Cost benefit with early operative fixation of unstable ankle fractures

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ABSTRACT

INTRODUCTION Ankle fractures are common and many require surgical intervention. It has been well documented that a delay in fracture fixation results in increased length of hospital stay and increased complication rate. Initial delay can also allow swelling or blistering to develop which may necessitate a further delay in operative fixation for up to 1 week. The aim of the current study was to review the length of hospital in-patient stay for operative ankle fractures over the previous 12-month period at our hospital and compare this to the length of hospital stay following the introduction of a fast-track system for the fixation of these fractures (all fractures fixed within 48 h).

PATIENTS AND METHODS A retrospective review of all ankle fractures managed by open reduction and internal fixation over a 12-month period was undertaken. A protocol was then agreed to openly reduce and fix these fractures at the earliest possible opportunity over the next 6-month period. We then collected the data on all ankle fractures that needed open reduction and internal fixation over this 6-month period. The pre-protocol and post-protocol groups were then compared for total hospital length of stay and complication rate.

RESULTS In the 12-month retrospective review, there were 83 ankle fractures that required surgical intervention. Sixty-two of these had surgery within 48 h (mean length of stay, 5.4 days), and 21 had surgery after 48 h (mean length of stay, 9.5 days). There were 39 ankle fractures in the post-protocol group who all had surgery within 48 h (mean length of stay, 5 days). There was no increase in complication rate after implementation of the fast-track system.

CONCLUSIONS This study shows that early operative intervention for ankle fractures reduces the length of hospital stay. Intensive physiotherapy and co-ordinated discharge planning are also essential ingredients for early discharge. Early operative fixation for unstable ankle fractures has substantial cost-saving implications with no increase in complication rate.

KEYWORDS

Ankle fracture – Fixation – Cost

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The indications for ankle fracture fixation have narrowed and we no longer operate for an isolated Weber B injury.¹ It has also been well documented that unless unstable fractures are fixed early, swelling or blistering may necessitate a delay in operative fixation for up to 1 week (Fig. 1).² In practice, it is very rare for an ankle to be too swollen to undertake operative fixation on the day of admission.⁵ Furthermore, a number of authors have found that delaying the open reduction and internal fixation increases the complication rate.^{2–5} Importantly, in-patient stay has been shown to be significantly longer in those patients who do not get operated on within the first 24 h.^{2,6}

We reviewed our hospital in-patient stay for operative ankle fractures over a 12-month period. We subsequently introduced a fast-track system for fixation of these fractures

and then closed the audit loop. The aim of the current study was to compare the length of hospital stay and complication rate pre- and post-introduction of a fast-track system to treat unstable ankle fractures operatively.

Patients and Methods

A retrospective review was undertaken of all ankle fractures managed by open reduction and internal fixation over a 12-month period. The fractures were classified as unimalleolar (subgroup: medial malleolus), bimalleolar or trimalleolar. We excluded all patients who failed initial non-operative treatment and those who presented more than 24 h after injury. The patients were divided into an early operative group (< 48 h from injury) and a late operative

Figure 1 A photograph of an acutely injured ankle.

group (> 48 h from injury). The mean length of time from presentation to operation, the mean postoperative length of stay and the mean total length of stay were recorded for each group. After analysis, the results were presented to the Orthopaedic Unit Meeting. A protocol was agreed to reduce and fix these fractures openly at the earliest possible opportunity and the theatre and anaesthetic staff were informed of the new policy. Then, the same data were collected on all ankles that needed open reduction and internal fixation over the following 6-month period. The same exclusion criteria were utilised. The length of hospital stay and complication rate before and after the introduction of the fast-track system were compared.

Results

Twelve-month retrospective review

Eighty-three patients who satisfied the inclusion criteria underwent open reduction and internal fixation for their

ankle fracture. Sixty-two of these patients were operated on within 48 h of admission to hospital. The remaining 21 patients were operated on after 48 h. There were 27 unimalleolar (3 medial malleolus fractures), 26 bimalleolar and 9 trimalleolar fractures in the early operative group and 9 unimalleolar (no medial malleolus fracture), 10 bimalleolar and 2 trimalleolar fractures in the late operative group. The mean time delay to theatre for the early operative group was 25.8 h and for the late operative group it was 4.1 days. Two patients in the late operative group had their surgery delayed because of medical co-morbidity that needed to be optimised. The other patients in the late operative group were delayed due to inadequate trauma list time and out-of-hours operating. The mean total hospital stay of the early operative group was 5.4 days (range, 2–15 days) whereas the mean total hospital stay of the late operative group was 9.5 days (range, 5–19 days). The mean length of stay postoperatively was 3.9 days for the early operative group and 5.4 days for the late operative group. The mean age of the early operative group was 42 years and that of the late operative group was 47 years. In the early group, the males and females were equally distributed but in the late group there were 13 males and 8 females. There was only one complication: this was a superficial wound infection in the late operative group.

Results of re-audit

Thirty-nine patients who satisfied the inclusion criteria underwent open reduction and internal fixation of their ankle fracture. All of these patients were operated on within 48 h of presentation. There were 18 unimalleolar (2 medial malleolus fractures), 15 bimalleolar and 6 trimalleolar fractures. The mean time from presentation to operation for these patients was 20.7 h. The mean total length of stay was 5 days. The mean age was 42 years. There were 22 males and 17 females. There were no complications.

Figure 2 A graph comparing the length of in-patient stay between the pre-protocol and post-protocol groups.

Discussion

Burwell and Charnley stated that swelling was not a contra-indication to early operative fixation of ankle fractures.³ There was no increase in complication rate in our re-audit group. Our findings also corroborate the findings of Breederveld² and James *et al.*⁶ that length of hospital stay for patients with delayed ankle fixation is clearly longer than for patients who are fixed early (Fig. 2). This has very significant cost implications in the treatment of these patients.⁶ The cost of an acute trauma bed was estimated by James *et al.*⁶ to be £225 per day. If this cost was applied to the mean difference in in-patient stay between our two pre-protocol groups (early and late), then over the 12-month period the hospital would have saved £19,372 if all these patients had been operated on within the first 48 h. James *et al.*⁶ reported a mean length of stay of about 12 days. However, the overall combined mean length of stay for our pre-protocol series was about 8 days. There could be a number of potential reasons for this difference. We believe that intensive physiotherapy and co-ordinated discharge planning are essential ingredients for safe, early discharge. Post-protocol, the mean hospital length of stay came down to 5 days. The incidence of ankle fractures averages about 100 per 100,000 patients in most large cities; therefore, it is possible to see significant savings in each hospital trust.^{7–10}

Conclusions

The combined policies of early operative fixation and proactive discharge planning minimise the financial implications

of caring for this common fracture, with no increase in the complication rate.

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