

Remnant bone debris after ACL reconstruction surgery: a cause of heterotrophic calcification and patellar tendon ossification

Abstract

Patellar tendon ossification after anterior cruciate ligament reconstruction (ACLR) with Bone-patellar tendon-bone (BPTB) graft is an extremely rare complication. We are reporting a case of patellar tendon ossification and heterotrophic ossification after ACLR with BPTB graft in the same patient. This patient was managed non-operatively as it was not causing hindrance to his daily activity.

Keywords: patellar tendon ossification, heterotrophic ossification, BPTB, ACL

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Introduction

ACLR is a commonly done procedure in orthopaedics. Hamstring tendon graft and BPTB graft are two most commonly used autograft for ACLR. BPTB graft is observed to be associated with more donor site morbidity as compared to hamstring tendon graft¹. Patellar tendon ossification is one such rare complication seen with BPTB graft.

Case presentation

ACLR was done using BPTB graft in 30 years old badminton player (recreational). The time interval between index injury and surgery was 1 month. Patient also had a concomitant tear in the posterior horn of the medial meniscus for which meniscal repair was done. Next day after surgery knee bending (up to 90°), quadriceps strengthening exercises and non-weight bearing walking started. At 6 weeks, cycling, full knee bending and half squats were added to the rehabilitation program.

At 9 months patients presented to the clinic with anterior knee pain, restricted range of motion and difficulty in doing squats. On examination bony swelling was present on the medial aspect of the knee, tenderness was present at the donor site and the range of motion was restricted (0-110°). All stability was normal. The arthrometer (KT-1000TM) measurement showed that anterior translation of tibia was 4 mm in the normal knee and 5 mm in the operated knee. X-ray of the knee showed that patellar tendon ossification and heterotrophic calcification at the medial femoral condyle (Figure 1). Patient was managed non-operatively as he did not have any limitation of daily activity.

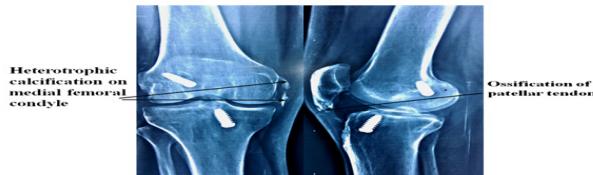


Figure 1 AP view of x-ray showing heterotrophic ossification on medial femoral condyle and lateral view of left knee x-ray showing patellar tendon ossification.

Discussion

BPTB graft is considered as a gold standard graft for ACLR because of better knee stability^{1,2} and higher return to sports after ACL reconstruction with BPTB graft.^{1,3,4} However, BPTB graft is criticized for donor site morbidity like anterior knee pain, patellar fracture, quadriceps tendon rupture etc.⁵⁻⁷ Among the variously described complication of BPTB graft, patellar tendon ossification is one such rare complication. Patellar tendon ossification has been reported mainly in patients with knee injury,⁸ total knee replacement,⁹ partial patellectomy,^{10,11} intramedullary nail¹² and after spinal cord injury.¹³ Patellar tendon ossification after ACLR is extremely rare. This complication has been reported by only few studies in literature¹⁴⁻¹⁸ (Table 1). The cause of patellar tendon ossification is not cleared. Gianluca Camillieri et al.¹⁶ gave hypothesis that persistence of bone debris inside the patellar tendon may trigger calcification. However, they did not have an immediate postoperative X-ray to prove their hypothesis. In the present case

report, we had postoperative CT scan (5th day) which showed the loose bone fragments in the joint (Figure 2) which support the hypothesis given by Gianluca Camillieri et al.¹⁶ & Erdogan et al.¹⁹ gave another hypothesis he believed aggressive rehabilitation causes microtrauma within patellar tendon.¹⁹ However same rehabilitation protocol was followed by others patients and none of them showed patellar tendon ossification. Another possible pathogenesis given by Bonamo et al.²⁰ he stated that devascularization of the graft during harvested results in avascular necrosis. Heterotrophic ossification is commonly encountered problem in orthopaedics. The incidence of heterotrophic ossification after ACL reconstruction with BPTB graft vary from 1.54%-2.58%.²¹ Mohamed A et al.²² observed that incidence of bone debris after ACL reconstruction surgery was 15% if thorough debridement was done and 65% if no specific debridement protocol was followed.²² Treatment of patellar tendon ossification is still not well established. However, some authors showed good results with surgical resection of ossification.¹⁴ We managed our patient non-operatively as he did not have any limitation of daily activity. In the present case report, we observed that patient had both patellar tendon ossification and heterotrophic ossification. There was no case reported in the literature which showed both patellar tendon ossification and heterotrophic calcification in the same patient after ACL reconstruction with BPTB graft.

Table I Review of literature

Article	Age/sex	Type of graft	Treatment	Duration of injury
Gianluca Camillieri	42/male	BPTB	Excision of ossification	-
Homero Valencia	29/male	BPTB	Excision of ossification	10 months
Mehmet Erdil	36/male	BPTB	Excision of ossification	3 months
Fahri Erdogan	45/male	BPTB	-	5 months

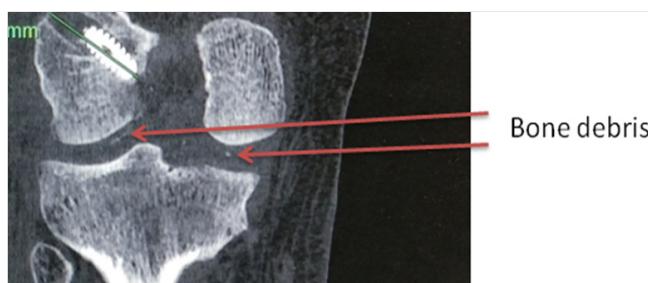


Figure 2 Post-operative (5th day) CT scan showing loose bone debris in the joint.

Acknowledgements

Written and informed consent was taken from the patient.

Conflict of interest

No conflict of interest.

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