Timing of re-transfusion drain removal following total knee replacement

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ABSTRACT

INTRODUCTION The use of postoperative drains following total knee replacement (TKR) has recently been modified by the use of re-transfusion drains. The aim of our study was to investigate the optimal time for removal of re-transfusion drains following TKR.

PATIENTS AND METHODS The medical records of 66 patients who had a TKR performed between October 2003 and October 2004 were reviewed; blood drained before 6 h and the total volume of blood drained was recorded.

RESULTS A total of 56 patients had complete records of postoperative drainage. The mean volume of blood collected in the drain in the first 6 h was 442 ml. The mean total volume of blood in the drain was 595 ml. Therefore, of the blood drained, 78% was available for transfusion.

CONCLUSION Re-transfusion drains should be removed after 6 h, when no further re-transfusion is permissible.

KEYWORDS

Total knee replacement – Surgical drain – Re-transfusion

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Over 40,000 total knee replacements (TKRs) are performed in the UK each year. The use of surgical drains postoperatively following TKR has been commonplace for many years, although re-transfusion of collected blood is a recent advance. There is a growing body of evidence to support the benefits of re-transfusion drains.¹ However, the optimal time of drain removal has not been studied. The aim of this study was to clarify the optimal time for removal for the Bellavac re-transfusion drain following TKR.

Patients and Methods

The Bellavac re-transfusion system was introduced into our hospitals in 2003. The standard policy for the use of these drains was to re-transfuse the blood drained within the first 6 h postoperation if this amounted to 200 ml or more. Any amount less than 200 ml and any blood drained after the 6 h point was discarded. The drains were then removed at 24 h.

The medical records of 66 consecutive patients were reviewed. Each patient had a TKR performed by the senior surgeon between October 2003 and October 2004. The

blood drained before 6 h and the total volume of blood drained was recorded for each patient.

Results

The medical records of 5 patients were unavailable for review. A further 5 patients did not have the total amount of blood collected in the drain recorded in their notes. This left 56 patients with complete records of the postoperative drainage.

Of these 56 patients, 51 (91%) had an autologous blood transfusion. The mean volume of blood collected in the drain in the first 6 h was 442 ml. The mean total volume of blood in the drain was 595 ml. Of the total volume of blood in the drain, 78% was collected before 6 h and was, therefore, available for transfusion (see Table 1).

Only 4 patients did not have an autologous transfusion because they had less than 200 ml of blood in the drain within the first 6 h. In addition, 2 patients breached the transfusion protocol. One patient had more than 200 ml of drainage in the first 6 h but did not have the blood transfused. The reason for not transfusing the patient was not

Table 1 Postoperative blood loss

	Mean (SD)
Drainage before 6 h (ml)	442 (272)
Drainage after 6 h (ml)	133 (70)
Total drainage (ml)	595 (375)
Percentage loss before 6 h	78
Percentage loss after 6 h	22

recorded. One other patient had only 180 ml of drainage but did have the blood transfused.

Discussion

This is the first published study to investigate the timing of removal of re-transfusion drains. The published evidence regarding postoperative closed suction drains in joint arthroplasty has been reviewed recently.^{2,5} The literature suggests no significant advantage is conferred by the use of drains, in terms of wound complications, postoperative function, fall in haemoglobin and the need for re-transfusion. Moreover, closed suction drains significantly increase blood loss and requirement for allograft blood transfusion.^{2,5}

Autologous blood re-transfusion has been shown to be safe and acceptable by Dalen *et al.*⁴⁻⁶ Furthermore, the use of re-transfusion drains significantly decreases the relative risk of allograft blood transfusion and the volume required.¹ As such, the evidence currently supports the use of postoperative drains for autologous re-transfusion.

The manufacturers of the Bellavac drain (Astra Tech) recommend re-transfusion is completed within 6 h, in line with American Association of Blood Banks' standards. Our study indicates that the majority of blood is drained within

6 h (78%) and provides a significant volume for re-transfusion. Given that drains confer no advantage in terms of postoperative function or wound complications, we suggest that the remaining 22% can be ignored. The drain can, therefore, be removed at the time of re-transfusion saving nursing time, the use of further collection bags, and removing the theoretical risk of introducing infection.⁷ The practice in our hospital has been changed accordingly.

Furthermore 91% of patients had sufficient drainage for re-transfusion, which suggests it is worthwhile using these drains in all TKR patients.

Conclusion

Our study suggests that re-transfusion drains should be removed after 6 h, when no further re-transfusion is permissible.

References

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