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Condylar plate fixation of subtrochanteric femoral fractures

M. C. van Meeteren', Y. E. A. van Riet', J. A. Roukema' and Chr. van der Werken'

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Introduction

Subtrochanteric femoral fractures in adults are to be treated operatively, but the method of choice for internal fixation is still controversial. In this area, distal to the lesser trochanter, biomechanics are unfavourable with high rotational and bending forces. This explains the considerable failure rate of internal fixation with various implants. Nowadays intramedullary nailing with various interlocking options is the method of choice. For this technique, however, the use of an image intensifier is mandatory.

The AO/ASIF 95° angle blade plate, introduced in 1959, was initially designed for stabilization of distal femoral fractures but it was soon accepted for treatment of fractures of the proximal femur as well. Angle blade plate fixation of subtrochanteric fractures is possible without intra-operative X-ray control. This retrospective study describes our experiences in 40 consecutive patients with subtrochanteric fractures treated with the AO 95° condylar blade plate in the years 1984–1991.

Surgical technique

After pre-operative planning, patients were operated on in a supine position on a normal operating table and without the use of an image intensifier. Through a lateral approach, the muscles were carefully retracted to expose only the lateral aspect of the bone. The three-dimensional position of the blade was determined by one guiding K-wire at the anterior aspect of the femoral neck. In simple fractures, interfragmentary compression was applied. In comminuted cases, the fracture area was bridged after indirect reduction restoring length, alignment and rotation. No primary autogenous bone grafting was performed. Bone cement was used in pathological fractures or in cases of severest osteoporosis. Postoperatively partial weight-bearing was allowed; when bone cement was used, patients were encouraged to bear full weight. Radiographs were taken 6 weeks and 3 months after the operation (Figure 1).

Patients and methods

Between 1984 and 1991, 40 patients with a subtrochanteric fracture underwent internal fixation with an AO 95° condylar blade plate in the Department of...
Table I. Cause of injury

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 21</td>
<td>N = 19</td>
</tr>
<tr>
<td>Traffic</td>
<td>12</td>
</tr>
<tr>
<td>Sports</td>
<td>3</td>
</tr>
<tr>
<td>Industrial</td>
<td>2</td>
</tr>
<tr>
<td>Domestic</td>
<td>1</td>
</tr>
<tr>
<td>Pathological</td>
<td>2</td>
</tr>
<tr>
<td>Multiple Injuries</td>
<td>(6)</td>
</tr>
</tbody>
</table>

Group I, age <60 years; Group II, age >60 years.

Surgery of the St Elisabeth Hospital, Tilburg, The Netherlands. The records and radiographs of these patients were reviewed recording gender, age, type of injury and AO-fracture classification. Local and general complications as well as bone healing were registered.

Results

There were 23 men and 17 women, aged 15 to 89 years. In the younger patients (Group I, age <60 years, N = 21) fractures generally resulted from high-energy injuries. Eight of these patients sustained multiple injuries (Table I). According to the AO classification, 13 fractures were comminuted, type C (Table II). The main cause of injury in older patients (Group II, age ≥ 60 years, N = 19) was domestic in seven, while another five fractures had a pathological origin (Table I). Fractures were classified as type A in 11 and type B in eight patients. There were no comminuted fractures in this group (Table II).

Additional bone cement was used in 10 cases; one large bone cyst was filled up secondarily with a homogeneous bone graft. One intra-operative complication occurred: the point of entrance of the blade was chosen too far distally and the introduction of the seating chisel resulted in an additional intertrochanteric fracture.

Three patients died early due to multiple injuries, including cerebral injuries. Postoperatively three wound infections developed. In two patients wounds and fractures healed uneventfully after early revision, while the third developed a fistula which persisted until the plate was removed after 7 months.

Fracture healing, allowing full weight bearing, took a mean period of 13 weeks in Group I (9–16 weeks) and 11 weeks in Group II (8–16 weeks) when bone cement was not used.

Table II. AO classification of subtrochanteric fractures

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>4</td>
</tr>
<tr>
<td>A2</td>
<td>3</td>
</tr>
<tr>
<td>A3</td>
<td>-</td>
</tr>
<tr>
<td>B1</td>
<td>1</td>
</tr>
<tr>
<td>B2</td>
<td>-</td>
</tr>
<tr>
<td>B3</td>
<td>-</td>
</tr>
<tr>
<td>C1</td>
<td>1</td>
</tr>
<tr>
<td>C2</td>
<td>4</td>
</tr>
<tr>
<td>C3</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 2. Radiographs of a 73-year-old man with a subtrochanteric fracture treated with a 95° condylar plate. a, Plate fracture. b, Reosteosynthesis with a 95° condylar plate. c, Consolidation of the fracture.
A 73-year-old man developed delayed union which ultimately resulted in repeated plate fracture due to fatigue. After a second re-operation, again with a condylar blade plate but in combination with slight valgization and homogeneous bone grafting, sound healing was achieved (Figure 2).

Discussion

Subtrochanteric fractures can be treated operatively with intra- or extramedullary implants. Nowadays nailing with various interlocking options is the method of choice. This is an elegant technique with limited exposure and optimal biomechanics. However for intramedullary nailing and interlocking, the use of an image intensifier is mandatory. This is also true for the use of the AO dynamic condylar screw (DCS), a forgiving but bulky implant, sacrificing much bone from the femoral neck and head. The 95° condylar blade plate can be used with success, especially in situations when image intensifiers are not available.

Treatment of subtrochanteric fractures with a 95° angle blade plate is a difficult technique because of the three-dimensional positioning of the blade plate in the narrow femoral neck. However in our hands it was a quick and safe procedure without using a fracture table or image intensifier. In all honesty, we must confess that the only intra-operative complication that we met would have been avoided by using X-ray control.

The results in 40 consecutive patients were excellent: all fractures except one healed uneventfully despite deep postoperative infection in three cases. After rigid fixation with interfragmentary compression full weight bearing is generally to be allowed 3 months after the operation.

Based on our favourable results, we consider the condylar blade plate fixation of subtrochanteric fractures an excellent method. This series originates from the period 1984–1991 and in recent years we have strongly preferred intramedullary nailing.

Nevertheless it seemed a useful reminder that older techniques are still effective in the management of fractures. This method is especially useful when image intensifiers are not available.

References


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