Intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

1 Guidance

1.1 Intraoperative red blood cell salvage is an efficacious technique for blood replacement and its use is well established in other areas of surgery. The evidence on safety is adequate. The procedure may be used during radical prostatectomy or radical cystectomy provided normal arrangements are in place for clinical governance and audit.

1.2 Clinicians wishing to undertake intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy should ensure that patients understand the possible risks and benefits of the procedure compared with those of allogeneic blood transfusion, and provide them with clear, written information. In addition, use of the Institute's information for patients ('Understanding NICE guidance') is recommended (available from www.nice.org.uk/IPG258publicinfo).

2 The procedure

2.1 Indications and current treatments

2.1.1 During either radical prostatectomy or radical cystectomy, patients may lose a considerable amount of blood. Conventionally, these patients receive a blood transfusion using allogeneic, banked blood, which carries a small risk of infection (for example, with hepatitis, human immunodeficiency virus [HIV], variant Creutzfeldt-Jakob disease [vCJD]) or antibody-mediated transfusion reaction. Exceptionally, autologous blood can be collected and stored before an elective operation, and transfused during or after the operation as required (see section 3.2).

2.1.2 Intraoperative red blood cell salvage offers an alternative to allogeneic or pre-donated autologous blood transfusion. It may also be useful in the treatment of patients who object to allogeneic blood transfusion on religious or other grounds.

2.2 Outline of the procedure

2.2.1 Blood lost during radical prostatectomy or radical cystectomy is aspirated from the surgical field using a suction catheter. The blood is then filtered to remove debris. The filtered blood is washed or spun and the red blood cells are resuspended in saline, for transfusion during or after the operation. A leukocyte depletion filter is nearly always used; this is thought to minimise the risk of re-infusion of malignant cells that may be present in the aspirate. A number of different devices are available for this procedure.

2.3 Efficacy

2.3.1 A case series of 49 patients treated with red blood cell salvage during radical cystectomy (either alone or in combination with other surgery) reported overall and disease-free survival rates of 88% (43/49) and 80% (39/49), respectively, at 24-month follow-up. No studies were available that described efficacy outcomes for the use of intraoperative red blood cell salvage during prostatectomy.

2.3.2 The Specialist Advisers considered key efficacy outcomes to include reductions in allogeneic transfusion requirements, haemoglobin levels and perioperative immunomodulation.

2.4 Safety

2.4.1 A non-randomised controlled study of patients who were treated with radical prostatectomy reported similar rates of biochemical prostate cancer recurrence in 265 patients treated intraoperatively.
2.4.2 A second non-randomised controlled study of patients who were treated with radical prostatectomy reported biochemical recurrence in 5% (3/62) of patients treated intraoperatively with salvaged red blood cells at 7-month follow-up. The study reported biochemical recurrence in 24% (24/101) of patients transfused with pre-donated autologous blood at 43-month follow-up (substantially different follow-up times noted). Progression-free survival was not significantly different between the groups (p = 0.41) at 43-month follow-up. In the same study, postoperative haematocrit levels were significantly higher in patients given salvaged red blood cells (31.3 ± 3.5%) than in those who received pre-donated autologous blood (27.9 ± 3.4%).

2.4.3 A third non-randomised controlled study of patients who were treated with radical prostatectomy reported that there was biochemical evidence of recurrence (based on blood levels of prostate specific antigen) in 19% (9/47) of patients treated intraoperatively with salvaged red blood cells at 43-month follow-up, and in 32% (17/53) of patients who did not require re-infusion at 46-month follow-up (statistical significance not stated). This study also reported that red blood cell salvage treatment was not an independent predictor of biochemical evidence of recurrence.

2.4.4 A fourth non-randomised controlled study of patients who were treated with cystectomy reported no significant difference in the 3-year overall survival rate between a group of 65 patients treated intraoperatively with salvaged re-infused blood and 313 patients who did not receive re-infusion (64% and 66% respectively; absolute numbers not reported; p = 0.74). Similarly, at 3-year follow-up, there was no significant difference in the disease-free survival rate between the groups (72% and 73% respectively; p = 0.90; absolute numbers not reported).

2.4.5 A case series of 49 patients who were treated with radical cystectomy and who received salvaged red blood cells reported that there were no complications directly related to red blood cell salvage transfusion at 24-month follow-up. No major reactions to transfusions were noted and no patient demonstrated clinical or biochemical evidence of hepatitis.

2.4.6 The Specialist Advisers considered key safety outcomes to include transient hypertension, length of hospital stay, infection rates, thrombosis and bleeding. An additional theoretical adverse event noted by the Advisers was re-infusion of cancerous cells leading to distant metastases.

2.5 Other comments

2.5.1 The Committee noted concern about the theoretical risk of infusing viable cancer cells that might cause metastases. However, there was no evidence in reported series that this occurred, and any such theoretical risk needs to be balanced against the potential risks of allogeneic blood transfusion. The Committee did not consider it likely that further long-term research would identify metastases that might have been caused by re-infused malignant cells.

3 Further information

3.1 The Institute has produced interventional procedures guidance on intraoperative blood cell salvage in obstetrics (www.nice.org.uk/IPG144).

3.2 NHS Blood and Transplant recommend use of the British Committee for Standards in Haematology’s ‘Guidelines for policies on alternatives to allogeneic blood transfusion’ in relation to preoperative autologous blood transfusion.

Information for patients

NICE has produced information on this procedure for patients and their carers (‘Understanding NICE guidance’). It explains the nature of the procedure and the decision made, and has been written with patient consent in mind. See www.nice.org.uk/IPG258publicinfo

Sources of evidence

The evidence considered by the Interventional Procedures Advisory Committee is described in the overview, available at: www.nice.org.uk/ip597overview

Ordering printed copies
Contact NICE publications (phone 0845 003 7783 or email publications@nice.org.uk) and quote reference number N1551 for this guidance or N1552 for the ‘Understanding NICE guidance’.

This guidance represents the view of the Institute, which was arrived at after careful consideration of the available evidence. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. This guidance does not, however, override the individual responsibility of healthcare professionals to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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