NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

INTERVENTIONAL PROCEDURES PROGRAMME

Interventional procedure overview of intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

Intraoperative red blood cell salvage involves the collection of the solid components of the blood lost during an operation which is then transfused back to the same patient.

Introduction

This overview has been prepared to assist members of the Interventional Procedures Advisory Committee (IPAC) in making recommendations about the safety and efficacy of an interventional procedure. It is based on a rapid review of the medical literature and specialist opinion. It should not be regarded as a definitive assessment of the procedure.

Date prepared

This overview was prepared in October 2007.

Procedure name

- Intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

Specialty societies

- British Society of Haematology
- Association of Anaesthetists of Great Britain & Ireland
- British Blood Transfusion Society
- British Association of Urological Surgeons

Description

Indications

Intraoperative red blood cell salvage may be required during prostatectomy and radical cystectomy operations to treat malignancy. Despite improvements in techniques considerable blood loss may occur.

Current treatment and alternatives

Patients who require blood transfusion due to bleeding while undergoing prostatectomy or radical cystectomy procedures are normally given allogenic, banked blood. Such transfusions carry a small risk of infection, from, for example, hepatitis, human immunodeficiency virus (HIV), vCJD. In addition, the allogenic blood supply is reliant on the availability of donors, and may occasionally be scarce, temporarily. Alternatively, autologous blood can be collected and stored before an elective operation, and transfused intra- or post-operatively as required.

This intraoperative red blood cell salvage procedure offers an alternative to allogenic blood transfusion to groups who object to this on any grounds,

What the procedure involves

Intraoperative red blood cell salvage is the process whereby blood shed in the surgical field is collected, filtered, and washed to produce autologous red blood cells for transfusion to the patient.

Blood that is lost during radical prostatectomy or radical cystectomy is aspirated from the surgical field using a suction catheter. The blood is then filtered to remove gross debris. The filtered blood is washed or spun and red blood cells are re-suspended in saline for transfusion. This may be given to the patient (using standard transfusion techniques) either during, or after the operation. A number of devices are available for this procedure.

The aspirate may include viable cancer cells, but a leukocyte depletion filter is nearly always used, and this is thought to minimise the risk of reinfusion of these cells.

Efficacy

Prostatectomy

No studies were available that described efficacy outcomes for the use of intraoperative red blood cell salvage during prostatectomy.

Cystectomy

A case series of 49 patients receiving cell salvaged blood during radical cystectomy (or cystectomy in combination with other surgery) reported an 88% (43/49) overall survival at 24 months follow up, and an 80% (39/49) disease free survival[5].

Safety

Prostatectomy

None of the studies regarding the use of red blood cell salvage in prostatectomy reported on safety outcomes relating to the salvage and re-infusion procedure itself.

One non-randomised controlled study reported that overall biochemical [i.e. based on Prostate Specific Antigen (PSA) rise] prostate cancer recurrence was similar in patients who received cell salvaged blood, (15%) and those who did not require re-infusion (18%) (p=0.76). Subgroup analysis of 'low risk', 'intermediate risk', and 'high risk' patients [based on prostate specific antigen (PSA) level and Gleason score] also found no significant difference in biochemical recurrence between patients receiving cell salvaged blood and those who did not require a transfusion[1].

A second non-randomised controlled study reported that biochemical recurrence occurred in 5% (3/62) of patients receiving salvaged blood at 7 months follow up, and in 24% (24/101) of patients receiving pre-stored autologous blood at 43 months follow up2. Progression free survival was not significantly different between the groups (p=0.41). In the same study, postoperative haematocrit levels were significantly higher in cell salvage patients (31.3 ± 3.5%) than in patients with pre-stored blood (27.9 ± 3.4%).

A third non-randomised controlled study reported that biochemical failure occurred in 19% (9/47) of patients receiving salvaged blood at 43 months follow up, and in 32% (17/53) of patients that did not require re-infusion, at 46 months follow up (level of significance not stated)3. This study also reported that exposure to cell salvage was not an independent predictor of biochemical failure. No patient in either group provided PSA positive blood samples at three to five weeks follow-up.

Cystectomy

A case series of 49 patients undergoing cell salvage with 24 months follow-up reported that there were no complications directly related to cell salvage and transfusion. No major reactions to transfusions were noted and no patient demonstrated clinical or biochemical evidence of hepatitis[5].

A non randomised controlled study reported that overall 3-year actuarial survival was 64% among patients receiving salvaged re-infused blood, and 66% in patients who did not require re-infusion (p<0.74). Similarly, disease-free survival was not significantly different between these group, 72% and 73% respectively (p=0.90)[4].

Literature review

Rapid review of literature

The medical literature was searched to identify studies and reviews relevant to intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy. Searches were conducted of the following databases, covering the period from their commencement to 17th October 2007: Medline, PreMedline, EMBASE, Cochrane Library and other databases. Trial registries and the Internet were also searched. No language restriction was applied to the searches. (See appendix C for details of search strategy.)

The following selection criteria were applied to the abstracts identified by the literature search (Table 1). Where these criteria could not be determined from the abstracts the full paper was retrieved.

Table 1 Inclusion criteria for identification of relevant studies

Characteristic	Criteria
Publication type	Clinical studies were included. Emphasis was placed on identifying good quality studies. Abstracts were excluded where no clinical outcomes were reported, or where the paper was a review, editorial, or a laboratory or animal study. Conference abstracts were also excluded because of the difficulty of appraising study methodology.
Patient	Patients undergoing radical prostatectomy or radical cystectomy
Intervention/test	intraoperative red blood cell salvage
Outcome	Articles were retrieved if the abstract contained information relevant to the safety and/or efficacy.
Language	Non-English-language articles were excluded unless they were thought to add substantively to the English-language evidence base.

List of studies included in the overview

This overview is based on three non-randomised controlled trials for salvage during prostatectomy,[1–3] and one non-randomised controlled trial[4] and one case series for red blood cell salvage during cystectomy.[5]

Other studies that were considered to be relevant to the procedure but were not included in the main extraction table (Table 2) have been listed in appendix A.

Existing reviews on this procedure

No published systematic reviews with meta-analysis or evidence-based guidelines were identified at the time of the literature search.

Related NICE guidance

Below is a list of NICE guidance related to this procedure. Appendix B details the recommendations made in each piece of guidance listed below.

Interventional procedures

- Intraoperative blood cell salvage in obstetrics. NICE interventional procedures guidance 144 (2005). Available from www.nice.org.uk/IPG144

Technology appraisals

None

Clinical guidelines

None

Public health

None

Table 2 Summary of key efficacy and safety findings on intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

Abbreviations used: EBRT, external beam radiotherapy; PSA, prostate specific antigen.

Study details	Key efficacy findings	Key safety findings	Comments
Nieder (2005)[1] **Non-randomised controlled study** USA Study period: January 1992 to February 2003 **n = 1038 (265 cell salvage)** Population: age = 61 years (mean), males = 100%, Gleason score = 6.2, PSA = 9.3 ng/ml, positive surgical margins = 33%. Indications: Patients undergoing radical retropubic prostatectomy. Exclusion criteria included EBRT or incomplete follow-up. Technique: Blood salvaged using the Haemonetics® Cell Saver® system, taking 7–10 minutes to cycle blood. Leukocyte depletion filters were not used. If no autologous blood was pre-donated, cell saver blood was given if estimated blood loss was >700–900 ml. **Follow-up: 40 months (mean)** Conflict of interest: not stated.	No efficacy outcomes relating to the procedure were reported.	**PSA recurrence** Patients were stratified into 3 subgroups based on baseline characteristics. Low risk (PSA 0 to 10 ng/ml and Gleason score 2 to 6) Med risk (PSA 0 to 10 ng/ml and Gleason score 7+, or PSA 10 to 20 ng/ml and Gleason score 2 to 7) High risk (PSA 10 to 20 ng/ml and Gleason score 8 to 10, or PSA >20 ng/ml and any Gleason score) Biochemical recurrence was defined as a PSA level of 0.4 ng/ml or greater. Overall biochemical recurrence rate at 5 years was 15% in patients who received cell salvaged blood and 18% in patients who did not (p=0.76). PSA recurrence free survival was not significantly different between patient who had cell salvage or not in the low risk subgroup (p=0.77), the intermediate risk subgroup (p=0.78), or the high risk sub group (p=0.58). There was no significant difference in the time biochemical recurrence in patients who received cell salved blood 27.9 ± 30.3 months,and those who did not 32.1 ± 29.5 months (p=0.49).	One operator undertook all procedures. Retrospective analysis from institution database All patients given opportunity to pre-donate blood. If pre-donated blood available this was used before a decision to use salvaged blood. Loss to follow up included 19 patients with incomplete baseline or operative data, and 5 patients with no follow up data. No significant difference between the two groups at baseline with regard to age, Gleason score, PSA level, risk of seminal vesicle invasion, or positive surgical margins. 4 patients who received cell salvage blood also received allogenic transfusion. Authors state that selection bias for cell salvage may have occurred, however clinicians never purposefully decided to transfuse or not transfuse salvaged blood on the basis of baseline characteristics of operative findings.

Abbreviations used: EBRT, external beam radiotherapy; PSA, prostate specific antigen.

Study details	Key efficacy findings	Key safety findings	Comments
Gray (2001)[2] **Non-randomised controlled study** USA Study period: May 1991 to March 1999 **n = 163 (62 cell salvage)** Population: age = 63 years (mean), male = 100%, Gleason Score 6.1, PSA = 9.5 ng/ml. Indications: Patients undergoing radical retropubic prostatectomy. Technique: Blood salvaged using Sequestra®1000 cell saver system. Leukocyte depletion filters were used. Cell-salvaged blood was given in cases of symptomatic anaemia, where the haematocrit level was less than 33%, or if the patient had coronary artery disease. **Follow-up: 7 months (mean) in cell-salvage group and 43 months in pre-donated group** Conflict of interest: supported by state funding.	**Operative characteristics** The mean volume of cell salvaged blood transfused was 534 ml (range 150 to 1800 ml). Outcome | Cell salvage (n=62) | Pre-donation (n=101) | p= Postoperative haematocrit | 31.3 ± 3.5% | 27.9 ± 3.4% | <0.001 Estimated blood loss (ml) | 1315 ± 823 | 1410 ± 764 | 0.46	No safety outcomes relating to the procedure were reported. Biochemical recurrence was defined as a PSA level of 0.4 ng/ml or greater, or adjuvant radiotherapy given for any elevated PSA level. During the follow up period biochemical recurrence developed in 5% (3/62) patients in the cell salvage group, and 24% (24/101) patients in the pre-donation group. Progression free survival was not significantly different between the groups (p=0.41) No clinical recurrence occurred in either group.	One team performed all the prostatectomies Different methods were used to estimate blood loss in the two groups. The two study groups were accrued consecutively rather than contemporaneously. Patients were excluded if they underwent perineal prostatectomy. 26 patients were lost to follow up due to incomplete data. It is not stated which treatment group these were in. At baseline patients in the cell salvage group were significantly younger (62.0 Vs 63.3 years p=0.02), and had a higher Gleason score (6.5 Vs 5.9 p=0.03). There was no significant difference in PSA levels, or pathological tumour stage between the groups. No conceptual reason why blood loss volume during prostatectomy should be related to type of transfusion used. The follow up period for the two groups was different owing to the pre-donation service being instigated before the cell salvage service.

Abbreviations used: EBRT, external beam radiotherapy; PSA, prostate specific antigen.

Study details	Key efficacy findings	Key safety findings	Comments
Stoffel (2005)[3] **Non-randomised controlled study** USA Study period: 1994 to 1997 **n = 112 (48 cell salvage)** Population: age = 61 years (mean), male = 100%, Gleason score ≤6 = 38%, 7 = 54%, ≥8 = 16%, PSA = 8.4 ng/ml. Indications: Patients with clinical T1c to T2 prostate cancer undergoing radical retropubic prostatectomy. Exclusion criteria included EBRT and radiological evidence of metastasis. Technique: Blood was salvaged using the Brat 2® cell saver system. No additional filters were used. Cell-salvaged blood was given preferentially over pre-donated blood or allogenic blood if >200 ml of collected blood was available. **Follow-up: 43 months (mean) in cell-salvage group and 46 months in non-transfused group** Conflict of interest: none.	No efficacy outcomes relating to the procedure were reported.	**Blood chemistry analysis** Molecular analysis was undertaken on 97 samples. PSA producing cells were found in 13% of preoperative peripheral blood samples, and 88% of salvaged blood samples. Peripheral blood analysis: Cell salvage (n=19) 16% (3/19); No salvage (n=28) 4% (1/28); p= 0.29 At 3 to 5 weeks follow up: 0% vs 0%; NR Samples from 11 control patients with no known prostate cancer demonstrated that 5% (2/40) tested positively for PSA. **Biochemical recurrance** Biochemical recurrence occurred in 19% (9/47) of patients in the cell salvage group, and 32% (17/53) of patients in the non salvage group (level of significance not stated). Advanced pathalogical stage fo tumour (T3, T4) was an independent predictor of biochemical failure during follow up, adjusted hazard ration 3.51 (95% CI 1.43 – 8.61) (p=0.006). However, cell salvage, baseline Gleason score, and PSA level were not significantly association with outcome.	Prospective cohort of patients undergoing prostatectomy. No significant difference between the two groups at baseline with regard to age, Gleason score, PSA level, or tumour stage. Blood samples could not be retrieved in all patients postoperatively as one surgeon did not collect samples. It is not clear whether this decision was made with any clinical knowledge of patient condition. 1 patient from the cell salvage group, and 11 patients from the non salvage group were lost to follow up for survival. No details given. No definition provided for cut off level used to determine disease-free survival Authors comment that the assay method to detect PSA producing cells may be inconsistent.

Abbreviations used: EBRT, external beam radiotherapy; PSA, prostate specific antigen.

Study details	Key efficacy findings	Key safety findings	Comments
Nieder (2007)[4] **Non-randomised controlled study** USA Study period: January 1992 to November 2005 **n = 378 (65 cell salvage)** Population: age = 69 years (mean), male = 81%, clinically high-grade tumour = 84%. Indications: Patients undergoing radical cystectomy. Cystectomy performed in standard fashion. Pelvic lymphadenectomy performed in all patients and cystoprostectomy in all male patients. Technique: Salvage system was not described. Leukocyte depletion filters were not used. Cell-salvaged blood was given if estimated blood loss >700ml. **Follow-up: 20 months (median)** Conflict of interest: not stated.	**Operative characteristics** The mean volume of cell salvaged blood transfused was 362 ml.	**Survival** 3 year survival rates Outcome: Cell salvage (n=65): No cell salvage (n=313): P= Overall survival: 63.9%: 65.8%: 0.74 Disease free survival: 72.2%: 73.0%: 0.90	One operator undertook all procedures. Retrospective analysis from institution database The median length of follow up of patients receiving salvaged blood was 19.1 months and of those not receiving salvaged blood 20.7 months, however this difference was not statistically significant. No significant difference between the two groups at baseline with regard to age, gender, clinical stage, pathologic stage, or nodal status. No definition provided for cut off level used to determine disease-free survival

Abbreviations used: EBRT, external beam radiotherapy; PSA, prostate specific antigen.

Study details	Key efficacy findings	Key safety findings	Comments
Hart (1989)[5] **Case series** USA Study period: 1984 to 1987 **n = 49** Population: age = 65 years (mean), male = 92%. Indications: Patients with transitional cell carcinoma of the bladder undergoing radical cystectomy. Cystectomy performed in standard fashion. 48/49 patients underwent staging lymphadenectomy and urinary division. Two patients underwent nephroureterectomy. Technique: Blood was salvaged using the Haemonetics® Cell Saver® system, taking 10–15 minutes to cycle blood. Leukocyte depletion filters were not used. **Follow-up: 24 months (mean)** Conflict of interest: not stated.	**Operative characteristics** The mean volume of blood loss was 1497 ml (range 400 to 4000 ml). The mean volume of salvaged blood transfused was 492 ml (range 0 to 1500 ml). The mean volume of allogenic blood transfused was 735 ml. The mean haematocrit level on discharge was 34% (range 29 to 40%).	There were no complication directly related to cell salvage and transfusion. No major reactions to transfusions were noted and no patient demonstrated clinical or biochemical evidence of hepatitis. **Survival** At a mean follow up of 2 years 88%(43/49) of patients had survived, and the disease-free survival was 80% (39/49). Of the 4 patients alive with tumour recurrence, one had a recurrent pelvic mass, one had pelvic recurrence and metastasis to the left supraclavicular lymph node, one had pelvic recurrence and hepatic metastases, and one had multiple pulmonary metastases without evidence of local recurrence.	Study cohort is a selected group of patients. Use of cell salvage was determined by consultation with the patient, anticipation of significant blood loss, and the availability of the salvage device. Criteria for the need to re-infuse blood not described. Authors state that the failure rate in this study was 'in keeping' with reported survival for patients undergoing cystectomy for bladder carcinoma.

Validity and generalisability of the studies

- Not all patients in the included studies who underwent blood cell salvage eventually required transfusion during the procedure.
- The length of the follow-up period in these studies may not be sufficient to demonstrate safety in terms of development of secondary carcinoma.
- Some studies reported different follow up lengths in the two study groups, making comparison of survival difficult.
- The comparators used in the controlled trials are not standardised across the studies. Some compare cell salvage with patients who had blood salvaged but for whom no transfusion was necessary, while others compare with patients who received autologous blood donated prior to the procedure.

Specialist advisers' opinions

Specialist advice was sought from consultants who have been nominated or ratified by their Specialist Society or Royal College.

Dr D Thomas (Association of Anaesthetists of Great Britain & Ireland), Mr W Turner (British Association of Urological Surgeons), Dr S Catling (Association of Anaesthetists of Great Britain & Ireland), Mark Emberton (British Association of Urological Surgeons).

- Two of the Specialist Advisers considered the procedure to be established and no longer new, and two categorised it as a minor variation on an existing procedure which is unlikely to alter its safety and efficacy.

- Adverse events known to the advisers included hypertensive episodes on the re-infusion of blood.

- Additional theoretical adverse events include re-infusion of cancerous cells that lead to distant metastases. However one adviser commented that if the tumour margins are not compromised during surgery any such cells must have pre-existed in the patient's circulation.

- One adviser commented that there are no safety concerns about the technical procedure itself which is 'tried and tested' .

- The procedure aims to avoid complications associated with allogenic transfusion such as incorrect / incompatible transfusions, and immunological reactions.

- The spread of cancerous cells is unlikely following the centrifuge and filtering process. Additionally, irradiation of salvaged blood may eradicate viable nucleated cells entirely, however this may be impractical.

- One adviser commented that there has been no change in incidence in metastatic disease over the period that salvage has been used in urological malignancy surgery.

- Training is provided by manufacturers. In addition 'Better Blood Transfusion' guidance and a training programme are available on the Department of Health website. http://www.dh.gov.uk/en/Publicationsandstatistics/Lettersandcirculars/Healthservicecirculars/DH_4004264 http://www.transfusionguidelines.org.uk/index.asp?Publication=BBT&Section=22&pageid=974#lcs

- Local audit / registries are in place, and the UK cell salvage action group are looking to set up a national database of cell salvage procedures.

- National standards and guidance are currently being produced by the UK cell salvage action group.

- One adviser commented that there is considerable scope to use cell salvage in other cancer surgery.

- The Specialist Advisers considered the key efficacy outcomes for this procedure to include, reduction in allogenic transfusion requirement, local and distant recurrence rates, PSA markers, reduction in perioperative immunomodulation, and blood haemoglobin levels.

- The Specialist Advisers considered the key safety outcomes for this procedure to include, transient hypertension, length of stay, need for ITU stay, infection rates, thrombosis, and bleeding.

- If the procedure was determined to be safe and efficacious, two advisers thought that it would be used in most or all district general hospitals, while one thought that it would be used at a minority of sites but at least 10.

Issues for consideration by IPAC

- More data are available on cell salvage in prostatectomy than in cystectomy. In one study of cystectomy, male patients also had their prostate removed.

- All three of the cell salvage devices used in the trials included in Table 2 of the overview (Sequestra 1000™ [Medtronic], Brat 2 [Cobe cardiovascular] and Cell Saver [Haemonetics]) all have CE marks.

- There are difficulties in conceptualising the safety outcomes specifically relating to cell salvage, as the transfusion procedure is largely similar to standard allogenic transfusion. Development of metastases is considered as an efficacy outcome for this procedure.

- Studies of patients undergoing procedures other than prostatectomy or cystectomy were excluded, as were studies where cell salvage was used in a range of procedures and the results were not reported separately for the different subgroups.

References

1. Nieder AM, Carmack AJ, Sved PD et al. (2005) Intraoperative cell salvage during radical prostatectomy is not associated with greater biochemical recurrence rate. *Urology* 65: 730–4.
2. Gray CL, Amling CL, Polston GR et al. (2001) Intraoperative cell salvage in radical retropubic prostatectomy. *Urology* 58: 740–5.
3. Stoffel JT, Topjian L, Libertino JA. (2005) Analysis of peripheral blood for prostate cells after autologous transfusion given during radical prostatectomy. *BJU International* 96: 313–15.
4. Nieder AM, Manoharan M, Yang Y et al. (2007) Intraoperative cell salvage during radical cystectomy does not affect long-term survival. *Urology* 69: 881–4.
5. Hart OJ, Klimberg IW, Wajsman Z et al. (1989) Intraoperative autotransfusion in radical cystectomy for carcinoma of the bladder. *Surgery, Gynecology & Obstetrics* 168: 302–6.

Appendix A: Additional papers on intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy not included in summary Table 2

The following table outlines studies considered potentially relevant to the overview not included in the main data extraction table (Table 2). It is by no means an exhaustive list of potentially relevant studies.

Article title	**Number of patients/follow-up**	**Direction of conclusions**	**Reasons for non-inclusion in Table 2**
Gilbert JB, Malkowicz SB, Wein AJ. (1995) Cell saver and radical retropubic prostatectomy: analysis of cost-effectiveness. *Urology* 46: 542–4.	Non-randomised controlled trial n=172 (86 salvage) Follow-up to discharge	No statistical difference in the rate of allogenic transfusions between patients with pre-donated blood and those having cell salvage.	Studies in Table 2 have longer follow-up .
Park KI, Kojima O, Tomoyoshi T. (1997) Intraoperative autotransfusion in radical cystectomy. *British Journal of Urology* 79: 717–21.	Case series n=10 Follow-up to 47 months	20% (2/10) of patients who refused chemotherapy, died from metastatic lesions at 12 and 35 months, respectively.	Comparative data for patients undergoing cystectomy are available in Table 2
Waters JH, Lee JS, Klein E et al. (2004) Preoperative autologous donation versus cell salvage in the avoidance of allogeneic transfusion in patients undergoing radical retropubic prostatectomy. *Anesthesia & Analgesia* 98: 537–42.	Non-randomised controlled trial n=50 (24 salvage) Follow-up to discharge	No difference in exposure to allogenic blood was found between patients with pre-donated blood and those undergoing cell salvage.	Larger studies and studies with longer follow-up are available in Table 2

Appendix B: Related published NICE guidance for intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

Guidance programme	Recommendation
Interventional procedures	**IPG144 Intraoperative blood cell salvage in obstetrics** 1 Guidance 1.1 Intraoperative blood cell salvage is an efficacious technique for blood replacement and its use is well established in other areas of medicine, but there are theoretical safety concerns when it is used in obstetric practice. Data collection is therefore important and clinicians should report all complications to the Medicines and Healthcare products Regulatory Agency (www.mhra.gov.uk). 1.2 Whenever possible, patients should be fully informed of the potential complications. In addition, use of the Institute's *Information for the public* is recommended. 1.3 This procedure should only be performed by multidisciplinary teams who develop regular experience of intraoperative blood cell salvage.
Technology appraisals	None applicable
Clinical guidelines	None applicable
Public health	None applicable

Appendix C: Literature search for intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy

IP 597 Intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy		
Database	**Date searched**	**Version searched**
Cochrane Library	17/10/2007	Issue 3, 2007
CRD databases (DARE & HTA)	17/10/2007	Issue 3, 2007
Embase	17/10/2007	1980 to 2007 Week 41
Medline	17/10/2007	1950 to October Week 1 2007
Premedline	17/10/2007	October 16, 2007
CINAHL	17/10/2007	1982 to October Week 2 2007
British Library Inside Conferences	17/10/2007	–
NRR	17/10/2007	Issue 3, 2007
Controlled Trials Registry	17/10/2007	–

The following search strategy was used to identify papers in Medline. A similar strategy was used to identify papers in other databases.

1	exp Blood Transfusion, Autologous/
2	(blood transfusion adj3 autologous).tw.
3	(cell adj3 (salvage or saver)).tw.
4	autologous blood.tw.
5	or/1-4
6	exp Prostatectomy/
7	prostatectom$.tw.
8	Montsouris.tw.
9	or/6-8
10	exp Cystectomy/
11	cystectom$.tw.
12	10 or 11
13	5 and (9 or 12)

14	Animals/
15	Humans/
16	14 not (14 and 15)
17	13 not 16