THE TREATMENT OF FEMORAL SHAFT FRACTURES IN THE ELDERLY

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The management of femoral shaft fractures in the elderly poses special problems (Barry 1967) and it has been assumed that internal fixation is usually the treatment of choice (Böhler 1968). Although there have been retrospective trials of operative and conservative treatment of femoral shaft fractures (McKeever 1945, Dencker 1965) none has been devoted specifically to the elderly. The purpose of this present study is to compare the relative value of operative and conservative treatment of femoral shaft fractures in the elderly patient. Its special feature is the method of selection of the patients for these two groups.

**METHOD OF SELECTION**

Patients admitted from April 1, 1960, to March 31, 1972, were studied (Table I). All patients aged sixty-five years and over on admission were included. These patients, their notes and radiographs were reviewed at the Kent and Canterbury Hospital, the Royal Sea Bathing Hospital, Margate, Ashford Hospital, Kent, and the Buckland Hospital, Dover. Twenty-eight patients were seen for review and seven were personally operated upon.

| TABLE I  
<table>
<thead>
<tr>
<th>FOLLOW-UP OF FIFTY PATIENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dead by September 1969</td>
<td>15</td>
</tr>
<tr>
<td>Follow-up for one year by colleagues</td>
<td>11</td>
</tr>
<tr>
<td>Personal follow-up for one year</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

One surgeon used skeletal traction to treat all femoral shaft fractures regardless of age, while the other three surgeons used internal fixation as a routine for all elderly patients. Patients were therefore assigned to conservative or operative treatment on the basis of which surgeon was on emergency duty on the day of admission. The surgeon who used skeletal traction had the greater part of his sessions at the main accident centre of the area. By chance, the number of patients in his group approximately equalled the number of patients belonging to the other three surgeons together.

A fracture of the shaft of the femur was defined as one involving the shaft from five centimetres below the lesser trochanter to six centimetres above the adductor tubercle (Dencker 1965), as measured on radiographs.

The records of the sixty-two patients were reviewed: twelve were withdrawn because six patients were moribund on admission and died within twenty-four hours, and in another six the fractures were through metastases. There remained fifty patients (fifty-one fractures) to make up the trial. Twenty-five fractures were treated conservatively and twenty-six by operative fixation.

**MANAGEMENT OF PATIENTS**

The first group was treated by skeletal traction through the tibial tubercle on the day of admission, plus a Thomas splint in balanced traction. Active movements were encouraged and knee bending was begun at six weeks.
The second group was treated by internal fixation on the next routine operating list after admission.

All patients in whom internal fixation had been successfully achieved were up non-weight-bearing on crutches as soon as the stitches were removed on about the fourteenth day. Patients with unstable internal fixation were treated with a plaster spica or skin traction.

METHOD OF ASSESSMENT

The fifty patients with fifty-one fractures were divided into two groups: Group 1 consisted of twenty-five patients with twenty-five fractures treated by traction. Group 2 consisted of twenty-five patients with twenty-six fractures treated by internal fixation.

<table>
<thead>
<tr>
<th>Medical assessment</th>
<th>Treatment</th>
<th>Patients alive</th>
<th>Patients dead</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit</td>
<td>Traction</td>
<td>20</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Fit</td>
<td>Fixation</td>
<td>18</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Unfit</td>
<td>Traction</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Unfit</td>
<td>Fixation</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>41</td>
<td>9</td>
<td>50</td>
</tr>
</tbody>
</table>

Assessment of fixation

<table>
<thead>
<tr>
<th>Medical assessment</th>
<th>Successful fixation</th>
<th>Patients alive</th>
<th>Patients dead</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fit</td>
<td>Successful fixation</td>
<td>15</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Fit</td>
<td>Unsuccessful fixation</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Unfit</td>
<td>Successful fixation</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Unfit</td>
<td>Unsuccessful fixation</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

They were assessed on the following nine points: 1) age at first fracture (Fig. 1); 2) site of fracture (Fig. 2); 3) method of treatment (Fig. 3); 4) medical complications on admission (Table II); 5) mortality (Figs. 3 and 4); 6) mechanical success of internal fixation (Figs. 3 and 4); 7) length of time in hospital (Fig. 3); 8) time to clinical and radiological union (Fig. 5); 9) incidence of sepsis. This information was either obtained from the notes and radiographs, or from examination of the patients who were still living at the start of this investigation in July 1969 (Table I). Internal fixation was assessed as mechanically successful if the patient needed no external splints after operation and could walk, non-weight-bearing, on removal of the stitches (Fig. 3).

The fracture was assessed as united when patients who had been treated in traction could take their full weight on the unsplinted legs, with or without a walking aid. This usually coincided with radiological union with a continuous bridge of callus across one side of the bone. The same radiological assessment was used for the patients with internal fixation.
RESULTS

The age distribution of the patients is given in Figure 1. The mean ages of the traction and fixation groups were 75.4 and 75.1 years respectively. The distribution of the sites of fracture and their types is shown in Figure 2. The method of treatment and the success or failure of the five types of internal fixation is related to mortality in Figure 3. Ten patients had serious medical conditions on admission. Seven had congestive cardiac failure and three

had had recent cerebrovascular accidents. Seven of these ten patients died. The only three survivors were in the traction group (Table II). Two patients had congestive cardiac failure and one patient had a recent cerebrovascular accident.

The five admitted with congestive cardiac failure died of that condition and bronchopneumonia. Four were in the internal fixation group and one in the traction group. The four in the internal fixation group had their congestive cardiac failure treated with digoxin and
diuretics for between three days and two weeks after admission before operation. They were all passed as fit before operation when cardiac failure was judged to be absent. Congestive cardiac failure returned between twelve hours and three days after operation and all these patients died between two and fourteen weeks from operation.

The one patient in the traction group had her congestive cardiac failure treated successfully on admission but this returned, accompanied by bronchopneumonia, fourteen days from admission and she died on the twenty-first day.

Of the two patients admitted with a recent cerebrovascular accident who died, both were in the traction group and they had further cerebrovascular accidents twenty-one and fourteen days respectively after admission.

In the group of forty patients who were fit on admission, the only two who died were in the internal fixation group. Both died of pulmonary embolism forty-eight and seventy-two hours after operation, on the fifth and seventh day of admission respectively.

Of the twenty-five patients whose twenty-six fractures underwent internal fixation, three had screws only and were all unsuccessful, nine had plates successfully, four had plates unsuccessfully; eight had Küntscher nails (two of the eight died). Two patients had Minneapolis prostheses and cement for fracture of the shaft and of the femoral neck, with success (Fig. 3).

The mortality of the internally fixed group was three times that of the traction group, although the unfit patients were equally distributed between the two groups. The mortality in the failed internal fixation group was nearly six times that of successful internal fixation (Figs. 3 and 4).

Non-union occurred in two patients in the traction group but not in the surviving members of the internal fixation group (Fig. 5).

The average time in hospital for the internal fixation group was eleven weeks, and twelve weeks for the traction group. The relatively long period in hospital after successful internal fixation was due to social reasons preventing return home.

Two cases of deep sepsis occurred in the internal fixation group. These were both successfully treated by immobilisation and antibiotics. No sepsis occurred in the traction group.

**DISCUSSION**

The successful results of conservative treatment in these elderly patients were mainly due to good nursing and early mobilisation on traction. The problems with the operation group were caused by the poor medical condition of many of the patients and by difficulty in the fixation of long spiral fractures. These problems are not confined to the elderly, as the more general series of McKeever (1945), Dencker (1965) and Watson-Jones (1950) show. These findings are quite different from the results obtained in the special centres for intramedullary nailing (Rokkanen, Slätis and Vankka 1969; Clawson, Smith and Hansen 1971). However, in the latter series spiral fractures were never described and the end point,
walking without a stick, precluded the elderly. This present study suggests that the unfit patient does better with traction than with operation, because in this series all unfit patients treated by internal fixation died.

![Graph 4](image)

**Fig. 4**

Treatment and the length of time in hospital.

![Graph 5](image)

**Fig. 5**

The time of union in the thirty-three surviving patients.

A further two fit patients died in the operation group, and even the series from the special centres have an appreciable mortality. There has been no other series published with an assessment of medical complications before operation.
The use of multiple screw fixation without plates produced uniformly bad results and was abandoned in 1965. Plating, or double plating, for short oblique fractures without comminution gave improved results. The medical condition before operation—rather than the success of internal fixation—seems to have been the most important factor on the outcome of most cases. From these results the elderly patient who is ill or who has a spiral or long oblique fracture of the femur is best treated conservatively, while good methods of internal fixation are best used in those with transverse fractures of the middle or uppermost thirds of the femur.

**SUMMARY**

1. The results of treatment of fractures of the shaft of the femur in fifty patients aged sixty-five years and over seen over a twelve-year period are presented.
2. Half of the patients were treated by internal fixation and half by conservative methods. The mortality in the former group was three times that of the latter.
3. The length of hospital stay was only slightly less after internal fixation because many patients in both groups had to remain in hospital because of social problems.
4. The indications for internal fixation of fractures of the shaft of the femur in elderly patients are discussed.

My thanks are due to Mr R. C. Baird, Mr F. G. St Clair Strange, Mr T. G. Thomas and Mr P. R. Wright for permission to study patients under their care, and to Professor R. L. Huckstep for encouragement and advice.

**REFERENCES**


