The use of the cell saver in obstetrics

The most recent Confidential Enquiry into Maternal Deaths cited haemorrhage as the second most common cause of death, killing 17 parturients, two of whom refused donated blood (Lewis, 2005). Cell-saved blood is used routinely in other specialities where massive haemorrhage is common, yet this is not the case in obstetrics, mostly because of the concern over possible iatrogenic amniotic fluid embolism.

Cell salvage was developed in 1974. Blood is suctioned from the surgical site through continuously heparinized tubing, passes via a filter to remove particulate matter, into a reservoir and finally into a centrifugal bowl. Red cells are forced to the outside of the bowl where they are washed with saline. The other components of the collected fluid are removed and discarded. The pure red cells, with a haematocrit of up to 80%, are collected in readiness for transfusion.

The case against using cell savers

Amniotic fluid embolism has a high mortality. In the period 2000–2002, there were 19 cases of amniotic fluid embolism-reported to the amniotic fluid embolism register and five maternal deaths were attributed to amniotic fluid embolism (Lewis, 2005). There is a theoretical risk of causing amniotic fluid embolism by returning amniotic fluid to the maternal circulation in salvaged blood, although evidence has shown that all mothers have amniotic fluid in their blood after caesarean section (Waters et al, 2000).

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Suggested safety measures to minimize maternal exposure to amniotic fluid include the use of separate suction until after delivery of the placenta (Catling and Joels, 2005) and using a Pall RS leucocyte depletion filter. This filter reduces the levels of particulate matter in the salvaged blood to levels equivalent to those in maternal venous blood at the time of caesarean section (Waters et al, 2000).

Rhesus negative mothers may become iso-immunized as a result of fetal red cells being suctioned from the surgical site and subsequently infused into the mother. Early Kleihauer testing and adequate doses of anti-D immunoglobulin are required to prevent sequelae (Catling et al, 1999).

While the machines are easy to set up and use, if used infrequently, maintaining adequate staff training could be difficult.

The case for using cell savers

A cell salvage machine in the obstetric theatre could minimize delay from onset of haemorrhage to transfusion as the cell saver can be set up in less than 5 minutes by an experienced operator, with autologous blood being available for transfusion 3 minutes after that.

A cell saver costs approximately £15 000 and the disposables cost £80 per patient. Homologous blood is expensive and supplies are dwindling. A unit from the authors' hospital's blood bank costs £132. Excluding the initial cost of the cell saver, a 10-unit transfusion would save £1240. Furthermore, it is possible to eliminate the risk of virus and prion transmission from donated blood. Autologous transfusion reduces the risk of immunological reactions including haemolysis, major ABO incompatibilities, transfusion related acute lung injury (TRALI), graft versus host disease, or reactions to donor plasma proteins.

Cell-saved blood provides better oxygen delivery than banked homologous blood, because it has higher levels of 2-3-diphosphoglycerate. Also, the adverse metabolic effects of homologous blood such as hyperkalaemia, acidosis, citrate toxicity and hypothermia can all be avoided.

Many Jehovah's Witnesses will accept cell-salvaged blood.

Conclusions

The number of deaths from obstetric haemorrhage has remained unchanged over the last decade despite advances in other areas. The cell saver may have a role to play in preventing some of these deaths, especially with the increase in acceptance of cell-salvaged blood by the Jehovah's Witness church. However, if there is going to be an increase in autologous transfusion then further study must be implemented to assess the actual risk of inducing amniotic fluid embolism syndrome. The National Institute for Clinical Excellence is developing recommendations for the use of cell salvage in obstetrics, which will be published before 2006. BJHM

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