Case Report

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Reconstruction of Chronic Patellar Tendon Rupture After Partial Patellectomy & IL Nailing Tibia, Using Semitendinosus & Gracillis Autograft: Technique with Promising Results

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Abstract

Chronic patella tendon rupture is a rare disabling injury that is technically difficult to repair. Bone avulsions of the patellar tendons or pure ruptures of the quadriceps and patellar tendons are usually caused by indirect forces and sometimes by penetrating injuries.

We are presenting a case of old patella tendon rupture which also had other co morbidities of tibial fracture & partial patellectomy.This case had classic symptoms of old patella tendon rupture.We did repaired this case with help of semitendinosus & gracilis graft. Patient did recovered well in post operative phase with good physiotherapy.

In most of cases old patella tendon rupture is associated with other systemic diseases or it is itself due to old neglected injury. In this case old rupture is associated with previous patella & tibia fractures with partial patellectomy.It shows that even after old partial patellectomy & old operated tibia fracture with interlocking nail,patella tendon can be repaired & patient can lead normal life.

Keywords: Old Patella Tendon Rupture; Parial Patellectomy; Semitendinosus and Gracilis Graft.

Introduction

Chronic patellar tendon rupture is a rare disabling injury that is technically difficult to repair. Bone avulsions of the patellar tendons or pure ruptures of the quadriceps and patellar tendons are usually caused by indirect forces and sometimes by penetrating injuries.

The peak incidence of injury occurs in the third and fourth decades and it is six times more common in males than females [1]. In younger patients, rupture of the patella tendon tends to be the result of significant trauma or cumulative microtrauma, while in older patients it often is related to degenerative changes associated with aging. The injury also is associated with systemic diseases [2] such as rheumatoid arthritis, systemic lupus erythematosus [3], chronic renal failure, diabetes, Paget's disease, and hyperparathyroidism. Iatrogenic patella tendon rupture has been described as a complication of total knee arthroplasty [4-9], a late complication of a tibial nail [10], a result of steroid injections [11], and following removal of the central third of the tendon for anterior cruciate ligament (ACL) reconstruction [12-13]. It 's incidence is about 0.24%.Bilateral simultaneous rupture is very rare and usually occurs in association with chronic systemic disease [14-17].

On physical examination, there was generalized swelling throughout the knee and tenderness at the inferior pole of the patella or along the patella tendon in acute cases. Palpable defect in the tendon is noted which may be obscured by swelling or increased soft-tissue mass. The characteristic picture of asymmetric patella alta becomes more apparent with knee flexion.

It is essential to test active knee extension in all cases where patella tendon disruption is suspected. Extension lag is noted or weakness of extension as compared to opposite side.

Usually clinical examination is sufficient to diagnose a patellar tendon rupture but sometime imaging modalities may be required to confirm the diagnosis. On plain radiographs, degenerative changes in the patella tendon near its origin may cause a "tooth sign." Patella alta also may be seen. The Insall-Salvati ratio is >1.2 and an avulsed bone fragment attached to the tendon may be seen. Ultrasonography and magnetic resonance imaging are usually not required but may be useful in the few cases where the diagnosis is unclear especially in older cases [18-19].

Case History

We are presenting a case where we have used semitendinosus and gracillis tendon autograft with box wire augmentation loop.

A 35 year old male patient presented with complaints of difficulty in walking and inability to move his knee since trauma.

Patient sustained trauma due to road traffic accident about 6 months back and suffered from fracture tibia diaphysis and fracture patella for which patient was treated elsewhere and interlocking intramedullary tibia nail was used for fracture tibia and partial patellectomy was done. After a period of immobilization of 6 weeks patient was allowed full weight bearing with mobilization and physiotherapy for knee. After a period of 4 months of treatment patient did not get satisfactory improvement. He was unable to extend his knee & was unable to walk properly. This patient then attended OPD at our medical college.

After doing examination following findings were present on inspection there was midline incision scar was present over anterior aspect of knee.Mild generalized swelling apparent over knee. There was disuse atrophy of muscles of thigh and leg. On palpation tenderness was present over infrapatellar region. High riding patella was present towards affected side as compared to opposite side. There was no joint line tenderness.

On examination of movements, flexion was upto 90 degree. There was extension lag of 50 degrees (due to rupture of quadriceps tendon). No varus or valgus instability was found.

This case was treated by surgery. After following routine protocol midline incision was given over previous scar. On exposure patella was high riding with lower part of patella was absent and patellar tendon was completely detached from patella, extensive fibrosis was present. Fibrous tissue were cleared and patella was pulled as far down as possible. Then semitendinosus and gracillis graft were harvested from same side. Single transverse tunnel in patella was made and another tunnel was made at tibial tuberosity. Semitedinosus tendon was passed from patellar tunnel and gracillis tendon was passed from tibial tunnel from medial to lateral side(Figure 1). On lateral side both tendons were sutured together using bunnel stitches. Patellar tracking was checked and was found to be normal.

Next box wire loop augmentation was done passing from patella to tibial tuberosity with knee in 45 degrees of flexion. Sutures were removed after 2 weeks (Figure 2).

Fig. 1:

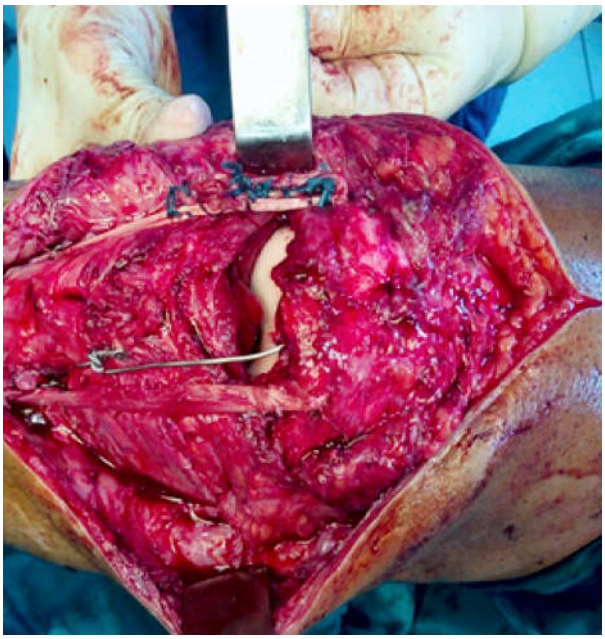

Fig. 2:

Fig. 3:

Postoperatively knee was immobilized for six weeks, then wire was removed and knee mobilization was started.

After 4 weeks of follow up after removal of wire patient gained good range of motion from 0-90 degrees with negligible extension lag (Figure 3),which was almost disappeared after good physiotherapy for next 4 weeks.

Discussion

In case of rupture of patella tendon surgery is required. Repair techniques with or without reinforcement are generally used. The reinforcement devices were made up of metals, nonabsorbable sutures or autografts.

When a rupture of the patellar tendon is more than 6 weeks old, the patella is retracted proximally and may require extensive surgical release to draw it distally to the appropriate level.

In 1947, McLaughlin described a technique in which the patella tendon was repaired primarily. To protect the repair, he recommended placing a stainless steel wire through the quadriceps tendon just proximal to the patella, and anchoring it to a bolt placed transversely through the tibial tubercle. The wire then was removed at 8 weeks [20].

Fujikawa et al describe reconstructing the patella tendon using a flexible open-weave polyester Leeds-Keio prosthetic ligament. Good results were described in 14 of 18 patients[21]

Kelly et al repaired the tendon with nonabsorbable sutures passed through drill holes in the patella. In 2 of 10 cases, they also augmented the repair with either a wire loop or umbilical tape. While Cybex strength testing showed good or excellent strength in only 4 of 9 patients, good or excellent clinical results were seen in 8 of 10 patients.[22]

Levin first described the use of a Dacron vascular graft as a suture material in reconstruction of the patella tendon. Frazier and Clark described the use of a 5-mm Dacron vascular graft to repair acute ruptures, with good results at 4 months. Levy et al also recommend the use of a Dacron vascular graft to allow immediate mobilization of the knee [23].

Kelikian et al first described using the semitendinosus tendon in patella tendon reconstruction. They divided the tendon at the musculotendinous junction, passed it through drill holes in the tibial tubercle and the patella, and sewed it back on itself. They used a traction pin through the patella to mobilize the patella and then incorporated it into a cylindrical cast to help protect the repair [24]. Larson and Simonian report excellent clinical results using semitendinosus augmentation with immediate postoperative mobilization in 4 of 4 patients [25].

Haas and Callaway determine the method of repair based on the location of the rupture and the time frame. For ruptures at the junction of the patella and the patella tendon identified within the first 2 weeks, they recommended primary repair with Kessler-type sutures in the tendon placed through holes in the patella. For midsubstance repairs, lacerations, or delayed repairs, they recommended augmentation of the primary repair with the gracilis and semitendinosus tendons [2].

Lindy et al describe a technique in which #5 braided polyester suture is used in whipstitch fashion to approximate the ends of the tendon, followed by #0 absorbable suture to approximate the free tendon edges. Mersilene tape then was used in a cerclage fashion through soft tissue to protect the repair. Of note, all 5 of 24 patients who had the Mersilene tape tied with the knee in extension developed patellofemoral pain, while only 1 of the remaining 19 who had the tape tied with the knee in 90° of flexion had patellofemoral symptoms. They stressed early passive range of motion [26].

Siwek and Rao reinforced their immediate repairs using external devices. These included Bunnell pullout wires, a pullout wire tied to a Steinmann's pin through the tibia, or a pullout wire with Steinmann's pins through both the patella and tibia. Their patients then were casted in extension for 6 to 11 weeks. Twenty-four of 26 patients subsequently had a good or excellent result, with one rerupture [2].

Ecker, Lotke, and Glazer reported good results using semitendinosus and gracillis autograft in four patients [27].

Mandelbaum,bortolozzi &carney described method in which Z lengthening of quadriceps tendon and Z shortening of patellar tendon was done [28].

Miroslav Z. Milankov, Natasa Miljkovic, Milan Stankovic reported for the reconstruction of chronic patellar tendon ruptures using contralateral bone-tendon-bone (BTB) autograft [29].

In our patient we made single tunnel in patella as sufficient patellar length was not available to make two tunnels and box wire loop augmentation was done to protect the repair.

Conclusion

In our case partial patellectomy was already done elsewhere but that did not affected healing & recovery of patient. In our case we had only made a single tunnel & repaired the tendons with bunnel repair. Our patient was a driver & full extension was necessary for his occupation.Even after partial patellectomy patient had good function recovery. Our case was one of unique case where he recovered well even after old partial patellectomy & with remaining half fragment of patella. With this we recommend that in case of old patella tendon rupture with remaining half fragment of patella surgery can be undertaken without sacrificing patella. A good recovery can be expected in such cases.

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