Injection-Induced Contracture of the Quadriceps Femoris Muscle in Children

Abtullah Milcan, MD
Metin M. Eskandari, MD
Volkan Öztuna, MD

Mehmet Çolak, MD
Fehmi Kuyurtar, MD

Contracture of the quadriceps femoris in children leads to limited knee flexion. Fairbank and Barrett and Hnevovsky believed the contracture was congenital or secondary to progressive idiopathic fibrosis of the vastus intermedius. Lloyd-Roberts and Thomas stipulated that multiple injections into the thigh might cause the contracture.

Proximal release in the early stage and distal release in the late stage are the recommended treatments. Concomitant proximal and distal release in the early stage has not been reported previously.

This article presents a case of quadriceps contracture due to multiple thigh injections in a young patient.

CASE REPORT

A 2.5-year-old girl diagnosed with contracture of the left quadriceps femoris underwent multiple antibiotic injections into her left thigh 6 months prior to presentation due to left otitis externa (Figure 1).

Examination revealed a painless arc of 15° flexion with 1-cm atrophy of the left thigh. On the left side, Ely test was positive and the patellar reflex was diminished. Radiographs of the knee revealed no structural changes. Physical therapy, consisting of 10 minutes of 1.5 watt/cm² ultrasonography, 20 minutes of hot pack application, and 20 minutes of passive range of motion exercises 5 times a day were administered for 20 days. This conservative treatment provided no relief.

Proximal release, as described by Sengupta, provided no relief, and succeeding Thompson distal quadricepsplasty rendered 110° flexion to the left knee.

Range of motion exercises commenced on the postoperative day 3. Histopathological examination of the quadriceps femoris muscle tissue revealed fibrotic changes.

Flexion of 110° attained postoperatively decreased to 105° at 4-week follow-up. The patient’s lack of cooperation in the rehabilitation program was blamed for the loss. Installation of a closely scrutinized rehabilitation program led to knee flexion of 135°, full extension, normal gait, and squatting at the final follow-up visit 24 weeks postoperatively (Figure 2).

DISCUSSION

Contracture of the quadriceps femoris muscle in childhood may be congenital or secondary to various acquired causes. Congenital form of the quadriceps contracture is seen in congenital dislocation of the knee or patella, spinal dysraphism, nail-patella syndrome, and a mild form of arthrogryposis multiplex congenita. Although the cause of quadriceps contracture is obscure in the congenital form, muscle dysplasia, congenital defect, or shortness of the quadriceps femoris are incriminated. An acquired form of the contracture is seen in congenital dislocation of the knee or patella, spinal dysraphism, nail-patella syndrome, and a mild form of arthrogryposis multiplex congenita. In this case, multiple injections into the thigh caused the quadriceps contracture.

The joint-related changes at the knee are varying degrees of limited knee flexion, genu valgum or recurvatum, high riding patella, habitual patellar dislocation, elongation or fragmentation of the inferior pole of the patella, small hypoplastic patella, and a flat- and square-
shaped femoral condyles.\textsuperscript{1,3,6–8} In this patient, only limited knee flexion was observed.

To date, various treatment methods have been recommended. Passive stretching and physiotherapy are unlikely to produce a lasting improvement.\textsuperscript{4} One patient in a series of conservatively treated patients improved.\textsuperscript{7}

Surgical treatment is recommended when the contracture is well established.\textsuperscript{5} In a series of 65 patients by Sasaki et al,\textsuperscript{9} the most satisfactory results were obtained in the release of the fibrosis group. Sengupta\textsuperscript{6} proposed proximal release in the early stage of the contracture when no structural changes of the joint are present. He reported that in 14 cases the average gain in flexion at 2-year follow-up was 65°. In the present case, although no structural changes were noted, the proximal release was not sufficient, and the addition of distal quadricepsplasty was warranted. The concomitant procedure enabled a gain of 120° range of flexion.

In a study by Hnevovsky,\textsuperscript{3} proximal release achieved a permanent range of flexion of 90° in 12 children. Fairbank and Barret\textsuperscript{2} reported an excellent postoperative result following a distal quadricepsplasty in one affected twin. Lloyd-Roberts and Thomas\textsuperscript{4} reported 6 cases in which only 3 who underwent distal quadricepsplasty had satisfactory results at follow-up.

In a study by Mukherjee and Das,\textsuperscript{1} 50 patients underwent distal quadricepsplasty. Results were good in 30 cases, fair in 11, and poor in 9. Jackson and Hutton\textsuperscript{7} reviewed 32 contractures in 17 young patients, 14 of which were treated conservatively, 10 by distal quadricepsplasty, and 8 by proximal release. They reported a slight improvement in 1 patient treated conservatively, an increase in the range of flexion averaging 79.4° in the proximal release group, and an increase of 86.5° in the distal release group, but an accompanying persistent extension lag of 5°-20° was present. In the present case, no extension lag was noted. However, it is not clear whether an attempt of initial distal quadricepsplasty alone would have been successful in this patient.

Although muscle contracture appears in the deltoid, triceps, and gluteal muscles, the most common site of contracture is the quadriceps femoris muscle. Therefore, multiple injections into the quadriceps femoris muscle should be avoided and the deltoid, triceps, or gluteal muscles preferred. Although the ideal location for multiple injections could be the abdominal region, intravenous administration is the preferred route of administration.\textsuperscript{5,9,10}

**REFERENCES**