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Case report

Twenty-seven-year nonunion of a Hoffa fracture in a 46-year-old patient

Yirui Jiang, Zhenyu Wang, Debao Zhang, Guishan Gu*

Department of Bone and Joint, First Hospital of Jilin University, Changchun 130021, Jilin Province, China

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ABSTRACT

A Hoffa fracture is an uncommon clinical entity typically seen in adults after high-energy trauma. Nonunion of a Hoffa fracture appears to be even more uncommon. To our knowledge, only three cases of nonunion of a Hoffa fracture have been documented in the literature to date, including two children and one adult. This article presents a case of an adult who had nonunion of a Hoffa fracture for 27 years and was treated by open reduction and internal fixation, and the varus deformity corrected with xenogenous bone graft. An excellent result has been achieved to date. This unusual case reminds us that we cannot neglect the possibility of nonunion of a cancellous bone fracture, especially the Hoffa fractures of the medial femoral condyle if they are treated nonoperatively. It also demonstrates that internal fixation with bone graft is effective, even for the 27-year Hoffa fracture.

1. Introduction

Coronal fractures of the femoral condyle, first described by Hoffa[1] in 1904, also known as Hoffa fractures, are uncommon injuries. Nonunion of a Hoffa fracture appears to be even more uncommon. To our knowledge, only three cases of nonunion of a Hoffa fracture have been documented in the literature to date, including two children[2,3] and one adult.[4] This article presents a case of nonunion of a Hoffa fracture in an adult who suffered the Hoffa fracture 27 years ago.

2. Case report

A 46-year-old man presented to our hospital with a complaint of worsening pain and swelling in his right knee. Upon presentation he described that he had sustained a major trauma to his right knee while falling down 27 years ago. He cannot recall the diagnosis to his injured knee, and affirmed that he received no treatment for it, except for painkillers, and definitely no surgery was performed. During the past 27 years, he had episodic pains and persistent disability of his injured knee. However, he was competent at his job as a driver until about 6 months prior to this presentation.

Anteroposterior and lateral radiographs of the knee showed a posteromedial proliferative osteophyte with a clearly displaced fracture to the medial femoral condyle (Figs. 1 and 2). On physical examination, the knee ranged from full extension to 70° flexion with 15° varus deformity[5] at 0° extension (Fig. 3), and the valgus stress test was positive. CT scan showed the nonunion of Hoffa fracture and the incongruity of the medial condyle (Fig. 4). There were also marked degenerative changes in the knee.

The procedure was performed openly, through a medial incision. An evident pseudarthrosis that was formed by the posteromedial proliferative osteophyte was excised. There was an evident gap between the fractured medial condyle and the displaced condylar fragment (Fig. 5). When the valgus test was done intraoperatively, the gap widened, which meant that the medial collateral ligament (MCL) was intact and the displaced condylar fragment was attached to the MCL and the posterior capsule. The condyle was anatomically reduced and the 15° varus deformity was corrected after filling the gap with xenogenous bone graft (Fig. 6). The rigid fixation of the fracture was then achieved with two posteromedial to anterolateral lag screws. One dynamic compression plate was contoured to the medial femoral cortex as a buttress plate and was locked with two cortical screws proximally and four cortical screws distally (Fig. 7). Mobilization was started at the second day postoperatively. Toe-touch weight bearing mobilization was allowed at the seventh day postoperatively. At the 12 months follow-up, the patient was able to fully bear weight with no ligamentous instability and the range of motion was 0–125° (Fig. 8).

* Corresponding author. Tel.: +86 15044027678.
E-mail address: forever.jyr@qq.com

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Fig. 1. Anteroposterior view showed nonunion of a Hoffa fracture with a posteromedial proliferative osteophyte.

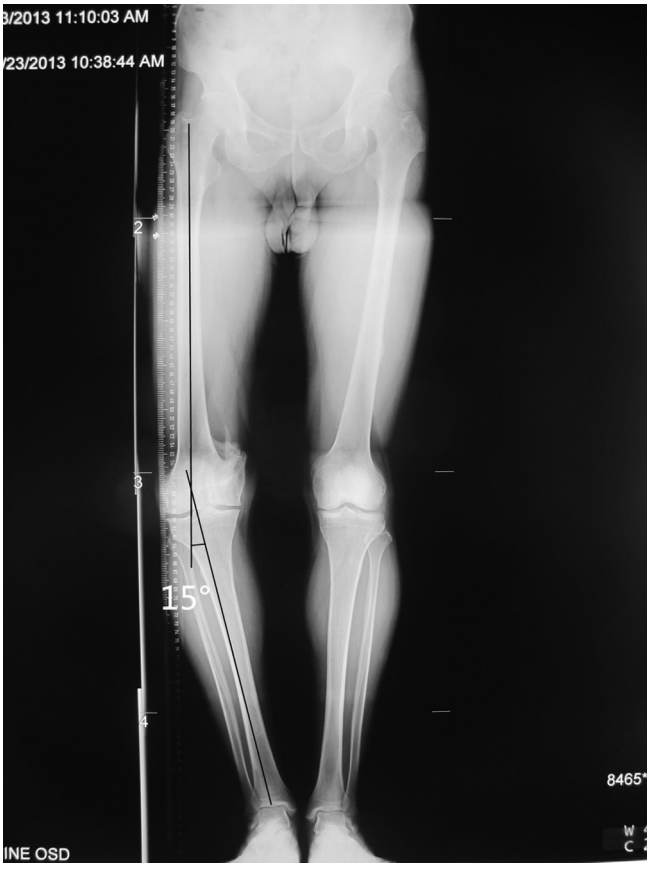

Fig. 3. Full-leg view showed 15° varus deformity in standing position.

Fig. 2. Lateral view showed the displaced condylar fragment.

3. Discussion

The Hoffa fracture is an intraarticular fracture of posterior aspect of the femoral condyle in coronal plane and is analogous to the capitellum fracture of the elbow. Usually, the injury results from high-energy trauma events,[6] and is often missed on plain radiographs but easily found on a CT scan.[7] Even though the exact mechanism of an injury that produces a Hoffa fracture is unknown, it is believed that Hoffa fractures of the lateral femoral condyle result from a shearing force on the posterior femoral condyle in the knee of flexion beyond 90°.[8] As to the injury mechanism of Hoffa fractures of the medial femoral condyle, it has been reported to be from a direct impact to the medial side of the knee in flexion.[9] There is a biomechanical vulnerability of the lateral condyle due to a physiological valgus of the knee joint.[8] Hence, the lateral condyle is involved three times as often as the medial condyle in a Hoffa fracture.[10] Our patient suffered the medial condyle fracture in the coronal plane, which is rare. It is really a pity that his mechanism of injury is unknown, because he cannot recall any detail of falling 27 years ago.

Hoffa fracture is inherently unstable, due to the bony instability as well as the pull of the gastrocnemius and popliteus. Nonoperative management may lead to malunion,[11] and nonunion (whether in child[2,3] or adult[4]). Fractures of the lateral and medial condyle tend to heal with a valgus and varus deformity, respectively.[12] In our case, the patient was treated nonoperatively and resulted in a nonunion with varus deformity. We speculate that when the injured knee extended or flexed, the wears and impingement occurred between the fractured medial condyle and the displaced condylar fragment. This accelerated the degeneration of the knee