

Osteonecrosis of bipartite patella following total knee arthroplasty without lateral release

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ARTICLE INFO

Article history:

Received 18 August 2017

Received in revised form

5 January 2018

Accepted 11 April 2018

Available online 5 May 2018

Keywords:

Knee

Patella

Total knee arthroplasty

Osteonecrosis

Bipartite patella

ABSTRACT

We present a case of osteonecrosis of bipartite patella occurring after total knee arthroplasty using medial parapatellar approach without lateral retinacular release in osteoarthritic knee of a 66 year-old-male. The surgery was performed using traditional technique with medial parapatellar approach and patella was resurfaced. Patella was everted during surgery. There was no event during follow-up period after surgery. Range of motion of the knee was 135° without flexion contracture. Eight months after the surgery, patella was fragmented and resorbed on the radiographs which was consistent with osteonecrosis. The patient showed extension limitation of 30° with no pain. Patellar osteonecrosis has been rarely reported after total knee arthroplasty with lateral retinacular release. However, there was no report of patellar osteonecrosis after total knee arthroplasty without lateral retinacular release. Caution should be taken about patellar osteonecrosis in case of bipartite patella even though lateral retinaculum is preserved during total knee arthroplasty.

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Patellar osteonecrosis is a very rare but challenging complication after total knee arthroplasty (TKA). Patellar osteonecrosis should be concerned when TKA is performed with lateral retinacular release because it might impede blood supply from lateral genicular artery. However, without lateral retinacular release, patellar osteonecrosis hardly occurs. If lateral retinacular release is carefully performed without damaging lateral genicular artery, patellar osteonecrosis is avoidable. Here we report a case of osteonecrosis and spontaneous fragmentation of resurfaced bipartite patella after TKA without lateral retinacular release.

Case report

A 66-year-old man came to our institution with a history of right anteromedial knee pain for several years. Radiographs revealed severe osteoarthritic knee and a bipartite patella of type II

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Peer review under responsibility of Turkish Association of Orthopaedics and Traumatology.

<https://doi.org/10.1016/j.aott.2018.04.003>

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according to Saupé classification¹ (Fig. 1). The patient had no history of trauma on the affected knee. He had undergone TKA with cruciate-retaining type Vanguard Complete Knee system (Biomet, Warsaw, IN, USA). Surgery was performed under spinal anesthesia. A tourniquet was applied during surgery. Anterior midline skin incision and medial parapatellar arthrotomy were used. Patella was everted during resection of distal femur and proximal tibia. Patella was resurfaced and the component was fixed with Cemex (Exactech, Gainesville, FL, USA) bone cement. Thickness of the patella was 24 mm before resection and 24.5 mm after resurfacing. The small bone fragment lateral to the patella was removed to avoid impingement which may cause anterior knee pain postoperatively. Lateral retinacular release was not performed as patellar tracking was good after all components were implanted. An electrocautery denervation around the patella was not performed. Postoperative radiographs are shown in Fig. 2.

Quadriceps set exercises were started immediately after surgery. Continuous motion exercises for the knee and walking with crutches were started thereafter. Ice massage was applied for 7 days after the surgery to reduce hemostasis and swelling. After removing the sutures on postoperative day 14, the patient was discharged without any complication.

At 6 weeks postoperatively, the knee showed a range of motion of 135° without flexion contracture. Radiographs revealed



Fig. 1. Preoperative radiographs of the right knee show severe osteoarthritic change and bipartite patella.

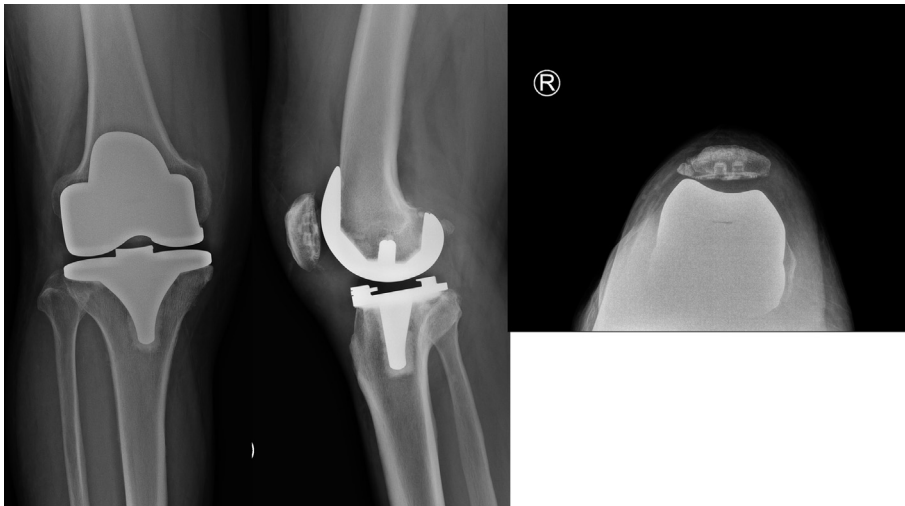


Fig. 2. Radiographs after TKA of the osteoarthritic knee.

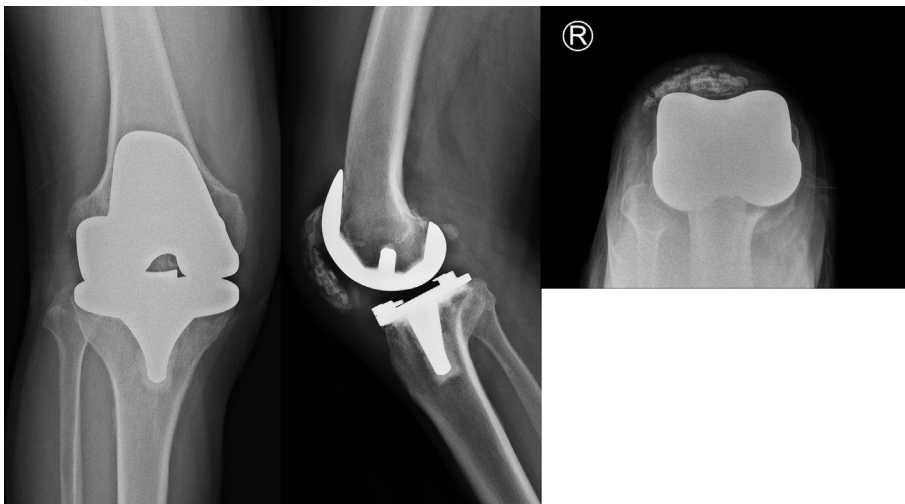


Fig. 3. At 8 months after TKA, radiographs show fragmentation and resorption of patella.

no abnormal findings. At 8 months after the surgery, the patient showed a flexion contracture of 30° with a further flexion of 135° without pain. Radiographs revealed significant fragmentation and resorption of the patella consistent with osteonecrosis (Fig. 3). The patient denied any injury on the knee since the operation. There was no sign of infection.

The patient was admitted to our institution. He had physical therapy to correct flexion contracture using skin traction and quadriceps set exercises for 4 days. The flexion contracture has been relieved. However, extension lag of 5° remained at one year postoperatively. The patient had no pain and revision surgery was not performed. Written informed consent was obtained from the patient to publish this case report, including the images.

Discussion

The incidence of patellofemoral complications after TKA has been reported to be up to 10%.² Osteonecrosis is known to be a main cause of patellar fragmentation after TKA with lateral retinacular release.³ Medial parapatellar arthrotomy is the most popular approach technique for TKA and is known to be safe. However, an interruption to the blood supply from the medial circumflex arterial network may occur with the medial parapatellar arthrotomy approach.⁴ Nicholls et al⁵ reported a patellar blood flow reduction of 53% after a medial parapatellar arthrotomy. However, Bourke et al⁶ reported that there is no difference in patellar vascularity between the medial parapatellar approach and subvastus approach in TKA. When lateral retinacular release is performed for proper patellofemoral tracking, the peripatellar vascularity may become seriously interrupted except the recurrent branch of the anterior tibial artery.⁷ Ritter et al⁸ reported significantly higher occurrence rate of patellofemoral complications after total knee arthroplasty with lateral retinacular release comparing those without lateral retinacular release. There have been a few case reports of patellar osteonecrosis after TKA with lateral retinacular release.⁹ However, to the best of our knowledge, there has been no report of patellar osteonecrosis after TKA without lateral retinacular release. Electrocautery denervation of the patella may cause an additional impact on the patellar blood supply. However, the authors did not performed the denervation of the patella. Bipartite patella as in this case report or nonunion of previous patellar fracture should be of concern even during routine approach for TKA as vascular network in such cases may not be normal. In bipartite patella especially type II, intraosseous vascular network of medial portion may be separated from that of lateral portion. Unfortunately, no study has been performed yet about the vascularity of bipartite patella. Oohashi et al¹⁰ reported that the

central region of the interposed tissue between fragments is lacking blood vessels in their histopathological study of excised specimens of painful bipartite patella. This means there is no vascular communication between the main fragment and accessory fragments of the bipartite patella. Medial parapatellar approach for TKA may cause significant damage to the medial portion vascularity of patella, thus causing avascular necrosis. Further study on the vascular network about bipartite patella is necessary. In knees with advanced osteoarthritis, it may be difficult to differentiate bipartite patella from fractured osteophyte which is not united thereafter. In this case, contour of lateral side of main patellar component did not seem to be equivalent to normal patella on an anteroposterior radiography, by which nonunion of fractured osteophyte might be excluded.

In conclusion, caution is needed during TKA to minimize the damage of vascular network of patella in case of type II bipartite patella or nonunion of old patellar fracture. Subvastus or lateral parapatellar approach may be an option.

Acknowledgement

This research was supported by 2017 Research Grant from Kangwon National University (520170445).

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