PREOPERATIVE SKIN TRACTION FOR FRACTURES OF THE PROXIMAL FEMUR
A RANDOMISED PROSPECTIVE TRIAL

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We report the results of a randomised trial to determine the effects of skin traction on 252 patients awaiting surgery for fractures of the proximal femur.

They were allocated randomly to be nursed free in bed or to receive Hamilton-Russell skin traction. No differences were found between the groups in terms of pain suffered, analgesia required, frequency of pressure sores or ease of operation.

The application of skin traction to patients with fractures of the upper femur is time-consuming and we recommend therefore that its routine use should be discontinued.

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Many patients admitted to hospital with fractures of the proximal femur are treated by skin traction while awaiting surgical treatment in the belief that traction reduces the pain. Some surgeons also believe that traction maintains or improves the position of the fracture, despite the very small force that can be applied through the skin. There is no evidence in the literature to support either of these suppositions.

There are risks associated with this method of traction. The skin may be damaged by mechanical shearing or by allergy to adhesive strapping, a risk that can be minimised by using non-adhesive, hypoallergenic bandages. The traction may also make nursing care of pressure areas more difficult by interfering with the lifting and turning of the patient. It may also make such movements more rather than less painful. There are potential risks to the arterial supply and venous drainage of the limb when circular bandages are applied. Skin traction is also time-consuming to apply (and reapply).

Our aim was to carry out a randomised trial to determine the value of preoperative skin traction in the management of patients with proximal femoral fractures. When we started our trial there was no published material to confirm or deny the usefulness of preoperative skin traction. Since then the results of a similar trial have been published (Finsen et al 1992) in which 80 patients, divided into three groups, had no traction, skin traction or skeletal traction. There were small numbers in each group and pain was not formally assessed, but the authors reported no difference in analgesia dispensed or any other difference between the groups.

PATIENTS AND METHODS
We assessed all patients admitted to the Leicester Royal Infirmary with fractures of the proximal femur from November 1991 to July 1993. Patients were excluded if informed consent was refused or, as in the case of senile patients, it could not be obtained and if they had conditions which in our view contraindicated the use of skin traction. These included poor skin, ulceration of the lower limb, peripheral arterial disease, severe oedema and lower-limb deformities.

The patients were randomised using the last digit of their registration number; those with odd numbers (the traction group) received Hamilton-Russell skin traction with 5 lb weight (2.3 kg) (Stewart and Hallett 1983); those with even numbers (the no traction group) were nursed free in bed. In all cases definitive surgical treatment was planned for the next available operating list.

On admission we recorded the age and sex, fracture type (intracapsular or extracapsular), mental test score, Waterlow (1988) score, pain score using a visual analogue scale, and the presence of pressure sores. The mental function of all patients admitted to our unit with proximal femoral fractures is assessed on admission by the house officer using a mental test score which determines orientation in time and space as well as long- and short-term memory (Hodkinson 1972). The maximum possible score is 13 points. Senile dementia has been shown to be
the greatest single prognostic indicator for patients with proximal femoral fractures and, when comparing the results of treatment in these patients, it is essential to demonstrate equivalence in this respect (Wood et al 1992).

The Waterlow score predicts the risk of developing pressure sores. Pain was assessed three times daily during the preoperative stage. Analgesia was recorded in the preoperative period as the number of doses given per day.

A daily check of pressure areas was made throughout the patients' hospital stay. The grade of pressure sore (Morison 1989) was measured by comparison with a photographic reference scale.

A subjective measurement was recorded by the operating surgeon of the ease of reduction of the fracture or, when appropriate, the ease of performance of a hemiarthroplasty. Since 109 of the operations were carried out by one surgeon (GHA) only these results are included in this analysis. Thus the measurement, although subjective, was made by the same person throughout. Skin traction was removed before the patient arrived in
the anaesthetic room so that the surgeon was unaware of the preoperative regime. The time interval between admission and operation and the length of hospital stay were recorded for each patient.

RESULTS

A total of 252 patients were entered into the trial; their mean age was 80.6 years (38 to 96; sd 9.08). Women outnumbered men by 3.3 to 1. There were 137 extracapsular and 115 intracapsular fractures.

There were 101 patients in the traction group and 151 in the no traction group. The probability of this large difference in numbers between the groups being random is between 2% and 5% by the chi-squared test. The reason for the difference is unclear and may relate to the allocation of registration numbers by the hospital administration. Since the age, sex, fracture type, mental ability and Waterlow scores of the two groups were well matched the difference in the numbers in the groups may have been a chance occurrence (Table 1).

Patients do not wait for the same length of time before their operations. The preoperative waiting times were recorded and were found to be similar in the two groups (Fig. 1). Analysis of each day’s pain scores, using the Kruskal-Wallis test, showed no significant difference between the groups (Fig. 2).

Figure 3 shows the number of patients given zero, one, two or three doses of analgesics on the first three days after admission. There is no difference between the groups. Because most of the patients had been operated on by the third day the numbers beyond that time are too small to compare.

All patients studied had at least a grade-1 pressure sore at some stage during their hospital stay. We therefore considered only pressure sores of grade 2 and above, those with skin damage other than simple erythema. Such pressure sores were already present in 5 of the 252 patients (2%) on admission. A further 14 patients developed sores while in hospital; in three they became apparent before and in 11 after operation. There was no significant difference between the two groups in the number of patients who developed pressure sores.

No patient in the trial suffered direct skin damage as a result of the application of traction.

Of the 109 patients in whom ease of reduction at operation was recorded, 7 of 64 (10.9%) in the no traction group and 5 of 45 (11.1%) in the traction group were considered to be difficult to reduce. The difference is not significant (chi-squared test).

The mean hospital stay for the traction group was 17.8 days (4 to 52; sd 8.5) and for the no traction group 16.6 days (3 to 58; sd 8.4). The difference is not significant (Student’s t-test).

DISCUSSION

We have shown no benefit from the application of skin traction preoperatively to patients with fractures of the proximal femur. None of our criteria showed differences that approached statistical significance.

One possible consequence of the use of skin traction which we were not able to address is its effect on the blood supply to the femoral head in displaced intracapsular fractures. In theory, by limiting external rotation of the limb, traction may prevent occlusion of the posterior capsular blood vessels. On the other hand, by preventing external rotation, traction may raise the pressure within the joint capsule and risk tamponade of the femoral head. We know of no evidence to suggest that skin traction has any effect on the incidence of post-traumatic osteonecrosis. Since only 14 patients, 9 in the traction group and 5 in the no traction group (6% of the study population), with displaced intracapsular fractures were treated by reduction and internal fixation, the numbers are not sufficient to show a difference in the incidence of post-traumatic osteonecrosis between the two groups.

There are potential dangers to the use of skin traction and it is time-consuming to apply. The cost of a skin traction set is small but with 46 000 patients per annum sustaining proximal femoral fractures (Report of the Royal College of Physicians of London 1989) the overall cost is considerable. Abandoning the routine use of traction would save both time and money.

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REFERENCES


