse events relating to the ICS device must be reported in accordance with the SBUHB Incident Reporting Policy. Additionally, where appropriate, reporting to the relevant external bodies should be undertaken, e.g. Serious Hazards of Transfusion (SHOT), Medicine and Healthcare products Regulatory Agency (MHRA).

Patient Information Sheet

National Institute for Health and Clinical Excellence
IPG144 Intraoperative blood cell salvage in obstetrics - information for the public:
http://guidance.nice.org.uk/IPG144/PublicInfo/pdf/English

References

1. Blood Transfusion and the Anaesthetist – Intra-operative Cell Salvage, AAGBI Safety Guideline. The Association of Anaesthetists of Great Britain and Ireland. September 2009

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3. Waters JH, Biscotti C, Potter PS, and Philipson E. Amniotic fluid removal during cell salvage in the caesarean section patient. Anesthesiology 2000, 92: 1531-1536.

4. Catling SJ, Williams S, Fielding AM. Cell salvage in obstetrics: an evaluation of the ability of cell salvage combined with leucocyte depletion filtration to remove amniotic fluid from operative blood loss at caesarean section. International Journal of obstetric anaesthesia 1999; 8 : 79-84. 5. Blood Transfusion in Obstetrics, Green-top Guidelines No47. Royal College of Obstetricians and Gynaecologists. December 2007.

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Maternity Services

Checklist for Clinical Guidelines being Submitted for Approval

Title of Guideline:	Guideline for the use of Cell Salvage in Obstetrics
Name(s) of Author:	N Jenkins
Chair of Group or Committee approving submission:	Labour ward Forum
Brief outline giving reasons for document being submitted for ratification	Update to expired guideline
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Name of Pharmacist (mandatory if drugs involved):	
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