Guidelines For The Use of Cell Salvage In Obstetrics

Originator: Anaesthetics Department
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Approved By: Labour Ward Forum
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**Guidelines for the use of cell salvage in obstetrics**

Intraoperative Cell Salvage (ICS) is an efficacious technique for blood replacement and there is a strong case for widespread introduction in surgery to avoid the well recognized risks, costs and increasing scarcity of allogenic blood for transfusion. However, theoretical safety concerns have slowed the introduction of intraoperative blood cell salvage in the obstetric setting despite the endorsement of the AAGBI and the Obstetric Anaesthetist’s Association\(^1\). The National Institute for Health and Clinical Excellence reviewed the evidence in 2005\(^2\) and supported its use in Obstetrics subject to:

1. Data collection
2. Reporting of complications to the Medicine and Healthcare products Regulatory Agency
3. Patients should be fully informed whenever possible of the potential complications
4. Performed by multidisciplinary teams who develop regular experience of intraoperative blood cell salvage

**Benefits of cell salvage**

1. To avoid the risks associated with conventional donor blood
   - Infection (viruses, bacteria, prions)
   - Incompatibility reactions
   - Hypothermia
   - Cost
2. Cell saved blood has improved survival and oxygen carrying ability compared to banked blood\(^3\).
3. To enhance the safety of Caesarean Section for patients who refuse donated blood products

**Indications for cell salvage**

Cell salvage should be considered in patients with:

- Increased risk of bleeding / Anticipated blood loss > 1000ml, for e.g.
  - Placenta praevia
  - Placenta accreta
  - Lower segment uterine fibroids
  - Multiple repeat caesarean section (three or more)
  - Coagulation disorders
  - Caesarean section during Second stage of labour.
- Low preoperative Hb (<10 g/dl)
- Patients with multiple antibodies and difficulty with cross-matching / rare blood groups
- Patients with objections to receiving allogenic blood / Jehovah’s Witness
- Discretion of the team
Relative contraindications to cell salvage

Pharmacological
- Clotting agents (Surgicel, Gelfoam, etc)
- Irrigation solution (betadine, antibiotics meant for topical use)
- Methylnethacrylate

Contaminants
- Urine, bowel contents, infection, amniotic fluid

Malignancy

Haematological disorders
- Sickle cell trait and disease
- Thalassaemia

Pre blood collection

The ODA preparing the ICS must be adequately trained and competent in its use¹.

Patients should be consented verbally for cell salvage by the anaesthetist and document 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. NICE patient information leaflets about ICS (Appendix K) should be given to all elective patients in whom cell salvage is indicated at pre-operative assessment clinics so that they may have an opportunity to ask questions and give informed consent to its use¹. 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.

Jehovah’s Witness’s 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 part of it ready to hand 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).

A two suction system should be used to help reduce contamination of salvaged blood with amniotic fluid³,⁴,⁵

1. Standard theatre suction should be used to remove amniotic fluid from the operative field during delivery of the baby.
2. Cell saver suction should be used after delivery of the baby and placenta.

The use of a Yankaueur suction tip is recommended for cell salvage to minimize red blood cell
damage. This can also reduce the risk of the wrong suction being used prior to removal of
the amniotic fluid if the standard obstetric suction tip is used on the waste suction because
they are easily distinguishable.

Starting cell salvage after delivery of the baby and placenta has been shown to reduce the
initial amniotic fluid contamination of the salvaged blood\cite{3,4,5}. However, more recent in vitro
work suggests that amniotic fluid contamination (indicated by alphafetoprotein levels) is no
higher if one suction is used and red cell retrieval is increased\cite{6}. Further research is needed
before the requirement for two suction units is revoked.

In cases of an anterior placenta praevia, if the uterus is incised through the placenta, a
significant amount of the blood loss occurs before the baby can be delivered, and this blood
should be collected and not wasted.

To reduce haemolysis the vacuum pressure should be set as low as possible – less than 100
mmHg (20 kPa) – but may need to be increased if bleeding is torrential\cite{1}.

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\cite{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.

<table>
<thead>
<tr>
<th>Swab washing</th>
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<tbody>
<tr>
<td>Set up a sterile bowel with 1000ml <strong>IV grade 0.9% saline (not saline for wash)</strong></td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>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.</td>
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<td>If blood loss is to be calculated by the weighing of swabs, the ODP needs to be informed when the blood will be aspirated from the bowl, so that the volume of wash can be noted. The washed swabs can then be weighed and the blood loss calculated from the weights and the volume of wash.</td>
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ICS should be temporarily discontinued when substances not licensed for intravenous (IV)
use are present within the surgical field\cite{1}. The standard theatre suction should be used to
aspirate the surgical field and the wound should be irrigated with copious 0.9% saline before
resuming ICS.

Examples of substances that should not be aspirated include

- Betadine / iodine
Antibiotics not licensed for IV use
Topical clotting agents

If clinically indicated or a sufficient volume of blood is collected then the anaesthetist will instruct to process the blood.

Salvaged blood should always be labeled 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 labeled with the collection start time and the expiry time of the salvaged blood.

**Re-infusion of blood**

Re-infusion of salvaged blood should **ALWAYS be through a Pall RS Leucocyte Depletion filter** to minimize amniotic fluid contamination. In the event of catastrophic haemorrhage, a clinical decision to reinfuse the cell salvaged blood without a leucocyte depletion filter may be made to allow the blood to be reinfused more quickly. This decision must be made on an individual patient basis taking into account the risk and benefits.

Re-infusion should start before the patient leaves theatre in order 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.

Re-infusion should be completed within four hours from the completion of processing.

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.

Hand over to the midwife that cell salvage has been used.
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. The Kleihauer blood sample must not be taken until the reinfusion of salvaged blood has been completed to ensure the levels of fetal 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**
Serious Adverse Events must be reported to the clinical lead for ICS and the Cell Salvage Co-ordinator (Karl Connick, ODP). Any adverse events relating to the ICS device must be reported in accordance with the ABMU 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).

Costings (December 2010)

Liverpool Woman’s Hospital NHS Trust have shown through audit that sufficient blood was collected to trigger processing in 17% of cases when used for all emergency and elective caesarean sections except those at minimal risk of blood transfusion. The inclusion criteria in our guideline are tighter than those for Liverpool Women’s hospital, so processing rate should be higher.

At the Princess of Wales Hospital the cost of collecting blood is:

- Collection reservoir £30.86
- Anticoagulation £5.20
- Suction pack £12.67
- **Total** £48.73

The cost of processing blood is:

- Blood processing kit £52.94
- Spike bag £3.86
- Leucocyte depletion filter £19.18
- **Total** £75.98

**Total for cell salvaged blood £124.71**

One unit of allogenic blood is £147.51
References


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
Obstetric cell salvage
Scrub Midwives’ Responsibilities

The ODP will set up the cell salvage

Ask the anaesthetist and surgeon if they would like swab washing to take place.

You will be handed two suctions
1. The standard theatre suction
2. The cell salvage suction with a Yankauer sucker attached

Use the standard theatre suction until the baby and placenta have been delivered, then hand the cell salvage suction to the surgeon.

If swab washing has been requested then, in a sterile manner:-

Set up a sterile bowel with 1000ml IV grade 0.9% saline (not saline for wash)

Soak all 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 the swab.

At the end of the procedure aspirate the swab wash solution into the cell salvage reservoir using the suction line.

If blood loss is to be calculated by the weighing of swabs, the ODP needs to be informed when the blood will be aspirated from the bowl, so that the volume of wash can be noted. The washed swabs can then be weighed and the blood loss calculated from the weights and the volume of wash.
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<tbody>
<tr>
<td><strong>Name(s) of Author:</strong></td>
<td>Anaesthetic Consultants</td>
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<tr>
<td><strong>Chair of Group or Committee supporting submission:</strong></td>
<td>Labour Ward Forum</td>
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<td>Consultant Anaesthetists, Labour Ward Forum members.</td>
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<tr>
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<td>This Guideline replaces the expired version on WISDOM</td>
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<td><strong>Name of Pharmacist (mandatory if drugs involved):</strong></td>
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<tr>
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<td><strong>Please indicate key words you wish to be linked to document</strong></td>
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