CASE REPORT

Reverse oblique supracondylar fracture associated with knee replacement
Management with an anatomical medial buttress plate:
A report of two cases

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Accepted 20 February 2008

Introduction

Supracondylar periprosthetic fractures around a total knee replacement were first described in 1981 and have an incidence of 0.3—2.5%.¹,² The majority of fractures are transverse or oblique and operative treatment is generally recommended for displaced fractures. If the prosthesis is not loose, then internal fixation with either a locked intramedullary nail or a plate is usually performed.

The surgeon is faced with a number of technical problems when treating these periprosthetic fractures. In most cases the fracture is transverse or oblique with the most distal fracture line on the medial side. Thus, the distal fragment is large enough to allow fixation with a lateral plate or supracondylar nail. However, we have recently treated two cases where the obliquity of the fracture resulted in a very distal lateral fracture line. This prevented use of a lateral plate (including locked plates) or a supracondylar nail. An anatomical, proximal, lateral tibial plate from the ipsilateral side was successfully used as a medial buttress plate and the technique will be described.

Case 1

A 79-year-old lady had a successful PFC total knee replacement in 1999 for osteoarthritis. She sustained her periprosthetic supracondylar fracture following an external rotational injury whilst getting up from a chair in 2004. There was no history of fall or direct trauma to the knee. At this time, she was living at home with her husband and completely independent in her activities of daily living.

Fixation of the reverse oblique fracture with a medial buttress plate was performed using the technique described below.

She made a good post-operative recovery. The fracture healed within 12 weeks and at this stage she was able to full weight-bear. At 18-month review she had regained her pre-fracture mobility and knee function.
Case 2

A 65 year-old lady had a right Scorpio total knee replacement performed in September 2005 for osteoarthritis. Four weeks later she sustained a reverse oblique supracondylar fracture above her right total knee replacement following a free-standing fall (Fig. 1).

There were no wound problems and so the fracture was fixed through the knee replacement surgical approach using the technique described below (Fig. 2).

She was placed immediately in a hinged brace set at 0–90° and was non-weight bearing for the first eight weeks, with a subsequent four weeks full-weight bearing in the brace. The fracture healed without complication and at 9-month follow-up had a good outcome.

Surgical technique

Surgery was performed on a radiolucent table with the patient supine. The previous midline incision and medial parapatella approach was used. This allowed excellent visualization of the fracture with direct anatomical reduction. The anatomical 4.5/5.0 proximal lateral tibia locking compression plate (LCP) was used from the ipsilateral side. When turned upside down, this plate fits the natural buttress of the medial distal femur perfectly and no additional contouring of the plate was required. A standard screw was then applied through the plate on the proximal side to allow the plate to act as a buttress. Fixation was completed using locking head screws to produce a fixed angle device. Following surgery, active knee range of motion exercises were commenced on day two and the knee protected in a hinged brace. The patients remained non-weight-bearing for 8 weeks.

Discussion

Reverse oblique supracondylar fractures can be difficult to fix, especially when the angle of the fracture makes the distal fragment too small for conventional surgical techniques based upon lateral plate fixation. The lateral fracture is also too distal to allow insertion of distal locking screws into a supracondylar nail, making this technique inappropriate for this fracture pattern.

From a biomechanical perspective, it is logical to fix this fracture pattern using a medial buttress plate, a technique that should provide the best available fixation (even in osteoperotic bone). This approach utilises the previous incision for the knee replacement and avoids possible soft tissue complications associated with a second lateral incision.
The lateral tibial buttress plate allows the surgeon to achieve fixation of the fracture pattern using a plate system without need for modification. This is brought about by the similarity in morphology of the natural buttress of the lateral proximal tibia and medial distal femur. We feel that this technique provides a simple and elegant solution to a rare but potentially complex problem.

References
