Should cell salvage be used in oncological surgery?

Cell salvage, the process whereby blood is suctioned from the surgical site then filtered, centrifuged and washed before being transfused, was first developed in 1974. Since then it has become a widely used technique which reduces the need for allogenic blood transfusion. Cell salvage was initially considered to be contraindicated in obstetrics, because of the risk of amniotic fluid emboli, in potentially 'dirty' surgical sites and in oncological surgery because of concerns about re-transfusion of malignant cells. However, cell salvage is now routinely used in obstetrics, particularly in massive haemorrhage, and in elective bowel resection. The potential use of cell salvage in oncological surgery has been highlighted following the National Institute for Health and Clinical Excellence (NICE, 2008) guidance sanctioning (although not specifically recommending) cell salvage during radical prostatectomy and cystectomy. This leads to the question of whether cell salvage is safe to use in these and other types of oncological surgery.

Advantages of using cell salvage

The main advantage of using cell salvage in oncological surgery is that it minimizes the need for allogenic blood transfusion. Generic complications associated with the use of allogenic banked blood which could be avoided include antibody-mediated transfusion reactions and acquisition of blood-borne infections. There is evidence that reduced use of allogenic blood in oncological surgery may improve outcome. Using autologous instead of allogenic blood has been shown to reduce the incidence of postoperative infections (Heiss et al, 1993) and to reduce or delay disease recurrence in some types of cancer (colorectal, oesophagus) (Heiss et al, 1994; Motoyama et al, 2004). The mechanisms for differences in postoperative outcome have not been fully elucidated but may be in part a result of the deleterious immunomodulatory effect of allogenic blood. Natural killer cells are thought to be important in transfusion-related immunomodulation and it has been demonstrated that natural killer cell activity remains higher in patients receiving autologous instead of allogenic blood (Takemura et al, 2005).

On a practical level shortage of banked blood is leading to a search for alternative options to allogeneic blood transfusion. Cell salvage is one way of overcoming this problem.

Disadvantages of using cell salvage

The principal objection to the use of cell salvage in oncological surgery is the theoretical possibility that viable malignant cells may be re-transfused, thereby disseminating disease and leading to tumour recurrence. However, there is no clear evidence of increased tumour recurrence when cell-salvaged blood has been used in oncological surgery, although the studies demonstrating this tend to be small, retrospective and non-randomized. A study involving monoclonal antibody labelling of malignant cells in 50 gynaeoncology patients showed that no malignant cells were detected after passage through a leucocyte depletion filter after cell salvage (Catling et al, 2008). A previous in-vitro study involving injection of tumour cell lines into blood before leucocyte filtration also showed no malignant cells in the filtrate (Miller et al, 1991). Interestingly, the NICE (2008) guidance states that leucocyte depletion filters are 'nearly always used' but does not stipulate that their use is mandatory.

Even if doctors believed that cell salvaged blood posed no risk of re-transfusion of malignant cells it would be difficult to adequately consent a patient to receive this blood without evidence from a large randomized control trial. As stated by Catling et al (2008) a trial would have to be sufficiently large and with a long follow-up period to show a significant difference in survival rates.

A further limitation to the use of cell salvaged blood is that cell salvage machines are not available in all institutions. The cost of the machines, disposables and training requires a significant initial investment but with the increasing cost of banked blood it may well prove to be more economical in the long term.

Conclusions

The principal objection to use of cell salvage in oncological surgery is the possibility of disseminating malignancy. Current evidence suggests that this appears to be a theoretical rather than a real risk. There is also evidence that using autologous blood may improve long-term outcome following surgery. However, without a large randomized controlled trial it is not possible to prove that cell-salvaged blood does not increase tumour recurrence. Despite this, the NICE guidance is likely to be the first step in the more widespread use of cell salvage in oncological surgery. **BJHM**

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