Recurrent Posterior Dislocation Following Primary Posterior-stabilized Total Knee Arthroplasty

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In our series of 136 patients with primary total knee arthroplasty using posterior-stabilized prosthesis, a female patient with Parkinson’s disease developed posterior dislocation of the knee 9 months after surgery. Eventually, the dislocation became recurrent, occurring several times a day. The patient made the reposition always by herself. Two months after the first dislocation, we performed the revision of the polyethylene tibial insert and found wearing of the tibial insert’s cam as an hitherto unreported cause of the mechanical instability of the total knee prosthesis.

Key words: arthroplasty, replacement, knee; knee joint; knee prosthesis; Parkinson’s disease

Both cruciate ligaments, anterior and posterior, are required for normal kinematics of the knee. Degenerative disease of the knee mostly affects the anterior cruciate ligament, whereas posterior cruciate ligament is almost always spared and functional (1). For this reason, many surgeons use a knee prosthesis where the surgical procedure preserves posterior cruciate ligament, although some opt for its excision. It seems that there is no difference between these two prosthesis models (2). A prosthesis that requires excision of the posterior cruciate ligament must have a system to prevent posterior subluxation or dislocation of the knee. After many modifications, recent models have a cam on the polyethylene tibial insert and a step on the femoral component (3).

In 1988, after their experience with more than a thousand endoprostheses of this type, Galinat et al (4) described dislocation as a previously unreported complication of the posterior-stabilized knee arthroplasty. Later on, other authors also reported on this type of complication (3-5).

We report a single case of posterior dislocation in a series of 136 posterior stabilized total knee arthroplasties. In contrast to earlier reports (3-5), we detected a worn-out cam of the polyethylene insert as the cause of the dislocation.

Case Report

A 65-year-old woman with Parkinson’s disease had a right posterior-stabilized total knee arthroplasty, PFC model (No. 2, 12.5 mm polyethylene insert; Johnson & Johnson Orthopedics, Raynham, MA, USA) because of progressive and painful osteoarthritis.

Preoperative x-ray examination showed a varus deformity of 8°. After surgery, the femorotibial angle was satisfactory. The tibial component of the prosthesis was implanted correctly, whereas the femoral component had a 9° forward inclination (Fig. 1). Nine months later, posterior...
dislocation of the prosthesis occurred (Fig. 2). The patient reported that it happened in a position of flexion over 50°. A few days later, dislocation recurred and became more frequent in the following days and weeks, occurring up to 5-6 times a day. Dislocations were not painful and the repositions occurred when the patient performed flexion and extension movements.

Four months after the onset of recurrent dislocations, the patient underwent surgery because of the knee instability. On admission, the examination showed that the dislocation was possible in the flexion position of about 50°, pushing the upper part of the leg backwards. At surgery, we found that the cement penetrated through a hole between condyles of the femoral component. The protruding cement was in contact with the cam of the tibial polyethylene insert in extension. The cam was damaged and worn out for more than five millimeters (Fig. 3). In the position of flexion over 50°, the cam became too small to prevent posterior dislocation. The cement was removed and new tibial polyethylene insert was implanted, 17.5 mm in size.

Discussion

Posterior subluxation or dislocation as a complication after total knee arthroplasty is very rare. It results from the laxity in flexion, and Aglietti et al (1) consider it a surgical problem. In two cases reported by Galinat et al (4), there was a large preoperative valgus deformity, necessitating a large lateral release, which was probably the reason for laxity and instability. In the first case, dislocation occurred 1 month after the surgery, and in the second, 8 months later. In both cases, the dislocation was painful. Reposition had to be made in general anesthesia and was followed by immobilization. Lombardi and al (3) reported 15 cases of complications from their series of more than 3,000 patients. They could not find the cause of the dislocation in all situations. There was a large preoperative deformity in 5 cases. In other cases, there was no angular deformity; the functioning of the prosthesis was good or excellent, yet the dislocations still occurred. Dislocations occurred in the flexion, in the period between 6 and 12 months after surgery. Repositions were performed in general anesthesia. In 3 cases, a revision surgery was necessary, and stronger polyethylene (2-4 mm) was reimplanted. The authors
thought that this complication was an enigma. Our case has something in common with those reported by Lombardi et al (3) and Galinat et al (4). In their cases, the dislocations occurred 7-8 months postoperatively and stronger polyethylene inserts were implanted in all reoperated cases. In our case, the dislocation occurred 9 months after the surgery and we also reimplanted stronger, 5 mm thicker polyethylene tibial insert. Seven months after revision, the prosthesis was functioning well.

We think that in our case the key reason for this complication was a remnant of the cement, which penetrated through the hole on the femoral component between condyles, damaged the cam on the polyethylene tibial insert and eroded it to the half of its original size. Forward inclination of the femoral component of prosthesis was probably of smaller importance, as well as general weakness of the muscles caused by Parkinson’s disease. As the wearing of the cam continued, the cam became smaller and smaller, causing more frequent dislocations. Finally, the complete instability developed and dislocations were happening constantly.

We think that this is the first reported case of the destruction of the cam of polyethylene tibial insert caused by cement, which resulted in the posterior dislocation after knee arthroplasty.

References

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