ABSTRACT

**Purpose.** To evaluate whether the operating time correlates with the survival and outcome in patients who underwent intramedullary nailing for metastatic femoral fractures.

**Methods.** Records of 10 men and 11 women aged 43 to 86 (mean, 66) years who underwent intramedullary nailing (4 bilaterally) for metastatic femoral fractures between 1999 and 2003 were reviewed. The patients were followed up for at least 2 years or until their death. The main outcome measure was the correlation between operating time and survival. Operating time was categorised into 5 groups from 60 to 210 minutes, with 30-minute increments.

**Results.** Operating time does not correlate with survival and outcome. The mean survival period was 9.4 months. Pain relief was achieved in 90% of the patients. There was no implant failure, but one loss of reduction.

**Conclusion.** Intramedullary nailing appears safe and effective for treatment of metastatic bone disease, and confers good functional results, pain relief, and mobility.

**Key words:** femur; fracture fixation, intramedullary; fractures, spontaneous; neoplasm metastasis; survival

INTRODUCTION

Advances in chemo- and radio-therapy and surgical techniques have improved the management of patients with bony metastases and their lifespan. Approximately 80% of patients with advanced carcinoma exhibit radiological evidence of skeletal deposits.1–4 The spine and pelvis are the most common sites, followed by the femur, with an incidence of 30 to 50% (especially in the proximal femur). About 65% of all fractures requiring surgical intervention occur in the femur.5 Immediate fixation or prosthetic replacement provides benefits in terms of pain relief,
The main outcome measure was the correlation between operating time and survival. Operating time was categorised into 5 groups from 60 to 210 minutes, with 30-minute increments. Patient demography, the area involved, type of implants used, the surgeon’s experience, and subjective features (pain relief, ambulation), and complications were recorded. Differences in blood loss, operating time, hospital stay, and interval to weight bearing were compared; 13 of our patients had impending and 12 had existing fractures. Postoperative radiographs were obtained at follow-up or when there was a new onset of pain, change in the gait, or suspected fracture. Reduction accuracy and hardware efficacy and stability were evaluated from radiographs.

RESULTS

The commonest primary malignancy was carcinoma of the breast (10 patients, 45%, Table 1). Of 25 femoral lesions, 18 occurred in the proximal femur (Fig. 1), 5 in the middle third, one in the distal third (Fig. 2), and one entailed a diffuse metastatic lesion throughout. The intramedullary devices used were: the long gamma nail (n=22, 88%), the intramedullary hip screw (n=2, 8%), and the supracondylar retrograde AO nail (n=1, 4%). Specialist registrars and consultants carried out 11 and 14 of the operations, respectively. The respective mean operating and survival times were 130 and 140 minutes, and 9.5 and 9.2 months.

| Primary source | No. of patients |
|----------------|-----------------|
| Breast         | 10              |
| Lung           | 2               |
| Prostate       | 4               |
| Myeloma        | 2               |
| Colon          | 1               |
| Thyroid        | 1               |
| Oesophagus     | 1               |

Table 1

Primary source of metastases

We aimed to evaluate whether the operating time correlates with the survival and outcome, in patients who underwent intramedullary nailing for metastatic femoral fractures.

MATERIALS AND METHODS

Records of 10 men and 11 women aged 43 to 86 (mean, 66) years who underwent intramedullary nailing (4 bilaterally) for metastatic femoral fractures between 1999 and 2003 were reviewed. The patients were followed up for at least 2 years or until their death.
All patients attained satisfactory pain relief as gauged by postoperative use of analgesics. 16 (80%) patients occasionally used non-narcotic analgesics, with excellent pain relief; 5 (20%) used them regularly and narcotic analgesics occasionally with good pain relief. All but one of the patients were ambulatory with or without an aid. The mean interval to weight bearing was 3 days in patients with impending fractures and 4 days in those with existing fractures. 16 patients had died at the time of review, with a mean survival of 9.4 (maximum, 40) months; one died intra-operatively.

Operating time does not correlate with survival (Table 2). Impending fractures endured less mean blood loss, shorter operating times, hospital stays, and intervals to weight bearing than those with existing fractures (Table 3). Two patients encountered superficial wound infections, 2 developed pneumonia, and one had loss of reduction, but there was no implant failure.

DISCUSSION

Intramedullary nailing is safe and reliable for pain relief, palliation, and ambulation in patients with impending and existing pathological fractures. Prolonged operating and anaesthetic times in already debilitated patients along with surgical stresses could have wide-ranging effects on long-term survival secondary to hypotension, cardiac arrest, pneumonia, fat embolism, adult respiratory distress syndrome, and wound infection.9-11 Unexpectedly prolonged operating time affects the performance of surgeons and anaesthetists and results in inadequate reduction,
fixation, and wound closure, as well as delays in rehabilitation and suboptimal outcomes.\textsuperscript{5,7,8}

Successful management of bony metastases requires a multidisciplinary approach, and the implants should last for the remaining lifetime of the patient.\textsuperscript{12} In a study on the use of intramedullary hip screws for 6 impending and 7 existing metastatic femoral fractures, the mean operating time was 100 minutes and the blood loss was 280 ml.\textsuperscript{13} Another study looked at long gamma nails and survival, but did not mention the operating time.\textsuperscript{5} Our results indicated that operating time did not differ significantly with surgeon’s experience. Patients with more co-morbidities, uncontrolled primaries, and widespread metastases contributed to the 57% mortality in our patients, but mortality was not associated with prolonged procedures.

Our study was limited by its retrospective nature and small sample size. There is a need for further research, particularly into whether prophylactic nailing should be considered in patients with metastatic lesions but no impending fracture.

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