Management of Rare Case of Posterior Cruciate Ligament Avulsion Injury with concomitant Transverse Fracture of Patella-A Case Report

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Abstract: Avulsion injuries of the posterior cruciate ligament are not as common as other knee injuries. In fact, they are often subtle and more difficult to evaluate than other ligament injuries of the knee. Sometimes a posterior cruciate ligament injury occurs along with injuries to other structures in the knee such as cartilage, other ligaments, and less commonly bone. Avulsion injury of PCL with concomitant fracture of patella has not been reported in literature. The following is a case report discussing the management of such an injury. A 27 year old patient came with closed fracture of patella along with avulsion fracture of Posterior Cruciate Ligament. Tension Band wiring of patella followed by ORIF with Cancellous screw fixation of PCL avulsion fragment was done. Knee was immobilized for 6 weeks followed by active and passive mobilization to regain full movement of knee. In case of rare combination of such an injury, immobilization to allow healing of PCL avulsion fracture may be given precedence to union of fracture patella and subsequent physiotherapy may be done to regain full range of motion.

Keyword: PCL Avulsion, Patella, Cancellous Screw, Immobilization

Introduction

Avulsion injuries of the posterior cruciate ligament are not as common as other knee injuries. In fact, they are often subtle and more difficult to evaluate than other ligament injuries in the knee. Sometimes a posterior cruciate ligament injury occurs along with injuries to other structures in the knee such as cartilage, other ligaments, and less commonly bone. Avulsion injury of PCL with concomitant fracture of patella has not been reported in literature. The following case report discusses the management of such an injury.

Patient history

Tamilselvan, a 27 yr old male met with a road traffic accident and sustained an isolated injury to his right knee as his knee struck the bumper of another incoming two wheeler. He immediately developed swelling of the knee. He was unable to walk or lift his right leg and any movement of the knee produced considerable pain. He came to the Accident and Emergency department with these complaints.
As to the question regarding which fracture had to be treated first, the simpler patella fracture was planned to be fixed first followed by the more difficult PCL avulsion fracture.

Operative Procedure

Under Spinal anaesthesia, with patient in supine position, Modified Tension Band wiring was first done with 2 k wires and fixation was found to be stable. Then we proceeded with fixation of PCL avulsion fragment. Patient was shifted to prone position and parts were cleaned and draped. A curvilinear incision 10 to 15 cm long over the popliteal space with the proximal limb following the tendon of the semitendinosus muscle distally to the level of the joint was made. It was curved laterally across the posterior aspect of the joint for about 5 cm and distally over the lateral head of the gastrocnemius muscle. The skin and subcutaneous tissues were reflected to expose the popliteal fascia, which was incised. Exposure of the tibial nerve followed by the popliteal artery and vein, which lie directly anterior and medial to the tibial nerve was done. The artery and vein were gently retracted laterally with the help of infant feeding tube. The posterior capsule of the knee joint was then exposed. A posterior capsulotomy was done to expose the posterior aspect of the tibial condyle and the avulsed fracture fragment was identified. It was found to be rotated superiorly. With the help of Allis forceps, the fragment was seated in position and fixed with thin k wire. A 4mm partially threaded cannulated cancellous screw was used to fix the fragment in place. The fixation was found to be stable. The wound was closed with interrupted sutures over the capsule, deep fascia and skin.

Immediate postop x-rays showed adequate fixation of both the fractures.
Post OP Clinical Pic
Hence, patient was immobilized with knee brace for 6 weeks and was allowed partial weight bearing walking for first 2 weeks followed by complete weight bearing walking. After 6 weeks, knee mobilization exercises were started.
At 6 months of follow up, patient showed good radiographic union of both the fractures. Range of motion of knee was also good with flexion up to 110 degrees and he could do all his daily activities without discomfort.
The posterior cruciate ligament is composed of two major parts, a large anterior portion that forms the bulk of the ligament and a smaller posterior portion that runs obliquely to the back of the tibia. It attaches proximally to the posterior part of the lateral surface of the medial condyle, and forms a segment of a circle. The tibial attachment is in a depression behind and below the intraarticular portion of the tibia, with a lip usually blending with the posterior horn of the lateral meniscus. The posterior cruciate ligament increased in cross-sectional area from tibia to femur and this probably explains the rarity of its avulsion injury from the tibia. It is more vertically than obliquely oriented and is the axis around which rotation of the knee occurs. On physical examination, the posterior drawer test result is positive with a deficient posterior cruciate ligament; however, the true direction of translation of the tibia should not be mistaken for that of anterior cruciate ligament. Treatment of a posterior cruciate ligament injury is a controversial current topic in knee surgery primarily because the natural history of this injury is unknown. It has been reported that significant osteoarthritic changes can occur in knees with a posterior cruciate ligament deficiency in an exceptionally high percentage (80%) of patients when repair or reconstruction is delayed beyond 4 years. Another study concluded that the natural history of the isolated posterior cruciate ligament–deficient knee varies considerably with trends ranging from essentially normal knees to knees with significant degeneration. The criteria for nonoperative treatment include (1) a posterior drawer of less than 10 mm (grade II) with the tibia in neutral rotation (posterior drawer excursion decreases with internal rotation of the tibia on the femur), (2) less than 5 degrees of abnormal rotary laxity (specifically, abnormal external rotation of the tibia with the knee flexed 30 degrees, indicating posterolateral instability), and (3) no significant valgus-varus abnormal laxity (no associated significant ligamentous injury). If operative fixation is planned and performed, the fixation is protected with tube cast or knee brace. At 5 days after surgery, the wound is inspected and the cast changed. The cast is removed at 6 weeks. It is preferred not to rigidly immobilize the knee in flexion for several weeks because of the deterioration of the articular cartilage surfaces associated with the absence of motion, especially in the patellofemoral joint. Cast removal is followed by active and passive knee mobilization n exercise. Coming to our case, a Posterior Cruciate Ligament avulsion injury with associated Patella fractures has not been reported in literature, though associated distal femoral, proximal tibial and tibial condylar fractures have been reported.

Our patient has a stably fixed patella fracture with limited retinacular tears for whom continuous passive motion could have been initiated immediately after surgery. Active range-of-motion exercises could have been performed after wound healing. Progressive resistance exercises could be started at 6 to 8 weeks as healing was evident on radiograph. Unrestricted activity could have been resumed as and when full quadriceps strength returned, at approximately 18 to 24 weeks. However, due to the associated Posterior Cruciate Avulsion injury, importance to healing of this injury was given precedence over that of patella fracture. As the patient was young, even after 6 weeks of immobilization, almost complete range of motion of knee could be achieved with subsequent mobilization.

**Conclusion**

Posterior Cruciate Ligament Avulsion injury is a rare one, moreover the associated Patella fractures has even been rarer. If there is gross instability clinically, it is better to fix the fracture than treat it conservatively. Immobilisation of knee for 6 weeks to ensure healing of the avulsion injury can be done safely and it does not hinder the healing of associated fracture patella in young patients.

**References**


