Acute hypotension associated with cell salvaged blood transfusion - a case report.

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Introduction

Cell-salvaged blood is now commonly used in many NHS hospitals because of its cost-effectiveness and reduction in complications associated with allogenic blood transfusion. Adverse reactions associated with cell-salvaged blood transfusion have been reported. We report a case of severe hypotension associated with cell-salvaged blood transfusion.

Case Report

A 28 year old female presented for emergency laparotomy with a suspected ruptured ectopic pregnancy. She was 14 weeks pregnant, otherwise fit and well with a history of previous lower segment caesarean section. She was not on any regular medication, and had no known allergies.

The patient was transfused two units of O-negative packed red blood cells (RBC) in the Emergency Department and she was transferred to the emergency theatre for a laparotomy. Standard monitoring was instituted with a non-invasive blood pressure of 110/45 mmHg, and a heart rate of 105 beats/min. One litre of Hartmann's solution was given prior to induction of anaesthesia. A standard rapid sequence induction was performed and airway secured with no difficulties. There was a small drop in blood pressure which recovered with fluid resuscitation. Invasive blood pressure monitoring was commenced and blood cell salvage (Haemonitics Cell Saver 5+) was set up. Laparotomy revealed a ruptured bicornuate uterus. Bleeding was controlled surgically and free blood in the abdominal cavity suctioned. The conceptus was delivered with the amniotic sac intact. Haemoglobin was 6.5 g/dl, and two units of cross matched packed RBC were transfused. The total estimated blood loss was 2000 ml and the volume of cell-salvaged blood collected was 620 ml. Transfusion of the autologous blood was commenced through a LeukoGuard® RS Leukocyte Pall Reduction filter with no pressure applied to the bag. A drop in blood pressure from a 100/65 mmHg to 65/28 mmHg was notd. Oxygen saturation remained stable at 100% and heart rate increased to 110 beats/min. The cell-salvaged blood transfusion was stopped and 1 mg of metaraminol was given intravenously. Blood pressure improved to 130/70 mmHg and heart rate was 90 beats/min. It was noted that the patient had also developed a red urticarial rash. Hydrocortisone 100 mg and chlorphenamine 10 mg were administered intravenously. The patient remained stable and 15 minutes later cell-salvaged blood transfusion was recommenced. The blood pressure dropped again from 90/50 mmHg to 57/30 mmHg within five minutes and this was treated with one milligram of metaraminol. Further cell-salvaged blood transfusion was stopped and the giving set disconnected from the patient. Two units of cross-matched packed RBC were given to the patient without any further adverse reactions. The patient was extubated at the end of the procedure, and the body rash resolved a few hours later. The patient made an uneventful recovery and was discharged from the hospital a few days later. The event was reported to our hospital transfusion team and the Serious Hazards of Transfusion (SHOT) cell salvage dataset.

Discussion

Sudden hypotension in this patient could be related to various factors.

Cefuroxime had been administered prior to the first episode of hypotension which resolved with a small dose of metaraminol. However the second episode of hypotension closely followed the recommencement of cell-salvaged blood

which promptly resolved with a small dose of metaraminol and stopping the transfusion of cell-salvaged blood. Hence we concluded that anaphylaxis was an unlikely cause of the hypotension.

Amniotic fluid and fetal material contamination of the cell-salvaged blood resulting in hypotension was unlikely because the fetus was removed with the amniotic sac intact and a LeukoGuard® RS filter was used.

Hypotension secondary to acute haemorrhage was unlikely because there was no active haemorrhage to account for the two sudden episodes of hypotension.

Citrate used as the anticoagulant has been associated with hypotension. However it is mostly removed during the washing process and any citrate infused undergoes rapid metabolism. Only a minimal volume of cell-salvaged blood had been transfused prior to the hypotensive episode which makes citrate an unlikely cause of hypotension.

A leucocyte depletion filter is recommended for use in obstetric practice to reduce the number of leucocytes, fetal blood cells and amniotic fluid in the transfused blood[1].

Infusion of cell-salvaged blood under pressure through a leucocyte filter may damage the white cells resulting in the release of cytokines and other vasodilating substances leading to hypotension[2]. Bradykinin produced when platelets are exposed to the negatively charged filter surface could lead to hypotension[3,4]. Activation of complement component 3 can occur on passage of warm blood through a positively or negatively charged leucocyte filter causing hypotension. However significant levels are seen mainly in vitro and not in vivo[6]. Having considered the various potential causes of hypotension in this particular case, we conclude that the hypotension was most likely associated with the use of a leucocyte depletion filter. In support of our conclusion, similar reactions have been reported in the literature[2,3,5]. It is important that anaesthetists and others are aware of this potential adverse reaction and remain vigilant to respond in a timely manner.

References

1) National Institute for Health and Clinical Excellence. Intraoperative Blood Cell Salvage in Obstetrics. IP Guidance number: IPG 144. 2005. http://guidance.nice.org.uk/IPG 144 (accessed 23/11/2011)

2 Kessack LK, Hawkins N. Severe hypotension related to cell salvaged blood transfusion in obstetrics. Case Report. Anaesthesia 2010; 65: 745-748

3 Sreelakshmi TR, Eldridge J. Acute hypotension associated with leucocyte depletion filters during cell salvaged blood transfusion. Case Report. Anaesthesia 2010; 65: 742-744

4 Cross MH. Cell salvage and leucodepletion. Perfusion 2001; 16: 61-66.

5 Serious Hazards of Transfusion Report 2010 http://www.shotuk.org/wp-content/uploads/2011/07/SHOT-2010-Report.pdf (Accessed 23/11/2011)

6 Iwama H. Bradykinin- associated reactions in white cell reduction filter. Journal of Critical Care 2001; 16: 74-81.