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RECONSTRUCTION OF NEGLECTED PATELLAR TENDON RUPTURE USING SEMITENDINOSUS TENDON GRAFT WITH INTACT DISTAL INSERTION AND FIBRE-WIRE AUGMENTATION – A CASE REPORT

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ABSTRACT

Introduction : Neglected patellar tendon provide a challenge for orthopaedic surgeons for reconstruction. They are rare as compared to acute tendon rupture and are often disabling. Patients tend to have difficulty in walking with inability to extend their knee. We describe an improved technique for the reconstruction of a neglected patellar tendon rupture, using semitendinosus grafts and Fibre-wire augmentation. **Case presentation :** presenting a case of a 23 year old male, non-smoker who came with a history of self-fall from a bike and sustained a contused lacerated wound over his right knee. Patient was primarily given sutures outside and presented to us four weeks later with inability to extend his knee. Radiographic findings were of Patella Alta with increased Insall-Salvati ratio. Patient was operated for a Patellar tendon reconstruction using the semitendinosus graft with Fibre wire augmentation. **Conclusion :** Patellar tendon reconstruction with Fibre wire augmentation provides a practical solution for chronic tears and is an easily reproducible technique.

INTRODUCTION

Neglected patellar tendon ruptures are rare and are often as a result of missed diagnosis. They are extremely disabling for the patient and are primarily treated10. They are usually at the lower pole of the patella as a result of a cut injury or sporting events7. We describe an improved technique for the reconstruction of a neglected patellar tendon rupture, using semitendinosus grafts and Fibre-wire augmentation.

CASE REPORT:

23 year old male, non-smoker, motorbike courier had a road traffic accident- self fall from bike and had an injury around the right knee. There was a Contused-Lacerated wound over the right knee which was sutured by the local doctor.

After a month (4 weeks), the patient presented to us with complain of unable to extend his knee (that is, he had absent extensor mechanism). He had the scar of the previous CLW that was sutured outside. On examining his right knee a palpatory gap was felt at patellar tendon that is suggestive of chronic patellar tendon rupture.

X-ray of right knee in ANTERO-POSTERIOR & LATERAL views showed an abnormally high lying patella with respect to femur suggestive of PATELLA ALTA.

SURGICAL TECHNIQUE:

Pre-operatively, lateral radiographs of both knees were performed in order to estimate the Insall– Salvati ratio and use the measurement from the uninjured side as a guide during the reconstruction. The Insall–Salvati ratio measured 1.5. The patient was consented for a patellar tendon reconstruction using SEMI-TENDINOSIS(HAMSTRING) graft and possible Z lengthening of the quadriceps tendon.

The patient was placed under spinal anaesthesia in a supine position on the operating table and intravenous antibiotic prophylaxis was administered. Tourniquet ischemia was not applied as this may have caused tethering of the quadriceps, preventing adequate assessment of patellar height. During the examination under anaesthetic no restrictions of patellar mobility were identified and it was possible to bring the patella distally to its appropriate position.

With an anterior midline incision an adequate exposure is done to fully show the anatomy. The ruptured patella tendon was identified and it was apparent that the tendon had ruptured off the distal pole of the patella. The scar tissue at the level of the rupture was excised exposing the healthy tendon edges. An assessment of the ability to recreate the Insall–Salvati ratio was confirmed at this stage and the patella was mobilized distally without significant tension from the quadriceps. The pes anserinus was identified and the semitendinosus tendons were harvested with an open tendon stripper, achieving maximum length of the tendon grafts and leaving the tendons attached distally at their tibial insertion. The free tendon edges were prepared with whip-stich sutures after cleaning of the remaining muscle and soft tissue. One trans-osseous tunnels was subsequently drilled following the general principles as described by Ecker et al[2].

A 5.5 mm transverse tunnel through the patella was made just distal to the mid-patellar level. With the knee in full extension, a FiberWire suture was passed through patellar tunnel and tensioned to bring the patella distally. The suture was used to set the height of the patella after using the previously calculated Insall–Salvati ratio of the uninjured knee. This was confirmed using C-arm image intensifier with the knee at 30° of flexion. The free end of the semitendinosus tendon was passed medio-laterally through the tunnel in patella and then taken to tibia just lateral to tibial tuberosity, this tendon was sutured to ruptured patellar tendon with ethibond no.2 and the free end of the graft was stapled to medial side of tibia near pes-anserinus insertion. The tendon edges at the site of the original tendon rupture were also sutured using the ethibond suture. After the repair was completed, the knee could be flexed to 90° passively without any gapping at the rupture site and the final patellar height was assessed at 60° of knee flexion and found to be symmetrical to the uninjured side. The wound was closed in layers, after repair and reefing of the injured extensor retinaculum.

Postoperatively, the knee was immobilized in a plaster cast at 20° of flexion. The patient was discharged the second postoperative day, not weight bearing. At the two-week follow-up, the cast and sutures were removed. With aggressive physiotherapy a 120° of flexion was achieved in 12 weeks. At the three-month follow-up, initiation of weight bearing was permitted along with closed chain knee exercises under the supervision of a physiotherapist. At the six-month follow-up, the patient was able to walk unaided and without a limp. He

had full active knee extension and 130° of flexion, achieving pre-injury functional levels, including return to sport.

Figure 1: Tunnel made in patella and the intact distal insertion of semi tendinosis muscle

Figure 2: Passage of semi-t graft medio-laterally through the tunnel made in patella

Figure 3: Augmentation with fibre wire and suturing the new graft with the ruptured patellar tendon with ethibond no.2

Figure 4: Newly reconstructed tendon

Figure 5: Reconstructed tendon

Figure 6: Suture removal at 2 weeks post-op

Figure 11: shows knee flexion of 20 degrees at 2 weeks

Figure 12: Active SLRT

Figure 13: 90 degrees knee flexion at 8 weeks

DISCUSSION:

A neglected rupture of the patellar tendon is a rare occurrence and the exact incidence remains unknown. Several methods of treatment for this challenging problem have been previously described. Simple re-approximation of the torn ends and direct repair augmented by cerclage wire was successfully employed in four cases by Casey and Tietjens[3]. Other authors[4] have used autogenous semitendinosus-gracilis tendon grafts adopting the principles of the Ecker et al[2]. technique, but without the use of a Steinman pin for patellar traction. Instead, they used circular wire through the patellar and tibial tunnels, in order to obtain satisfactory patellar height. Milankov et al[5]. used a contralateral bone-patellar tendon-bone graft followed by double-wire loop reinforcement. Furthermore, bone-patellar tendon-bone allograft[6], Achilles tendon allograft[7] and synthetic materials[8] have also been used yielding satisfactory results.

Our improved method follows the principles of the technique as initially described by Ecker et al2. and subsequently adapted by other authors4. Chen et al4. have recently described the value of the use of a semitendinosus-gracilis tendon graft and the preservation of its distal insertion. They also described the principle behind the use of a tension-

reducing wire as an aid to natural recovery and proper patellar tracking. The advantage of our approach to the same clinical problem lies with the use of a FiberWire suture, instead of metal wires or Steinman pins. The Fiber-Wire suture serves a dual purpose; initially it establishes a satisfactory patellar height for the semitendinosus tendon graft reconstruction, then it serves as augmentation for the reconstruction; crucially, further operative intervention for its removal is not required.

One of the challenges during the treatment of neglected patellar tendon ruptures is the difficulty in achieving the correct patellar height. This is usually due to adhesions and quadriceps contracture or atrophy that may ultimately cause proximal migration of the patella. Several methods have been previously described in order to adequately mobilize the patella and relocate it to its anatomical position. Mandelbaum et al[9]. recommended Z lengthening of the quadriceps tendon and Z shortening of the patellar tendon with augmentation using the semitendinosus and gracilis tendons. In cases with severe contracture of the quadriceps tendon, external fixation with pins and wires[10] and the Ilizarov method have been employed[11]. In our case, the patella proved mobile enough so as not to require additional procedures for its mobilization distally. In case of inability to achieve the patellar height, we suggest that our proposed surgical technique may be adjusted with the addition of Z lengthening of the quadriceps tendon. We recommend that this step is included in the consent form and that the same rehabilitation protocol is followed.

CONCLUSION

In conclusion, the use of a semitendinosus tendon graft with Fibre-Wire augmentation provides a practical solution for the treatment of a neglected patellar tendon rupture. We believe that this technique is easily reproducible and warrants further investigation.

CLINICAL MESSAGE

This case report shows an alternative and easy technique for neglected chronic patellar tendon ruptures which provides a challenge in treatment.

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