Endoscopic evacuation of an organized quadriceps haematoma. A case report with a technical note.

Endoskopska odstranitev organiziranega hematoma kvadricepsa. Opis primera in operativne tehnike.

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Ključne besede:
štiriglava stegenska mišica, mišica vastus lateralis, hematom, udarnina mišice, endoskopija, osificirajoči miozitis

Key words:
quadriceps, vastus, haematoma, contusion, endoscopy, myositis ossificans

Citirajte kot/Cite as:
Zdrav Vestn 2010; 79: 512–516

Abstract

Backgrounds: Thigh contusion is a common sports injury which results in the localized muscular rupture and haematoma formation causing temporary quadriceps dysfunction. The therapeutical approach is typically conservative, unless an organized large size haematoma is encountered. In such patients the prolonged morbidity and high incidence of myositis ossificans warrant surgical evacuation, which is routinely performed by open approach and thus causing additional trauma to the recovering muscle.

Conclusions: The endoscopic evacuation of a large (12 cm x 5 cm) organized post-contusion haematoma in the vastus lateralis in and adolescent handball player in described. The procedure was performed under general anaesthesia using a standard arthroscope and a soft-tissue shaver. The postoperative ultrasound revealed a remnant of fluid (1.5 cm in diameter) in the mid-portion of a previous haematoma that later asymptomatically ossified. The patient's full knee function was regained at 6 weeks; the return to full sports activities was allowed at 10 weeks. The endoscopic evacuation appears to be a successful minimally invasive surgical intervention for organized post-traumatic quadriceps haematomas.

Izvleček

Izhodišča: Udarnine stegna so pogoste športne poškodbe, ki povzročijo omejeno mišično raztrganino s hematomom, kar povzroči prehodno motnjo v delovanju štiriglave stegenske mišice. Zdravljenje je praviloma konzervativno, razen pri bolnikih z večjim organiziranim hematomom. Ker pri njih pričakujemo dolgotrajno moteno delovanje poškodovane mišice ter veliko verjetnost nastanka osificirajočega miozitisa (myositis ossificans), se odločamo za operativno odstranitev hematoma. Operacija poteka običajno z odprtim kirurškim pristopom, kar pa povzroča še dodatne okvare na mestu mišičnega celjenja.

Zaključki: V prispevku je opisana endoskopska odstranitev velikega (12 cm x 5 cm) popoškodbenega hematoma v mišici vastus lateralis pri adolescentnem igralcu rokometa. Poseg je bil izveden v splošni anesteziji z uporabo standardnega artroskopa in mehkotkivnega artroskopskega brivnika. Ultrazvočni nadzor po posegu je pokazal omejeno tekočinsko kolekcijo v osrednjem delu hematoma (1,5 cm v premeru), ki se je kasneje spremenila v osificirajoči miozitis, a brez simptomov. Polno delovanje kolenskega sklepa se je povrnilo po 6 tednih, bolnik pa je pričel z neomejenimi športnimi dejavnostmi po 10 tednih. Minimalno-invazivna endoskopska odstranitev se zdi uspešen operativni poseg pri organiziranih hematomih štiriglave stegenske mišice po poškodbi.

Prispelo: 13. jan. 2010,
Sprejeto: 18. fab. 2010

Introduction

Thigh contusion is a common injury in ball and contact sports. It results in a localized muscle rupture and haematoma formation that lead to a temporary quadriceps dysfunction according to the severity of the impact.[1, 2] The conservative management, based on cooling, compression, elevation, and controlled progressive exercise, is all that is needed for return to activities in most cases. As the contusion typically involves only a part of the quadriceps no surgical repair of the muscle is warranted.[3,4] There are, however, situations when a large size haematoma organizes and persists in spite of an adequate conservative management. Such haematomas are also disreputable to progress to myositis ossificans.[1, 2] The surgical evacuation of haematoma is rarely indicated; due to additional tissue disruption the healing time remains similar. Although the minimally invasive procedures have gained wide acceptance in the sports traumatology, there is, to our knowledge, only one publication dealing with the endoscopic evacuation of haematoma – in the calf of an older patient.[5] We herein present a case of an adolescent handball player in whom an organized post-contusion haematoma of the vastus lateralis was evacuated endoscopically.

Case report

A 14-year old handball player was kneed in the antero-lateral right thigh during a match. He stopped playing immediately and received initial therapy by the team physiotherapist. On the day of the injury he was able to continue with normal walking, but the symptoms aggravated severely on the next day. Due to the pain and swelling of the whole thigh he was admitted to the emergency department for observation. The measured intra-compartment pressure of the lateral thigh was 33 mmHg, and a muscular rupture with a large diffuse haematoma was confirmed by ultrasonography. After four days of conservative regimen he was discharged (intra-compartment pressure of 22 mmHg) and followed-up on the outpatient basis. An attempt of the haematoma aspiration two weeks post-injury was unsuccessful. After that the player was presented to our sports orthopaedics division. The control ultrasonography confirmed a homogenous mass of organized haematoma in the mid-portion of the vastus lateralis close to the bone without a significant reduction in size. We decided to continue the conservative therapy (tissue mobilization and deep friction, massage with heparinoid ointment, assisted hip and knee exercises, hydrotherapy, initial isometric quadriceps sets). As there was still no improvement in muscular function and no haematoma regression one month after the injury, the patient agreed to a minimally invasive surgical intervention. Preoperative parameters were the following: a localized elastic swelling in the mid-thigh, the circumference over the haematoma mass on the injured side was 47 cm and 45 cm on the non-injured one, passive range of knee flexion was 0° to 90°, active leg rising was possible with a 40° of knee extension deficit.

Preoperative ultrasonography was used to mark the skin incisions over the organized haematoma (12 cm x 5 cm) in the vastus lateralis located adjacent to the femoral bone (Figure 1). The patient was operated on in a supine position under general anaesthesia with a single dose antibiotic prophylaxis. A

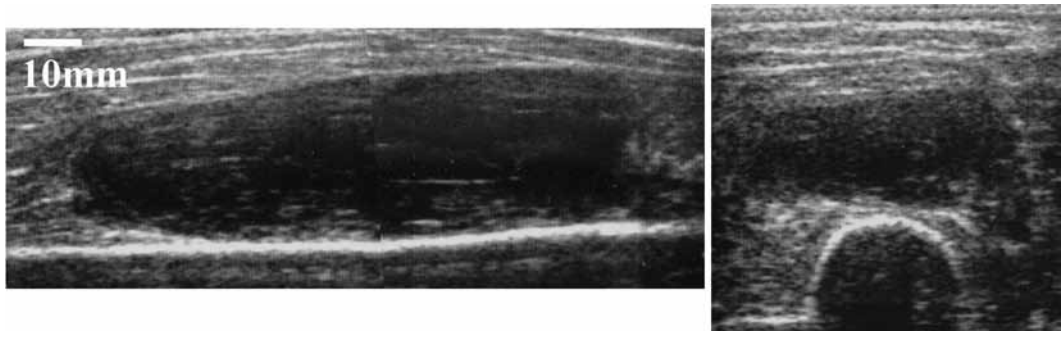

Figure 1: Organized vastus lateralis haematoma adjacent to the femur on the pre-operative ultrasonography (sagital view – left, transversal view – right).

Figure 2: A standard arthroscope and a soft-tissue shaver were introduced into the quadriceps haematoma through the previously marked portals.

narrow tourniquet was inflated at the most proximal part of the thigh. A standard 4.5 mm arthroscope (Olympus OTV–S7, Shirakawa Olympus, Fukushima, Japan) connected to the pump inflow (maximum pressure 50 mmHg) and a 4.5 mm Incisor blade (Smith&Nephew Endoscopy, Andower, MA, USA) with an active suction were introduced into the haematoma through two previously marked 1 cm long incisions on

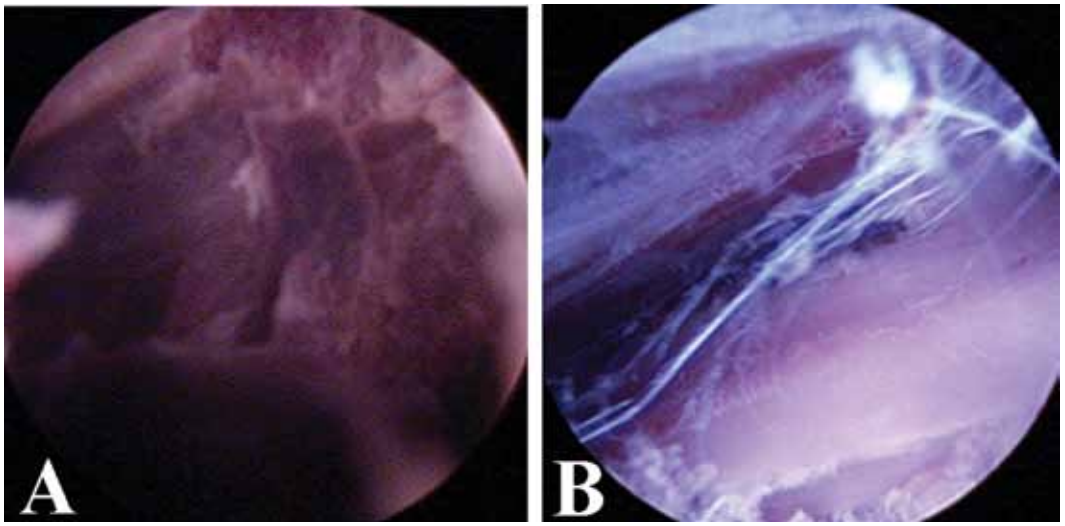

Figure 3: All of the dark red coagula and fibrin septa (A) were removed until the pink-purple structure of muscle (B) was shown.

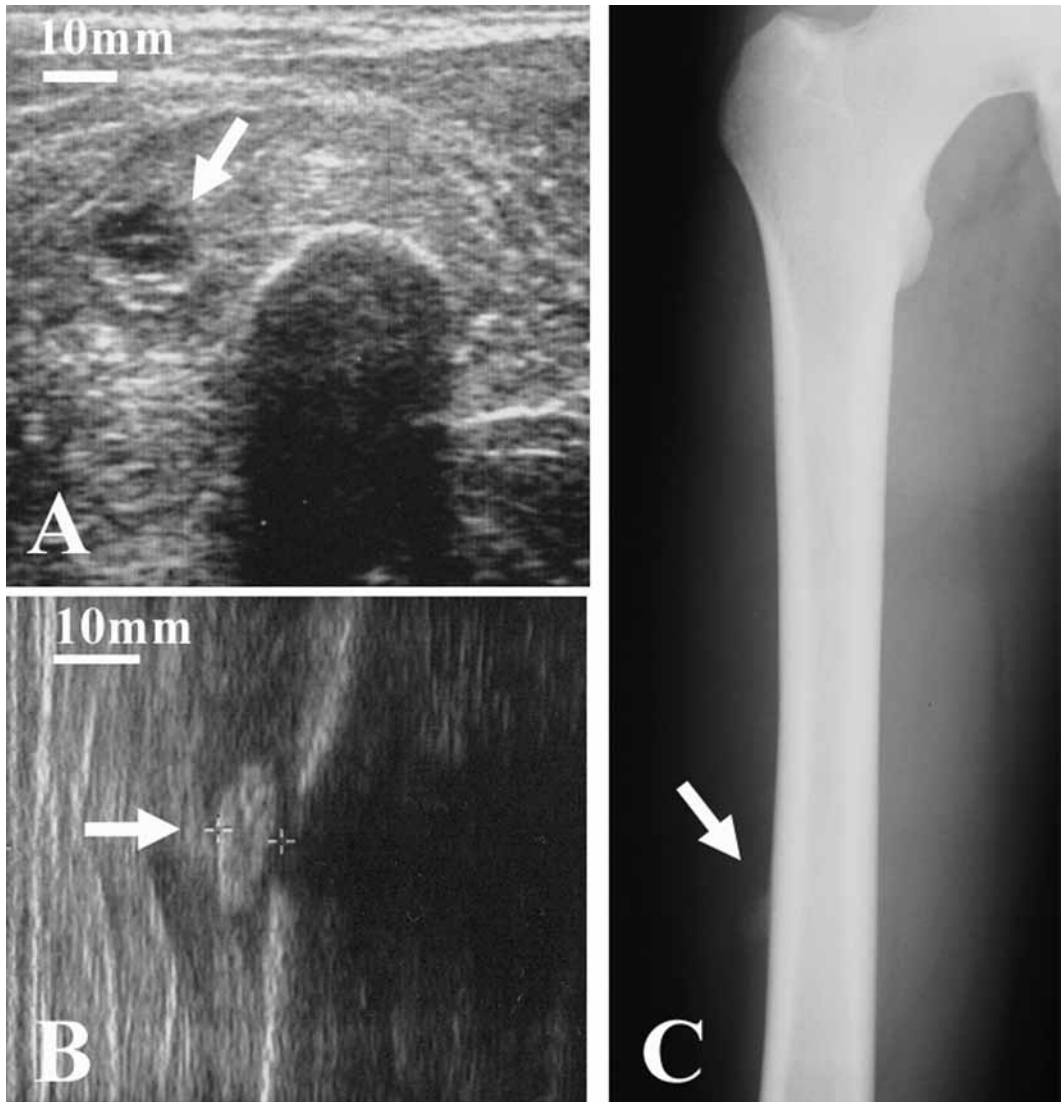

Figure 4: The haematoma residuum (A) later transformed into the asymptomatic myositis ossificans (B, C).

the antero-lateral aspect of the thigh (Figure 2). The haematoma was evacuated by shaving and suction under endoscopic control. All the dark red coagula with fibrotic septa were removed until the normal purple-pink muscular tissue was shown (Figure 3). Two suction drainages were introduced into the haematoma bed upon the instrument removal. The required operation time was 45 min. The mid thigh circumference at the end of the procedure was increased by 3 cm, but it instantly fell to the preoperative level after the tourniquet was released. A light compression elastic bandage was applied from the foot to the inguinal region. The initial intravenous analgesia and local cooling of the operated area were started immediately. The distal suction was removed on the second post-operative day, and the proximal one on the third day. The continuous passive motion and isometric exercises commenced on the first post-operative day. The control ultrasonography after the drainages removal revealed a localized residual fluid collection (1.5 cm in diameter) in the central part of the evacuated haematoma (Figure 4A). Weight-bearing as tolerated on crutches began on the second post-operative day. The patient was discharged four days after surgery with equal thigh circumferences on the injured and the non-injured thigh.

Further post-operative rehabilitation consisted of assisted and active range of motion and strengthening exercises with muscle electro-stimulation added from the second week onwards. At 2 weeks the patient started stationary cycling and water gymnastics. At 6 weeks, when full range of knee motion and leg raising strength with minor pain were regained, he continued with balance, plyomet-

ric, and quadriceps strengthening exercises. Ten weeks after the endoscopic treatment he was allowed to join handball team trainings. A small haematoma residuum that persisted after the operation underwent the process of calcification. It resulted in a small, localized asymptomatic myositis ossificans (Figure 4B).

Discussion

A contusion of quadriceps with muscle fibre disruption and haematoma formation is a common sports injury that is amenable for conservative management.[3,4] The above presented case might have never occurred if needle aspiration of the haematoma was attempted before it had been organized.[6] The natural history of quadriceps post-contusion haematomas depends upon the initial tissue disruption, location, and the individual predisposition.[2,3] In our patient even the small fluid residuum on the site of the endoscopic intervention progressed into an asymptomatic myositis ossificans. Without the evacuation the whole mass of the haematoma would most likely manifest in a large ossification that would severely compromise quadriceps function and postpone the return to play. The endoscopic evacuation offered a minimally invasive approach and better optic control over the tissue. To avoid a thigh compartment syndrome the inflow pressure was set to 50 mmHg.[5] Nevertheless, fluid accumulation in the soft tissues occurred, but it was redistributed after tourniquet was released and later absorbed without any consequences. As this was our first endoscopic haematoma evacuation and as there were no publications found in the literature, we decided to put the patient on a restrictive post-operative programme in spite of a low-invasive procedure. We have learned from this patient's follow-up, however, that a more intensive rehabilitation protocol can be used in the future. To summarize, endoscopic evacuation appears to be a successful minimally invasive surgical intervention for organized post-traumatic quadriceps haematomas that fail previous conservative management.

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