Is Cell Salvaged Vaginal Blood Loss suitable for reinfusion?
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Background
Haemorrhage remains one of the commonest causes for maternal critical care admission. At The Royal Cornwall Hospital, we have shown cell salvage used routinely during caesarean section, can contribute to a reduction in allogeneic blood consumption\(^1\). 0.8% of women who delivered in Cornwall in 2013 required a blood transfusion. Over 80% of these women delivered vaginally. Further progress in reducing allogeneic blood consumption to the obstetric population, requires us to target women who deliver vaginally. This study aims to provide evidence of a practical method to salvage vaginal blood loss and to assess its safety for re-infusion.

Methods
Blood lost after vaginal delivery was collected from 50 women and processed in a cell salvage machine. No blood was re-infused to any patient in this study. The following tests were performed pre and post-wash: Haemoglobin/haematocrit, alpha-fetoprotein, albumin, lactate dehydrogenase, plasma free haemoglobin, heparin, fetal red cells, identification of bacterial species and colony forming unit count(cfu).

We conducted a separate evaluation to assess bacterial contamination of cell salvage blood at emergency caesarean section (Em C/S). For a series of 20 women we took post wash samples from the reinfusion bag to test for bacterial species and quantity.

Results
The washout efficiency of the cell salvage machine was demonstrated by the removal of heparin and reduction in AFP and albumin (both 99.9% wash out efficiency) and LDH. Median Hb post-wash 164 g L\(^{-1}\). AFP, LDH and albumin significantly reduced post-wash (<1KU L\(^{-1}\), 259 iu L\(^{-1}\), 0.013g L\(^{-1}\) respectively; p<0.001). Haemolysis, demonstrated by plasma free Hb, showed levels similar to allogeneic blood.

Median fetal red cell level post-wash 0.61mls (range 0 -19mls).

Bacterial contamination
Bacteria were present in all cases post-wash although more than 86% (IQR 78-98%) of the bacteria present in the collected blood was washed out. Post-wash bacteria counts were significantly reduced (p<0.001).

Median bacterial contamination concentration post-wash 2 cfu/ml; total median dose 303 cfu. Bacteria were present in samples from all 20 Em C/S cases. Median quantity 1cfu/ml.

Conclusions\(^2\)
Vaginal blood can be collected safely and efficiently with no disruption to patient management. The level of haemolysis and washout of non-red cell blood components is consistent with results from caesarean section and non-obstetric surgery in our cell salvage quality assurance programme. 86% of bacteria are removed during washing and the remaining quantity is low relative to that seen in sepsis. The predominant bacteria identified in
this study were E.coli, Enterococcus sp and coagulase negative staphylococci which were likely to be part of the genital or skin flora. No Staphylococcus aureus or candida species were isolated. The contamination in vaginal cases is similar in bacterial species and quantity to blood re infused at emergency caesarean, although the upper range is higher in the vaginal cases. The quantity is within the range observed in asymptomatic bacteraemia during dental procedures \(^3\). The clinical significance of this level of bacterial contamination in cell salvaged blood is unknown. A retrospective review of women who received cell salvaged blood following an Em C/S did not identify a higher risk of post-operative infection, than those women who received no blood. Women who received allogeneic blood had a higher risk of infection \(^3\).

**Summary**

We recommend clinicians should re infuse salvaged vaginal blood loss in a life threatening haemorrhage in women who cannot have an allogeneic transfusion. A trial of cell salvage versus allogeneic blood for women who bleed after vaginal birth is needed to identify the comparative risk of infection.

**References**

2. Teare KM, Sullivan I J, Ralph C J. Is salvaged vaginal blood loss suitable for re-infusion?. *Transfusion medicine* 2014; **24 S1**: 33
4. D Baker, KM Teare, CJ Ralph. Does re infusion of blood salvaged at emergency caesarean section increase the risk of infection? *Accepted as poster presentation to OAA Dublin May 14*