

전경골근 탈출에 있어 국소 골막 회전 피판술을 이용한 치료 - 증례 보고 -

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전경골근은 하지 근육의 탈출에 있어 가장 빈번히 일어나는 근육이다. 이러한 현상은 이학적 검사나 영상의학적 검사, 특히 역동적 초음파검사를 통해 진단이 가능하다. 근육 탈출의 수술적 방법으로 일차봉합, 근막절개술, 자가 대퇴근막을 이용한 이식 및 합성 그물(mesh) 이식 등이 있다. 이에 저자들은 국소 골막 회전 피판술을 이용하여 전경골근 탈출을 치료한 예를 보고하고자 한다. 이러한 방법은 공여부 이환이 없고, 피부 자극이 없으며, 비용이 저렴하며, 단순하고 쉬운 장점을 가지고 있기에 전경골근 탈출증에 있어 하나의 대안이 될 수 있다.

색인 단어: 근육 탈출, 전경골근, 골막 피판술

Anterior Tibial Muscle Hernia Treated with Local Periosteal Rotational Flap — A Case Report —

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Tibialis anterior muscle hernia is the most common hernia among lower extremity muscles. This condition can be diagnosed by physical examination and radiologic findings, especially by dynamic ultrasonography. There are surgical methods of treatment for muscle hernia, including direct repair, fasciotomy, fascial patch grafting using autologous fascia lata or synthetic mesh. We report a case of tibialis anterior muscle hernia treated with local periosteal rotational flap. Because there are several advantages to the local periosteal rotational flap, such as lack of donor site morbidity, lack of skin irritation, low cost, simplicity, and an easy approach, this technique could be an option for tibialis anterior muscle hernia.

Key Words: Muscle hernia, Tibialis anterior muscle, Periosteal flap

Muscle can be protruded through a defect of the fascia into the subcutaneous fat and present clinically as a soft-tissue mass. Although most cases of muscle hernia are asymptomatic and don't require operative treatment, a few patients, often athletes, present with severe pain or cramps require surgery. We report a case of tibialis anterior muscle hernia treated with a local periosteal rotational flap.

CASE REPORT

A 19-year-old female admitted to our hospital due to acute subdural hemorrhage after a motorcycle accident. Four months after the accident, she visited our center and complained of palpable mass on her left lower leg, without any external wound or scar. Other hospitals had unsuccessfully attempted to aspirate the mass under the

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diagnosis of a cystic tumor. However, the mass continued to grow, she had more discomfort and pain sensation over the mass. Especially while she was trying to wear a pant, the mass was prominent and squatting position exacerbated the discomfort (Fig. 1). Dynamic ultrasonography was conducted and a 2.4 cm transverse fascial defect was detected (Fig. 2), showing a herniated tibialis anterior muscle through the defect, especially with dorsiflexion motion of the ankle joint. We diagnosed her with tibialis anterior muscle hernia.

At the first time, support hose was applied and we ordered restrictions and limitations regarding exercise for 1 month, but the patient wanted a surgical treatment as the herniated muscle had not reduce in size.



Fig. 1. The mass is prominent in a squatting position.

We made a 10 cm longitudinal incision on the anterior aspect of the mass. The tibialis anterior muscle was immediately exposed without a fascial cover of cm ovoid shape, and a pseudomembranous fibrous cover was found on the exposed muscle (Fig. 3). The long duration of these conditions created the retracted fascia rigid state and primary repair was not possible. The anteromedial surface of tibia was exposed by dissection, and the width of the anteromedial side of the tibia was measured as 5 cm, which was sufficient to cover the fascial defect. The length of the periosteal flap was determined to be 1 cm longer than the length of the fas-



Fig. 3. Fascial defect is seen after skin and subcutaneous incision.

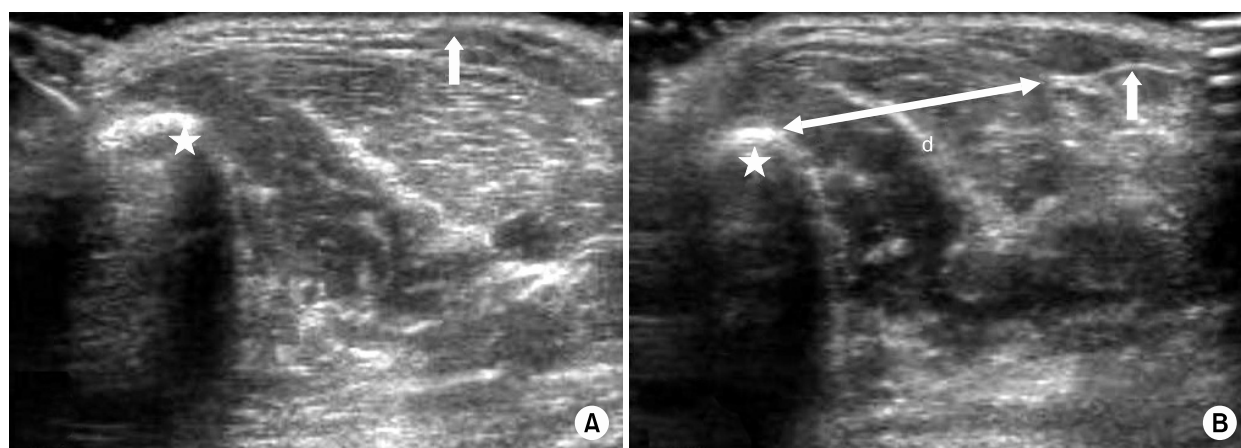


Fig. 2. Dynamic transverse ultrasonography of left anterolateral lower leg.

(A) Image of ankle plantarflexion. Mild tibialis anterior herniation is seen between the tibia (star) and discontinued fascia (arrow).

(B) Image of ankle dorsiflexion. The muscle hernia is prominent and the diameter (d) of the defect portion between the tibia (star) and fascia (arrow) is about 2.4 cm.

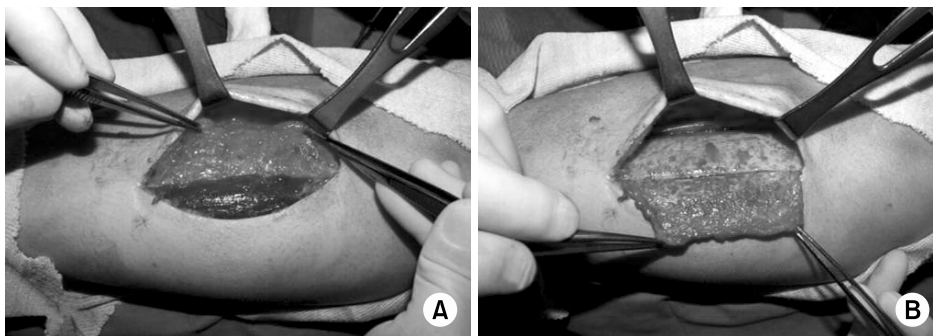


Fig. 4. (A) A periosteal flap is made to repair the fascial defect.

(B) Turning the graft over the defective portion.

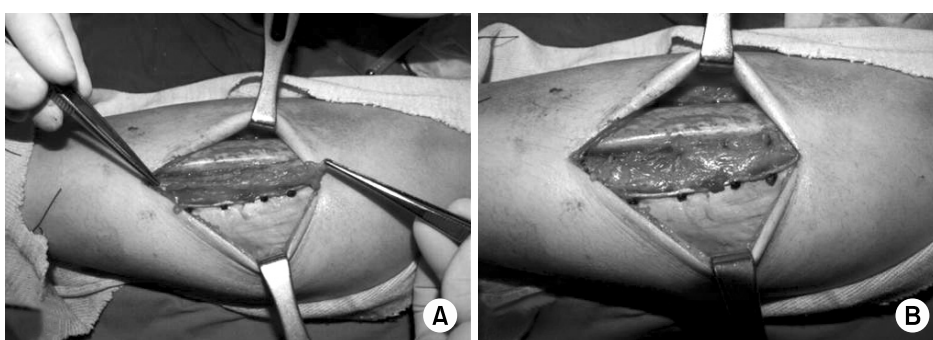


Fig. 5. (A) The graft is sufficient to cover the defect, but a partial graft is remained.

(B) The remaining periosteal portion is overlapped and sutured for augmentation.

cial defect. After sharp incision on the periosteum, meticulous subperiosteal dissection was performed with precautions not to tear the periosteal flap. The flap size was cm and we inverted the periosteal flap and sutured from the tibial side over the defected fascial side (Fig. 4). Fascial defects were covered by the periosteal flap without excessive tension, and the remaining periosteal portion was overlapped and sutured for augmentation (Fig. 5). At 3 weeks after the procedure, the patient could walk on crutches, and after one year, there was no remaining muscle hernia or complications, including pain or cosmetic problems. The patient was satisfied with the result.

DISCUSSION

Muscle hernias are not rare but have received little attention in the medical literature⁸⁾. A muscle hernia often occurs in the leg and the most common hernia site is the anterior compartment of lower leg¹⁾. Physical examination, ultrasonography, and magnetic resonance imaging are used to diagnose this disorder. The efficacy of ultrasonography as a diagnostic tool for muscle hernia has been reported. Dynamic ultrasonography is a non-in-

vasive, highly accurate, and readily available imaging technique for suspected muscle hernia¹⁾. Patients with muscle hernia seek medical advice because of painful symptoms, the possibility of a tumor or cosmetic concerns. Asymptomatic hernias require no treatment, and cosmetic problem usually is not an indication for surgery. For patients with moderate to severe symptoms or those in whom conservative treatment has failed to alleviate symptoms, surgical methods can be considered⁸⁾.

There are several surgical methods of treatment for muscle hernia, including direct repair, fasciotomy⁸⁾, fascial patch grafting using autologous fascia lata, fascial splitting²⁾ or synthetic mesh^{6,9)}. Direct repair is possible when the defect is small and the laxity of the borders permits approximation. But if attempted by force can make repair fail, causing recurrence of the hernia or complication of compartment syndrome²⁾. Some doctors even insisted that a small anterior tibial compartment hernia need not be closed by direct approximation of fascial edge^{7,10)}. Some authors suggest fasciotomy as a safe method of surgical treatment^{1,7)}. But the fasciotomy is indicated only for small fascial defects, and often results in adhesions between the muscle and the cuta-

neous scar, causing an evident skin depression upon muscle contracture⁹⁾. Also it could weaken the muscle fascia and increase the possibility of muscle hernia⁶⁾. The fascial patch grafting using autologous fascia lata has the weakness of donor site morbidity, causing cosmetic problems⁹⁾. A reinforcing patch of autologous or synthetic material is another options⁹⁾. This procedure is simple, and can be used for large defects. But the use of a synthetic patch has drawbacks including cost and risk of graft intolerance to normal surrounding tissue.

The periosteum consists of multipotent mesodermal cells that are capable of differentiating into various types of connective tissue and bone. Histologic examination of the periosteum showed the presence of an outer 'fibrous layer' and an inner 'cambium layer'. Because of osteogenic and chondrogenic property, periosteal flap was studied scientifically and used in orthopaedic surgery actually including ligament reconstruction³⁾. The procedure using auto periosteum was previously introduced⁴⁾. In 2009, Marić et al⁵⁾ already reported three cases treated with similar method. But to the author's knowledge, this is the first description of local periosteal rotational flap procedure concerning this problem written in English. Considering the medial side of the tibia, Siliprandi et al⁹⁾, in 1993, stated that the periosteum could not be used to cover a large defect of more than 3 to 4 cm. Miniaci and Rorabeck⁸⁾, in 1987, mentioned the risk of compartment syndrome. However, to date, there are no case reports of compartment syndrome with the local periosteal rotational flap. We think that preventing excessive tension is important and recommend this technique for treating defects those size do not exceed periosteal width. The contraindication, however, does not include the length of a defect. Cases of small sized hernia of the tibialis anterior muscle, including this case, are frequently reported, and therefore this method could be used in many cases⁴⁾. The local periosteal rotational flap method has several advantages compared to previous techniques. It could be used in relatively large defect. It has no donor site morbidity and skin irritation after treatment. It is simple and can be done with only single incision. It doesn't need addi-

tional cost and has no fear of rejection of graft material. If the fascial defect is small enough to be overwrapped by the periosteal flap (Fig. 5B), it may provide more strength to a defective area.

Even though the number of cases in this study was small, the local periosteal rotational flap for tibialis anterior muscle hernia provided satisfactory outcome without serious complications and could be an alternative option to conventional operative treatments.

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