Annals of the Royal College of Surgeons of England (1991) *vol.* 73, 116–118

Effect of blood transfusion on survival after radiotherapy as treatment for carcinoma of the prostate

A H Davies MA FRCS
Registrar in Surgery

D Cranston DPhil FRCS
Senior Registrar in Urology and Transplantation

P Ramarakha BA
Medical Student

P Jane Clarke MD FRCS
Senior Registrar in Surgery

Department of Urology, Churchill Hospital, Oxford

Key words: Blood transfusion; Prostatic carcinoma

Over a 14-year period, 71 patients underwent transurethral resection of the prostate with high dose radiotherapy. Eighteen patients required perioperative transfusion. The 5-year survival in the non-transfused group was 66% and in the transfused group 17% ($P < 0.001$; $\chi^2 = 11.57$). Recurrence of tumour in the transfused group was 72% compared with 21% in the non-transfused group ($P < 0.01$; $\chi^2 = 9.1$). When Cox's models and regression analysis were used, the disease state being controlled for grade and stage, only blood transfusion was seen to influence outcome. We conclude that careful thought should be given before transfusing patients undergoing transurethral surgery for prostatic carcinoma.

The effect of perioperative blood transfusion on patient survival and recurrence after undergoing surgery for carcinoma is controversial *(1–4)*. Animal studies have shown that perioperative transfusion is detrimental to survival *(5)*. It has been shown that transfused patients undergoing a transurethral resection of prostate (TURP) with carcinoma have a less good prognosis with regard to both survival and local recurrence than non-transfused patients *(2,6,7)*. The effect of blood transfusion in patients who have received high dose radiotherapy after TURP is previously unreported. This study aims to investigate outcome in this group of patients.

Patients and methods

Over the 14-year period 1973–1986, 71 patients with a median age of 66 years (range 47–76 years) underwent transurethral resection of the prostate and high dose radiotherapy. Patients were staged by clinical examination, examination under anaesthesia, serum acid phosphatase and ^{99}Tc skeletal scintigraphy. After 1983, computerised axial tomography was also used.

All patients received 5400 rad (54 Gy) in 18 sessions over a 6-week period. Data were obtained from the hospital notes and by contacting the patients' general practitioners. Perioperative transfusion was defined as a blood transfusion administered in the period 2 weeks before until 4 weeks after surgery.

Results

Eighteen patients required blood transfusion. Using Kaplan–Meier life curves, the actuarial 5-year survival for the 53 patients who were not transfused was 66% whereas that in the transfused group was 17% ($P < 0.001$; $\chi^2 = 11.57$). Recurrence rates in both groups were: in the non-transfused group 15 (21%) and in the transfused group 13 (72%) ($P < 0.01$; $\chi^2 = 9.1$) and local recurrence rates were 2 (4%) and 1 (6%), respectively ($P > 0.5$; $\chi^2 = 0.13$). All values of χ^2 were calculated using Yates' correction. Table I compares the variable factors of age, perioperative haemoglobin, stage or grade of the tumour, and the grade of surgeon or anaesthetist, none of which influence the need for transfusion. In view of the small numbers with respect to stage, if T_1 and T_2 are compared to T_3 and T_4 as two groups, stage does not influence need for transfusion ($P > 0.5$; $\chi^2 = 0.24$). With respect to grade, there was no significant difference in the need for transfusion in any group. (Well *vs* moderately $P > 0.5$; $\chi^2 = 0.093$. Well *vs* poor $P > 0.1$; $\chi^2 = 0.577$; Moderately *vs* poor $P > 0.1$; $\chi^2 = 0.614$).

Correspondence to: Mr A H Davies, Department of Urology, Churchill Hospital, Headington, Oxford OX3 7LJ

Table 1. Comparison of variable factors

		Non-transfused	*Transfused*	*Significance*
Number		53	18	
Median age in years (range)		65 (47–72)	68 (55–76)	
Survival at 5 years		66%	17%	$P>0.001$
Recurrence				
Total		15	13	$P>0.001$
Local		2	1	NS
Stage	T_1	4	0	
	T_2	28	9	*
	T_3	21	8	
	T_4	0	1	
Grade	W	11	4	*
	M	24	9	
	P	18	5	
Preoperative haemoglobin (g/l) (range)		12.8 (9.8–15.0)	12.2 (8.2–15.4)	
Surgeon				
Consultant		41	14	NS
Non-consultant		12	4	
Anaesthetist				
Consultant		32	12	NS
Non-consultant		21	6	

* See text
NS = Not significant
W = Well differentiated
M = Moderately differentiated
P = Poorly differentiated

Using Cox's models and regression analysis when disease state was controlled for grade and stage, the only variable found to be statistically significant was blood transfusion.

Discussion

Previous studies have shown the deleterious effect of blood transfusion on patients undergoing prostatectomy for carcinoma *(6,7)*.

This study confirms that patients requiring a perioperative blood transfusion who have undergone treatment with high dose radiotherapy have a less good chance of survival and an increased risk of recurrence, but not of local recurrence. This latter observation may either be a reflection of small numbers or that radiotherapy may be very effective in controlling local disease. Table I lists the variables that are thought to influence the need for transfusion; in this study there was no significant difference in either group. Data were not available regarding the volume of the prostate gland resected. The exact mechanism by which transfused blood exerts a deleterious effect is not understood. It may reflect immunosuppression at the time of an insult, analogous to the benefit seen in transplant patients transfused preoperatively *(8)* but this theory is controversial *(9)*. Until further prospective data are available we suggest, like others *(6,7)*, that careful consideration be given before offering blood transfusion to patients undergoing surgery for prostatic carcinoma. Autologous blood transfusion should be contemplated if preoperative assessment suggests that transfusion is necessary.

References

1 Burrows L, Tartter P. Effect of blood transfusion on colonic malignancy rates. *Lancet* 1982;2:662 (Letter).

2 Blumberg N, Heal J, Chuang C. Murphy P, Agarwal M. Further evidence to supporting a cause and effect relationship between blood transfusion and earlier cancer recurrence. *Ann Surg* 1988;**207**:410–15.

3 Moffat LEF, Sunderland GT, Lamont D. Blood transfusion and survival following nephrectomy for carcinoma of the kidney. *Br J Urol* 1987;**60**:316–19.

4 Francis DMA, Judson RT. Blood transfusion and recurrence of cancer of the colon and the rectum. *Br J Surg* 1987;**74**:26–30.

5 Clarke PJ, Tarin D. Effect of pre-operative blood transfusion on tumour metastases. *Br J Surg* 1987;**74**:520–2.
6 Heal JM, Chuang C, Blumberg N. Perioperative blood transfusions and prostate cancer recurrence and survival. *Am J Surg* 1988;**156**:374–80.
7 McClinton S, Moffat LEF, Scott S, Uribaniak SJ, Kerridge DF. Blood transfusion and survival following surgery for prostatic carcinoma. *Br J Surg* 1990;**77**:140–2.
8 Oplez G. Blood transfusion and renal transplanation. In: Morris PJ ed. *Kidney Transplantation. Principle and Practice.* 3rd Ed. Philadelphia: WB Saunders, 1988:417–38.
9 Francis DMA, Tartter PI. Blood transfusion and colorectal cancer. *J. R Coll Surg Edinb* 1988;**33**:49 (Letter).

Received 13 September 1990

Assessor's comment

The message in this paper from Oxford advises us to be very selective about blood transfusions for prostatic cancer patients undergoing transurethral prostatectomy and it would be very interesting if other centres looked at their cases in the same way, albeit retrospectively. The evidence from Oxford, and a previous paper from Aberdeen, is very persuasive.

Nevertheless, these results could also question the wisdom of using TURP in the first place for any patients requiring radical radiotherapy to attempt cure of a primary prostatic cancer. Most urologists would agree that transurethral prostatectomy under these circumstances should be for relief of outflow obstructive symptoms from the bladder, and not as a primary method of biopsy, but there is no guarantee that even small cancers will not bleed viciously when resected. However, the primary treatment of these patients is radical radiotherapy and TURP inevitably delays commencement of such treatment by 6–8 weeks at least. There is therefore a case for management of such patients initially by urethral catheterisation to enable immediate irradiation to be undertaken, and palliative TURP to be postponed for those who fail a trial without catheter after 2 months or so. I have used this policy for many years which, apart from the merit of early radiotherapy for the cancer, is frequently followed by adequate voiding by the patient, and where TURP is required the operation is carried out on irradiated tissue which is usually not particularly vascular.

W B Peeling FRCS
Consultant Urological Surgeon
St Woolos Hospital
Newport, Gwent