

A repair of tibialis anterior hernia with periosteal turnover flap

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Abstract

The tibialis anterior muscle herniation was treated with the periosteal turnover flap technique, which has not been previously described in literature. The defect area covered with tibial periosteum by turning the raised flap over on itself at 180° after debridement of the defect edges. Four cases had a history of trauma and the herniation was in the mid-third of the tibia. The mean follow-up period was 84 months (range, 72-96 months) during which no complications or recurrence were observed.

In this paper, the periosteal turnover flap technique is described for the first time in literature. The repair of tibialis anterior muscle herniation with periosteal turnover flap can be considered as a safe method.

Keywords: Tibialis Anterior; Herniation; Periosteal; Flap; Surgical Treatment.

INTRODUCTION

Muscle herniation is an overflow of part of the muscle from a defect in the fascia (1). The tibialis anterior was the first muscle herniation to be defined (2). Although seen most often in the tibialis anterior muscle, herniation has also been reported to have been observed in the peroneus longus, peroneus brevis, extensor digitorum longus and gastrocnemius muscles (3). Muscle hernias are differentiated as traumatic or structural (3). Although often asymptomatic, there may be complaints of pain and cramp following activity of a long duration (1). Different surgical treatment methods have been reported in symptomatic cases.

In this paper, the periosteal turnover flap technique is described for the first time in literature as applied to symptomatic cases who were determined with tibialis anterior muscle herniation.

CASE REPORT

The study comprised 4 cases who presented with complaints of pain and swelling in the leg, were diagnosed with tibialis anterior muscle herniation and treated surgically (Figure 1a). Informed consent was obtained from the patients. Under tourniquet, the intervention was made with an anterior curve incision by planning the

defect area and the tibial periosteum projection. After defining the surgical borders with a pen, the periosteum was raised as far as possible as a flap from the medial as far as the lateral edge (Figure 1b, 1c). By turning the raised flap over on itself at 180°, it covered the defect area. After debridement of the defect edges, the repair was made by tight suturing of the periosteum to the muscle fascia with 3/0 PDS sutures (Figure 1d).

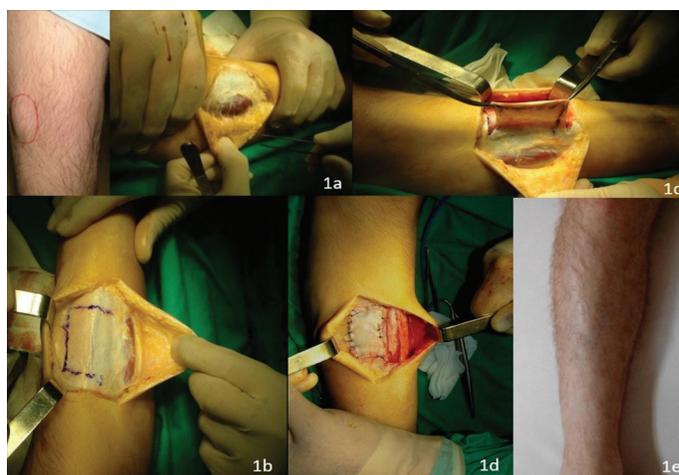


Figure 1a. Preoperative and intraoperative images of the tibialis anterior muscle herniation. **Figure 1b.** Indicating the tibial periosteum. **Figure 1c.** Raising the tibial periosteum as a flap. **Figure 1d.** Image of the defect after repair. **Figure 1e.** Image of the skin after repair.

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The cases were 3 males and 1 female with a mean age of 26.2 years (range, 20-32 years). The lesions were right side in 2 cases and left side in 2 cases. All 4 cases had a history of trauma. In 2 cases, the lesion had developed directly associated with a tibia fracture and there was indirect association in 1 case with trauma-related soft tissue injuries and in 1 case contralateral femoral fracture. In all the cases the herniation was in the mid-third of the tibia. The mean follow-up period was 84 months (range, 72-96 months) during which no complications or recurrence were observed (Figure 1e).

DISCUSSION

Although seen most often in the tibialis anterior muscle, herniation has also been reported to have been observed in the peroneus longus, peroneus brevis, extensor digitorum longus and gastrocnemius muscles (3). The reason for this can be related to it being the area most often exposed to trauma. In the 4 cases presented in this paper, the herniation was in the tibialis anterior muscle.

Muscle hernias can be classified as traumatic or structural. In those which are traumatic, direct mechanisms are associated with open fractures and indirect with an impact (3). In the current cases, 2 lesions occurred directly associated with a tibia fracture and the other 2 were indirect, 1 associated with fracture of the contralateral femur and 1 with trauma-related soft tissue injury.

Muscle hernias are often a cosmetic problem and asymptomatic. In symptomatic cases, there is spontaneous pain, cramp and local sensitivity. Diagnosis of muscle herniation is made from clinical symptoms and physical examination. A reduction in the soft tissue mass during isometric contraction when standing is a physical examination finding. Other soft tissue pathologies such as haematoma, and benign and malignant soft tissue tumours must certainly be considered in the differential diagnosis (1,2). All of the current cases had complaints of pain and swelling.

Imaging methods are extremely helpful in the diagnosis of muscle herniation. The amount of herniated muscle and the fascia defect can be measured with ultrasonography. That this method is non-invasive, cheap and can be easily applied are advantages. Magnetic resonance imaging (MRI) is helpful in muscle herniation diagnosis, in defining the herniated muscle volume and in planning surgical treatment. Differentiation from other soft tissue pathologies can be made with MRI (4). With forced dorsiflexion and plantar flexion of the ankle, MRI aids in the diagnosis of changes in the dimensions of the muscle herniation (5). These methods were not used routinely in the current cases. Diagnosis was made from physical examination.

Asymptomatic hernias can be monitored in treatment. In asymptomatic wide hernias, longitudinal fasciotomy is a treatment choice (6). However, a case has been reported in literature of acute compartment syndrome and muscle necrosis which developed after primary repair of the fascia defect (7). Other choices are to repair the fascia defect with autologous graft (fascia lata) or to cover it with synthetic patches (8). Polyester mesh and bovine pericardium graft are used for this (9,10). Unwanted effects of the materials used in defect repair include rejection, infection and adhesion to the host tissue. As the use of autografts requires a second surgical procedure, complications and morbidity rates increase. Although the known osteoinductive effect of the periosteum, ossification at the surgical site did not reveal in any case with our technique.

CONCLUSION

With this novel method, which to the best of our knowledge has not been previously described in literature, the fascial defect of a tibialis anterior muscle herniation was covered with the adjacent autologous tibial periosteum. Thus, the unwanted side-effects of biomaterials described above were not encountered and there was no requirement for a second surgical procedure to harvest an autograft. In conclusion, the repair of tibialis anterior muscle herniation with periosteal turnover flap can be considered a safe method.

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