Fracture of the unresurfaced patella after total knee arthroplasty: a report of two cases

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ABSTRACT

Patellar fractures are unusual in total knee arthroplasty without patellar resurfacing. We present 2 such cases that occurred within postoperative 2 months and were managed conservatively. Both patients had their knee function preserved.

Key words: arthroplasty, replacement, knee; fractures, bone; patella; postoperative complications

INTRODUCTION

The most common complications after total knee arthroplasty (TKA) involve the extensor system.1 Patellar fracture is uncommon and is usually secondary to osteonecrosis (devascularisation), excessive patellar removal, and implant-related factors such as poor alignment of the patellar component or technical errors with placement.1,2 In TKAs without patellar resurfacing, such fractures occur in 0.05% of cases.2–4

CASE REPORTS

Case 1
In January 2003, a 75-year-old man with early Parkinson’s disease presented with persistent pain caused by advanced gonarthritis (Fig. 1a) that failed to respond to anti-inflammatory agents and physiotherapy. He underwent a TKA without patellar resurfacing through a medial parapatellar approach. The Hoffa fat pad was removed to improve visualisation; the external patellar retinaculum was not released. The soft tissues around the patella (2–3 mm deep) were denervated using an electric scalpel with coagulation function, and the osteophytes were resected. Postoperative radiographs showed correct positioning of the components (Fig. 1b). At the 2-month follow-up, the pain had decreased considerably, but a patellar fracture with displacement was noted (Fig. 1c). The patient had not sustained any injury or sudden loss of mobility. As function was preserved and the patient refused surgical revision, conservative treatment (immobilisation in extension) was applied. The knee range of motion was maintained at -15° to
100°. At the 4-year follow-up, the patient was pain-free and able to walk with a cane, with his knee function preserved (Fig. 1d).

Case 2

In March 2006, a 68-year-old man with advanced gonarthrosis (Fig. 2a) presented with knee pain that limited his activities of daily life. Physiotherapy and anti-inflammatory drugs failed to improve the pain. He underwent a TKA without patellar resurfacing with similar procedures to those described in case 1 (Fig. 2b). At the 2-month follow-up, he had tolerable pain and walked with the aid of crutches, but he fell that day without directly injuring his patella. Radiographs showed a transverse patellar fracture without displacement (Fig. 2c), which was treated with a leg immobilisation brace in extension. The patient walked with the brace for 6 weeks until fracture consolidation. Kinesitherapy was started after removal of the brace. At the 3-month follow-up, the patient was pain-free and able to walk unaided (Fig. 2d). At the 15-month follow-up, his knee range of motion was 0° to 100°.

DISCUSSION

Only 0.05% patients undergoing TKA without a patellar component sustain a patellar fracture. The rate increases to between 0.2 and 21% when the knee prosthesis includes a patellar replacement.
Fractures can be caused by direct injury or a stress fracture, mostly in TKAs. In TKAs without patellar resurfacing, patellar fractures are usually caused by rheumatoid arthritis or degenerative osteoarthritis.

More than 80% of patellar fractures are detected within 3 years. Contributing factors include obesity, excessive activity, excessive knee flexion, a very thin patella, osteopenia, previous surgery, a history of gout or rheumatoid arthritis, and being of male gender (because of the greater activity and weight that requires more effort from the extensor musculature). Other factors leading to patellar fracture are procedure-related and include the extent of patellar resurfacing, a patellar component with only one fixation point, uncemented fixation, and a metal patellar component. Technical factors include incorrect patellar tracking, inappropriate thickness, thermal necrosis, devascularisation (lateral release, excessive resection of the retropatellar Hoffa fat pad), incorrect positioning of the femoral component or the extension device, and excessive quadriceps release.

The medial approach, together with lateral retinaculum release and resection of the Hoffa fat pad may remove the blood supply from the superior geniculate artery and thus increase the risk of patellar fracture. Some studies therefore suggest that patellar replacement be performed routinely. In TKAs that include the patella.

In case 1, the associated Parkinson’s disease may have caused muscular tension that predisposed to bone stress. In case 2, indirect injury with sudden contraction may have caused the fracture. The loss of bone stock and devascularisation of the patella increased the risk of fracture.

44% of patients with a patellar fracture are asymptomatic. Most treatment options are conservative; surgery is recommended when there is loosening of the patellar component and a loss of extension.

REFERENCES