CASE REPORT

Chronic knee dislocation treated with arthroplasty

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Introduction
Dislocation of the knee joint is uncommon. Many such cases reduce spontaneously and are appropriately treated in the community. Neglected knee dislocations and knee dislocations with delayed treatment are much more uncommon. In 1996, Henshaw et al. reported a case of delayed reduction 33 weeks after traumatic posterior knee dislocation. The reduction was maintained by Steinmann pins and immobilisation in a cylinder cast for 12 weeks. The final range of motion was 5–40°. In 1998, Vicente-Guillen et al. mentioned a long-standing posterior dislocation of the knee, managed by staged reduction with external fixation and finally arthrodesis. In 2000, Petrie et al. described another two cases of delayed treatment, treated finally with total knee arthroplasty. We present a case of long-standing posterior dislocation of the left knee, which we successfully managed with total knee arthroplasty. At 2 years’ follow-up, the patient had an HSS score of 86 and the range of motion was 0–90°.

Case report
A 56-year-old man attended our clinic complaining of progressive left knee pain, disability and gross deformity. The left knee had been injured 30 years previously, when he was 26 years of age, but he had been unable to pay for treatment apart from bed rest for about 4 weeks. Thereafter, he could stand and walk with tolerable pain, and conservative treatments were sought with painkillers, local injections, massage and Chinese herbal medications. The deformity and pain had worsened, and he could now attend for surgical management.

There was neither joint hypermobility nor any connective tissue disease. The man was able to bear weight and to walk for a short distance with a kyphotic posture. There was bayonet deformity of the left knee (Fig. 1), with approximately 25° of flexion contracture and 25–65° of motion. The extensor mechanisms and the neurovascular functions were all intact. Radiographically, the left knee showed an unreduced posterior dislocation with advanced osteoarthritic changes (Fig. 2).

After detailed explanations of the risks and benefits, one-stage total knee arthroplasty of left knee was performed (F.-Y.C.). A midline incision using the conventional medial parapatellar approach to the knee was made. Intraoperative examination
revealed a fixed posterior dislocation of the knee, and missing osteochondral surfaces over the posterior femoral condyle and anterior tibia plateau with marked degenerative change. Both anterior and posterior cruciate ligaments were absent. Medial and lateral menisci were almost completely worn out. Marked flexion—extension gap mismatch was noted, with laxity of the anterior soft tissue and contracture of the posterior soft tissues. Medial—lateral soft-tissue balancing was performed first, followed by classical bony cuts at $7^\circ$ anatomical axis. A larger femoral component was chosen for balancing the flexion—extension gaps. The patella was resurfaced, and posterior soft-tissue release was carried out extensively to allow full extension of the left knee with the components being tested in position. Flexion—extension and medial—lateral gaps were also checked to be nearly in balance, with relative stability during the full range of motion with the prostheses in place. Because stability was obtained using an LPS type of implant, a constraining implant was not considered necessary. Finally, Nexgen Fixed-Flex total knee components (LPS type, Zimmer) were applied and fully cemented. The intraoperative range of motion was approximately $0^\circ$–$100^\circ$ with appropriate stability after closure of the wound.

Continuous passive motion of the left knee was started immediately after the operation, and
posterior dislocation was noted when flexion increased to 100°. After successful closed reduction at the bedside, flexion of the left knee was limited to less than 90°. Walking training with full weight bearing was initiated, but another posterior dislocation occurred 5 days postoperatively during a range of motion exercise, with less than 90° of flexion (Fig. 3). Closed reduction was performed under spinal anaesthesia, and a cylindrical cast was applied with the knee in 10° of flexion. The cast was removed 4 weeks later, and physical therapy with range of motion exercises restarted without any subluxation or instability thereafter. At latest follow-up 2 years postoperatively, the man had a stable left knee with a range of motion of 0–90° and an HSS score of 86. Radiographs showed a well aligned and well fixed total knee prosthesis (Fig. 3B). The patient was very satisfied with the final outcome.

Discussion

Knee dislocation is uncommon. Most acute knee dislocations are diagnosed accurately and treated
acutely in the emergency department. There have been some case reports of delayed treatment of knee dislocation in the English literature.\textsuperscript{1,2,4,6,9} The time between the injury to the knee and definitive treatment ranged from 16 weeks to 8 months, and extensive open reconstruction using the Ilizarov technique, Steinmann pin fixation, hinged external fixation or total knee arthroplasty have all been suggested. However, only total knee arthroplasty was appropriate for our case, having advanced osteoarthritis and absent meniscus, anterior cruciate ligament and posterior cruciate ligament.

Neglected (chronic) dislocation of the knee with arthritic change is extremely rare, and no treatment guidelines have been established. Only one case has been documented in the English literature, by Vicente-Guillen et al.\textsuperscript{8} They reported on a 55-year-old woman whose knee was injured at 5 years of age. They thought the long-standing dislocation was due to trauma to the anterior aspect of the proximal tibial growth plate, which caused tibial plateau deformity and posterior dislocation of the tibia on the femur. They treated the dislocation with staged operation, i.e. open release with external fixation, progressive reduction and finally arthrodesis. Richard, who had diagnosed and treated long-standing dislocations of many joints, mentioned that he had never seen a chronic dislocated knee.\textsuperscript{3} His experience with chronic dislocation of other joints suggested to him that a primary knee arthrodesis might be the treatment of choice; but arthrodesis has not been considered because of the major disability that would result. However, for our case of a 56-year-old man whose knee was injured at 26 years of age, total knee arthroplasty in a one-stage operation was appropriate.

Petrie et al. reported two successful treatments with total knee arthroplasty and a constraining device for posterior knee dislocation 4 months after the initial injury.\textsuperscript{2} In their report, up-sizing the femoral component and posterior translation of the femoral components were recommended. In our case also, we chose a larger femoral component with appropriate posterior translation of the femoral components (Fig. 3), but postoperative dislocation developed in spite of good stability when checked intraoperatively. However, we did not use a constraining implant which might have prevented further dislocation. Thus, we suggest that a constraining implant should be used in such cases, even when intraoperative stability is satisfactory with a less constraining device.

Sharkey et al. reviewed seven cases of dislocation after total knee arthroplasty.\textsuperscript{5} He noted that all knees were in valgus deformity before surgery and all had problems with flexion-extension mechanisms. Our case was in a similar condition. We chose conservative treatment with casting for the postoperative dislocation, instead of revision with a constraining device, because the patient would not accept a second operation. Appropriate range of motion and stability were preserved after 4 weeks of casting.

In conclusion, total knee arthroplasty is an effective and valuable treatment for chronic neglected dislocation of the knee and a constraining implant is recommended.

References