

CASE REPORT

The Outcome of Delayed Fixation of Patellar Osteochondral Injury Using Suture Fixation at One and Half Years Follow up: A Case Report

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ABSTRACT

Osteochondral fracture fixation could be challenging due to the low healing capacity of cartilage especially when the case is delayed. There are various fixation options available. The personality of the fractured fragment would determine which fixation method is more suitable. This is a case of a 14-year-old girl with right knee patellar osteochondral fracture fixed with suture passed through drilled holes after four weeks of injury. The outcome at eighteen months follow up shows a painless knee with a full range of motion and patient is asymptomatic. Knee radiograph shows union of the fragment and MRI did not show evidence of necrosis.

Keywords: Osteochondral, Injury, Fracture, Fixation, Patella

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INTRODUCTION

Osteochondral fracture may occur following patella dislocation and this injury is not uncommon (1). The low healing capacity of cartilage may be a concern especially in a delayed case. Various techniques have been described for the fixation of osteochondral fracture that includes headless screw, bioabsorbable pin, suture anchor and crossing suture fixation. The usage of these methods needs to be judged base on the characteristic of the fracture fragment. Some of these implants may not be readily available at certain institution or relatively expensive.

An ideal surgical treatment is the one that can maintain the fixation and subsequently preserved the viability of the 'detached' fragment especially the cartilaginous part. This case describes the outcome of an osteochondral fracture that consists mainly of cartilage with a thin rim of subchondral bone fixed with simple parallel suture fixation.

CASE REPORT

A 14-year-old girl presented with right knee pain and inability to weight bear after she slipped and fell with

the knee hitting the floor. Examination revealed a grossly swollen knee, tenderness over the medial aspect of the knee and reduced range of motion.

Knee imaging showed tilting of the patella, a bony defect over the articular surface of the patella and a bony fragment medial to the medial femoral condyle with grade IV osteochondral injury of the patella (Figure 1). Partial tear of medial patella retinacular was also reported.

Knee arthroscopy performed after four weeks post-trauma showed an osteochondral defect over the center of the patella and via an open procedure, the osteochondral fragment was retrieved from the medial gutter (Figure 2A and 2B). This 2x2 cm fragment was mainly composed of cartilage with a thin layer of bone attached. The defect over the patella was minimally curetted to remove the fibrotic tissue and the osteochondral fragment was reduced anatomically. Fixation was done by parallel suture fixation. Four holes were drilled through the fragment and patella using guided wire size 2.4 with eyelet. The fragment was sutured using Ethibond 2 by passing the suture through the eyelet. Two sutures were used and were tied in a parallel manner as shown in figure 2C. Both knots were tied and secured at the anterior cortex of the patella bone. The knee was then irrigated and closed in layers. The torn medial patella retinaculum was reinforced and repaired.

Post-operatively the knee was immobilized with a knee



Figure 1: A, B and C are knee radiograph at the time of presentation; D and E are knee MRI at three weeks post-trauma. White hollow arrow shows osteochondral fragment medial to the medial femoral condyle. The white arrow shows defect on the patellar articular surface.

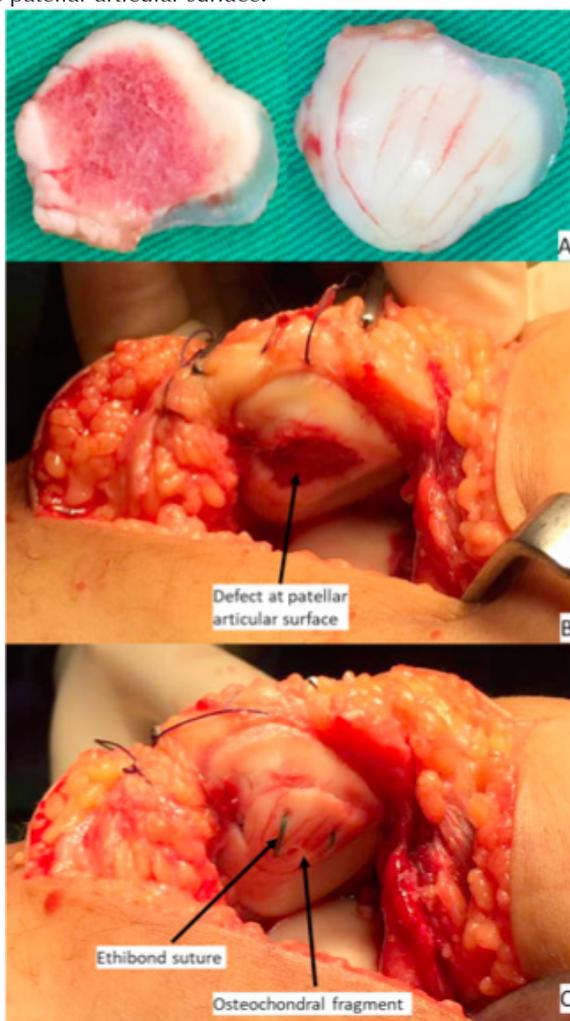


Figure 2: A shows retrieved osteochondral fragment which is mainly cartilaginous with a thin layer of subchondral bone. B shows the patellar articular surface with a defect at the center. C shows the patellar articular surface after repair with Ethibond 2 suture.

brace in extension for two weeks and she was allowed for partial weight bearing ambulation with crutches. Knee range of motion was increased progressively after two weeks to full weight bear after four weeks.

Repeated knee radiograph at three months post-operation showed union of the fracture and repeated MRI at four months post-operation showed that the fragment was properly placed at the patella with no evidence of necrosis (Figure 3). During follow up at eighteen months post-operation, patient did not have anterior knee pain or instability in her daily activity except mild discomfort during sitting in the extreme full flexion. Examination shows a negative patellar grind, patellar facet was not tender and apprehension test was negative. Knee range of motion was full.



Figure 3: A is knee radiograph at day one post-operation showing the osteochondral fragment is well reduced at the patella. B and C are knee radiograph at three months post-operation showing that the osteochondral fragment was united. D and E are knee MRI repeated at four months post-operation showing that the osteochondral fragment has healed anatomically with no evidence of necrosis

DISCUSSIONS

Osteochondral injury may be difficult to diagnose especially in the acute setting as the knee is usually swollen and painful. The osteochondral fragment that only contain small ossified portion could be difficult to detect with plain radiograph (2). MRI is a good modality to help in the diagnosis however it is not readily available in all institution. Knee arthroscopy remains the gold standard examination for intra-articular pathology as well as providing treatment at the same time (2, 3). Treatment of osteochondral injury of the knee is usually by non-operative or operative depending on various factors. Main concern in surgical treatment is to maintain the fixation and subsequently preserve the cartilaginous part.

In this case, the surgical fixation was performed using suture as it is readily available, relatively cheap, provides some compression across the fracture fragment and does not require implant removal. Our method was slightly differs to Ng et al method that used cross suture fixation. We drilled the hole for suture passage using guide wire with eyelet and we placed the suture parallel to each other. Whereas in a method described by Ng et al, the authors use drill bid and crossed the two sutures. The authors also suggest that the fixation should be done within two weeks of injury to avoid fragment degeneration (2). However there is no specific time frame after which the fixation is not recommended although early fixation within two weeks is always preferred (4). In our case the fixation was delayed until four weeks. Intra-operatively we did not notice any significant degeneration or the fragment become friable. The outcome at 18 months after the surgery was very satisfactory.

While it is obvious that early fixation is better, we believed that the surgeon should still consider fixation in the delayed cases. If this technique fails, other methods to restore the cartilage defect could be utilized such as osteochondral autologous transplantation, osteochondral allograft transplantation, autologous chondrocyte transplantation or stem cell therapy (3).

Various methods have been described for the fixation of osteochondral fracture that includes headless screws, bioabsorbable pin, suture anchor and crossing suture technique. Headless screw could lead to cartilage abrasion and prominent hardware that requires implant removal and it is only suitable to be used on larger osteochondral fragments. In our case, we believed headless screw is not an option due to only minimal bony fragment that was present making screw fixation difficult. Bioabsorbable pin is costly, associated with implant breakage, less compression across the fracture, aseptic synovitis and foreign body reaction (2).

There are multiple reports on the success of osteochondral fracture fixation even in chondral only fragment (2-5), however, there is no study comparing the outcome of these methods, size of the fragment that should be fixed and duration from trauma before fragment is fixed. More research would be beneficial with regard

to suture fixation of osteochondral fragment especially on the type of suture to be used, size of the suture and number of strand of suture as this fixation method is easy to learn, readily available, does not require removal of hardware, can be used in small osteochondral fragment and relatively cheap.

CONCLUSION

Suture fixation of osteochondral fracture is a possible option. Our case suggests that despite a delayed surgery after four weeks of injury, it provides a good outcome at one and half years follow up.

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