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The Characteristics of Post Tur Blood Loss: A Preliminary Study

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Summary. Peroperative and postoperative blood loss was studied in 20 patients. Both peroperative and postoperative blood loss was found to correlate together ($p < 0.05$) and with the weight of resected tissue ($p < 0.05$). The characteristics of the postoperative blood loss demonstrated a strong negative correlation with time, and calculation of the t_{50} showed that a 50% reduction in postoperative blood loss occurred within 16 h.

Key words: Blood loss, Transurethral resection, Prostate, Cyanmethemoglobin, Colorimeter.

Introduction

Much has been written on blood loss following transurethral resection of the prostate (TURP) [2–7], and it has been advocated that two units of blood should be made available for the procedure [1].

Studies that have assessed both peroperative and postoperative blood loss have demonstrated that peroperative loss is related to both the weight of resected gland and duration of resection [3, 4, 6, 7]. Postoperative loss is difficult to assess, and all studies have looked at total postoperative blood loss with the aim of reducing this figure [2, 5, 7]. The present study was undertaken to determine the characteristics of postoperative blood loss, and to assess whether the rate of loss would suggest the optimum time for blood replacement.

Patients and Methods

Twenty males undergoing consecutive transurethral resection of the prostate (TURP) were studied. Patients with a preoperative diagnosis of carcinoma or who were receiving long-term anticoagulant therapy were excluded. The age range of the patients was 53–90 years with a mean age of 72.5 years. Thirteen patients had been catheterised preoperatively, 12 for acute retention and one patient for chronic retention and overflow. Preoperative urine cultures were performed in all patients. A significant positive culture (10^5 organism ml^{-1}) was demonstrated in five patients (three E. coli, one proteus and one Strep. faecalis) and appropriate antibacterial therapy was given 24 h before surgery and postoperatively until removal of the catheter. Serum haemoglobin (Hb), urea, electrolytes and creatinine were measured in all patients, (mean values are given in Table 1). Two units of blood were made available in all patients.

All fluid used for irrigation during resection was collected and the volume measured. The resected prostate was weighed. At the end of the procedure a catheter was inserted and a urimeter attached; 20 mg intravenous Frusemide was given and a standard postoperative fluid regime of alternate 4-hourly 500 ml volumes of N saline and 5% dextrose was given for the first 24 h. The postoperative haemoglobin was measured on Day 2.

Urine was collected hourly for the first 12 h; 2-hourly for the next 12 h and 4-hourly for the final 24 h.

Peroperative and postoperative blood loss was determined by measuring the Hb concentration by the cyanmethemoglobin method, using the standard Haemoglobin test combination kit, (Boehringer-

Table 1. Mean values (± SEM) for preoperative Hb (gdl^{-1}); urea ($mmol\ l^{-1}$); and creatinine ($umol\ l^{-1}$), peroperative and total postoperative blood loss (ml), the weight of tissue resected (g), and the 48 h postoperative Hb (gdl^{-1})

Preoperative Hb. (gdl^{-1})	Preoperative urea ($mmol^{-1}$)	Preoperative creatinine ($\mu mol\ l^{-1}$)	Peroperative blood loss (ml)	Total postop. blood loss (ml)	Weight of resected tissue (grams)	Postoperative Hb (gdl^{-1})
12.8 (± 0.4)	7.2 (± 0.7)	103 (± 8.3)	391.1 (± 118)	247.9 (± 86.2)	9.7 (± 1.6)	12.3 (± 0.5)

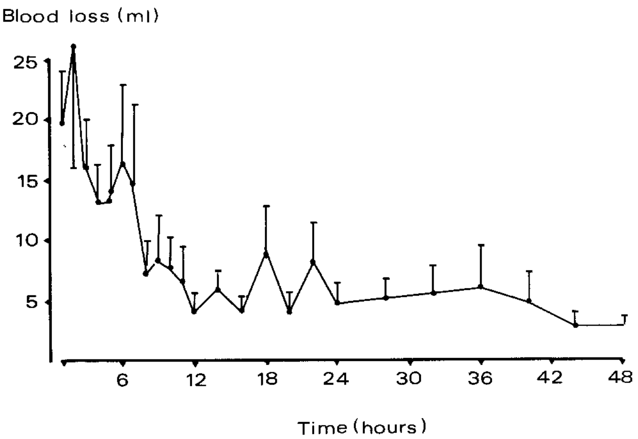

Fig. 1. To illustrate changes in postoperative blood loss in the 48 h postoperative period. Data points are mean values (± SEM) for each timed collection (n = 20)

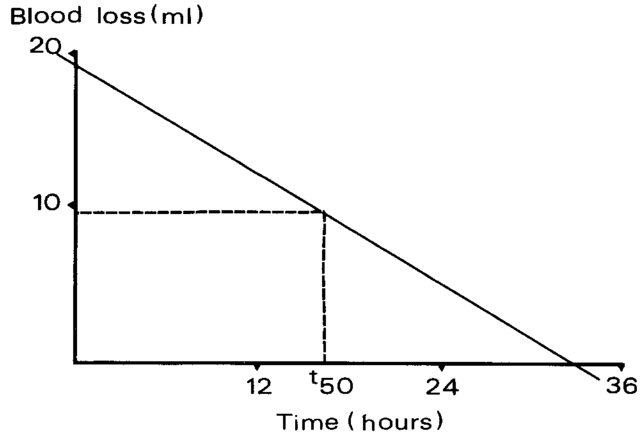

Fig. 2. The plot of blood loss v. time derived by least squares regression analysis. The correlation coefficient r = 0.72 (p < 0.010; the derived t_{50} = 16.4 h

Mannheim GmbH) [7]. Cyanmethemoglobin concentration was determined by the absorbance at 546 nM in a colorimeter, Corning EEL model 222 concentration colorimeter). From previously prepared standard curves, the Hb concentration in gdl^{-1} was determined. The volume of blood loss in the collected sample could be calculated by correction with either preoperative Hb (for peroperative loss and the first 24 postoperative hours) or postoperative Hb (for the second 24 h loss), and the volume of the collected sample.

Statistical Methods

1. The significance of observed differences between two comparable groups was assessed by the non-paired t test.

2. To determine the significance of the correlation between two sets of observations, the correlation coefficient was determined by the use of Kendall's method of rank correlation.

3. The relationship between postoperative blood loss and time was studied by least squares regression analysis. The slope of the derived line allowed the calculation of change in blood loss per unit time, and derivation of the t_{50} (the time taken to achieve a 50% reduction in blood loss).

Results

1. Peroperative Blood Loss

The mean peroperative, total postoperative loss and mean weight of resected tissue are illustrated in Table 1. No significant relationship between peroperative loss and preoperative Hb, urea and creatinine, could be obtained. There was no significant difference in blood loss between preoperatively catheterzised patients (n = 13) and those without a catheter (n = 7). The presence of a positive urine culture ($> 10^5$ organisms ml^{-1}) had no effect on peroperative loss. Peroperative blood loss was found to significantly correlate with both the weight of the resected gland ($p < 0.05$) and total postoperative blood loss ($p < 0.05$).

2. Postoperative Blood Loss

The mean (± SEM) total postoperative blood loss for the 48 h period is given in Table 1, and the values for blood loss per unit time are illustrated in Fig. 1. The straight line plot of blood loss v. unit time (Fig. 2) demonstrated a significant negative correlation between loss and time (r = 0.72; $p <$ 0.001) with a t_{50} of 16.4 h. There was no demonstrable relationship between postoperative loss and either the preoperative and postoperative Hb, and the preoperative urea and creatinine. There was a significant correlation between total postoperative loss and both the peroperative loss and the weight of resected gland.

Discussion

The direct measurement of blood loss following transurethral resection of the prostate is a simple procedure and does not interfere in the postoperative management of the patient.

In the present study it is confirmed that peroperative loss is related to the weight of resected tissue [3]. It is also demonstrated that total postoperative loss is related to both the weight of resected tissue and the peroperative blood loss, an association not previously recognised.

Postoperative bleeding is time dependent, and in the present study all patients had *clinically* clear urine by 48 h. The correlation of blood loss with time allows calculation of the t_{50} which was noted to be 16.4 h. It may be concluded that the need for transfusion can be assessed either immediately following resection (determined by the weight of resected tissue) or in the second postoperative day. The need for postoperative transfusion may be assessed by comparing blood loss in the first postoperative hour and 24 h following resection using the colorimetric method. A greater than 50% reduction in blood loss would negate the immediate need for transfusion.

A recent study from Virginia [3] has noted that the crossmatch to transfusion ratio in seven centres varied from 5.3 to 54.5 with a mean ratio of 24.1. The authors recommend that only ABO-RH typing and antibody screening need be carried out.

In the 20 patients studied, postoperative transfusion (of two units) was given to four patients, giving a crossmatch to transfusion ratio of 5:1, a value similar to that noted in two recent U.K. studies [6, 7].

From these findings we would agree with the recommendation of Jenkins and Mintz [2] that preoperative crossmatching for routine and uncomplicated transurethral prostatectomy in the absence of significant risk factors is unnecessary. ABO-Rh typing and antibody screening are a safe and cost effective alternative.

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