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Case Report / Приказ случаја

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Massive traumatic myositis ossificans

Масивни трауматски осификантни миозитис

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Масивни трауматски осификантни миозитис

SUMMARY

Introduction Traumatic myositis ossificans (TMO) is rare, and can jeopardize athletic careers, especially in cases when a large ossification is formed.

The aim of this paper is to present the results of the large size TOM by application of physical procedures.

Case Outline The TOM of large dimensions was established in 13 year old competitive athletes two months after sustaining a direct blow to the quadriceps. The physical treatment lasted for 3 months. The patient was able to carry out normal daily activities and recreational sports activities without limitation eight months after the initial injury. The imaging over 5 years follow up detected that the ossificans mass decrease in the height and width, but also a discrete increase in the length.

Conclusion Physical therapy resulted in a full functional recovery, regardless of the massive ossification. The height and width of the ossification was reduced but the length of the ossification increased.

Keywords: muscle injures; large ossification; physical therapy

САЖЕТАК

Увод Трауматски осификантни миозитис (ТОМ) је редак, али може угрозити спортску каријеру, посебно ако је великих димензија.

Циљ ове студије је да се представи резултат лечења ТОМ великих димензија применом физикалне терапије.

Приказ болесника ТОМ великих димензија је дијагностикован код 13-годишњег спортисте, два месеца након директног ударца у натколени мишић предње регије. Физикално лечење је трајало три месеца. Пацијент се вратио уобичајеним дневним активностима и рекреативном спорту без ограничења после осам месеци од повређивања. Снимања током петогодишњег периода праћења, показала су да се висина и ширина осификата смањиле, а да се дужина осификата дискретно повећала.

Закључак Примена физикалне терапије омогућила је пун функционални опоравак, упркос масивности осификата. Висина и ширина осификата су смањене, али је дужина повећана.

Кључне речи: повреда мишића; осификатни миозитис; физикална терапија

INTRODUCTION

Traumatic myositis ossificans (TMO) is defined as a nonneoplastic, extra-osseous proliferation of cartilage and bone in an area of muscle that has been exposed to trauma [1, 2]. It is a rare entity that has great clinical relevance, primarily because a malignant differential diagnos [3]. In spite its benign nature, TMO can lead to serious function impairement of the extremity. For athletes it represents a special problem because of prolonged absence from the sports field and compromising the sporting career [4, 5]. „There are no objective criteria in the literature for a return to physical activity following MO“ [6].

In most cases treatment is usually conservative with analgesics and physical therapy [5, 7-10]. If surgical intervention is planned, there is general agreement that early surgery is contraindicated for this condition and that surgery should only be undertaken on mature lesions [4, 11, 12].

In the presented case, massive ossification was identified, which has caused severe functional impairment of the extremities in 13 active young handball players. Conducted a three-month physical therapy, an excellent functional result was achieved. Applied physical therapy is described in detail in regard to the modalities and duration of administration of agents, and could be used for the formation of future common treatment protocol in similar cases such as in the presented case. Imaging follow up for 5 years founded that the length of the ossification was increased,, which has not been published to our knowledge.

CASE REPORT

A thirteen-year-old young athlete was referred to orthopedist, because of pain and swelling in the femur five days after sustaining a direct blow to the quadriceps during a handball match. The examination showed discrete swelling and moderate palpable pain in the middle third of the front femoral region. He had a normal gait cycle, and full knee range of motion with mild to moderate pain after flexion of the knee over 90 degrees. A standard inactivity regime and non-steroidal anti-inflammatory drugs were prescribed.

Two months after the initial injury, the patient visited the doctor walking with crutches and a prominent limp, pronounced functional deterioration, restricted mobility in the knee joint, and pain in the region of the thigh and knee. The patient reported back that he had incurred repeated injuries in the same region during his stay in a sports camp, where he had trained but in a lighter training regime.

Clinical findings showed a limp, with the leg in an antalgic position, and reduction in the knee movement to a greater degree. The range of motion (ROM) in the knee was 10 degrees of flexion contracture, and 20 degrees of maximal flexion of the knee joint (ROM 0-10-20; The first number denotes hyperextension, the second represents any degree of flexion contracture, and the third indicates the degree of flexion of the joint). Pain during knee movement, according to a visual analogue scale (VAS) was 7. There was also hypotrophy of the thigh musculature and diffusely local pain sensitivity on palpation in the middle third of the thigh. A physical examination revealed a firm, massive, immobile mass in the anterior area of the thigh muscle. An anteroposterior radiograph of the femur aroused suspicions of a malignant process (Figure 1). After gaining a second opinion in a higher ranking institution, thus confirming the suspicions, an magnetic resonance imaging (MRI) was done (Figure 2, 3). Based on the MRI findings, malign process was ruled out, and the diagnosis was established – MO as a result of a repeated partial miofascial rupture. In addition to the MRI, an ultrasound was also done. Imaging revealed the greatest diameter of the mass to be 18.5cm x 6cm x 3cm (length x width x thickness). The patient was then referred for to physical therapy.

Figure 1. AP radiograph of the femur obtained two months after the initial injury.

Figure 2. Sagittal MR image obtained two months after the initial injury.

Figure 3. Frontal MR image obtained two months after the initial injury.

The physical treatment lasted for 3 months (Table 1). The goal of the physical therapy was to increase the passive and active movement of the knee joint, to improve function, reduce pain, and improve the trophic of all involved structures and tissue around the osteoma and knee joint. The rehabilitation program was designed in eight successive treatments based on the continuous assessment of the patient to avoid pain and reflexive spasm in the thigh muscle mass as well as to preserve the integrity of the capsular structures at the knee while overcoming capsular restriction with the aim of returning the patient, as soon as possible, to sports and usual daily activity. Imaging follow-up included X-ray, MRI and ultrasound.

Table 1. Treatments and modalities used in physical therapy during the three month rehabilitation.

Therapy / Series	Duration (days)	Physical therapy	ROM at the end of the series	VAS at the end of the series
I	15	▪ Kinesytherapy 45min/day ▪ Interferential current stimulation (1-100 Hz) 20min/day ▪ Hydro/kinesytherapy 30min/day	0/5/45	5/10 on a VAS
II	10	▪ Electrophoresis with Potassium iodide 20min/day ▪ Diadynamic therapy 6min/day ▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40min/day	0/5/60	4-5/10 on a VAS
III	10	▪ Transcutaneous electrical nerve stimulation 20min/day ▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40min/day	0/5/70	4/10 on a VAS
IV	10	▪ Diadynamic therapy 6min/day ▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40min/day	0/5/85	4/10 on a VAS
V	10	▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40min/day ▪ Electrophoresis in Novocain 20min/day ▪ Massage 20min/day	0/0/90	3/10 on a VAS
VI	10	▪ Interferential current stimulation (1-100Hz) 20 min/day ▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40 min/day	0/0/100	3/10 on a VAS
VII	10	▪ Kinesytherapy 45min/day ▪ Transcutaneous electrical nerve stimulation 20 min/day ▪ Diadynamic therapy 6min/day ▪ Massage 20 min/day	0/0/105	2-3/10 on a VAS
VIII	10	▪ Kinesytherapy 45min/day ▪ Hydro/kinesytherapy 30-40 min/day ▪ Heat-superficial 15 min/day	0/0/105	1-2/10 on a VAS

ROM – Range of motion; VAS –Visual Analogue Scale

After completion of the rehabilitational treatment, the patient was able to carry out normal daily activities and recreational sports activities without limitation eight months after the initial injury.

After the one year follow-up, the patient was definitely decided not to accepted the operative treatment. He did not resume an active sports career.

After the five year follow-up, he had no complaints of pain or problems in usual daily activities. He was participating in recreational (volleyball, basketball, swimming, exercises in the gym) activities without difficulties, despite experiencing pain approximately once every two months which was associated with daily and recreational overload and weather changes, but did not impair his overall lifestyle. He had a normal gait cycle, and full knee (130 degrees of knee flexion) and hip range of motion (active and passive). Thigh circumference in the distal, middle and proximal third was reduced by one centimeter compared to the uninjured side.

Imaging follow up of the myositis ossificans, detected changes in the shape, dimensions, and smoothness of the surface of the ossification (Figure 4, 5). Maturation was finised after 8 month and initial regression of osiffication was obvious after 15 month (Figure 5). Final radiographs revealed the

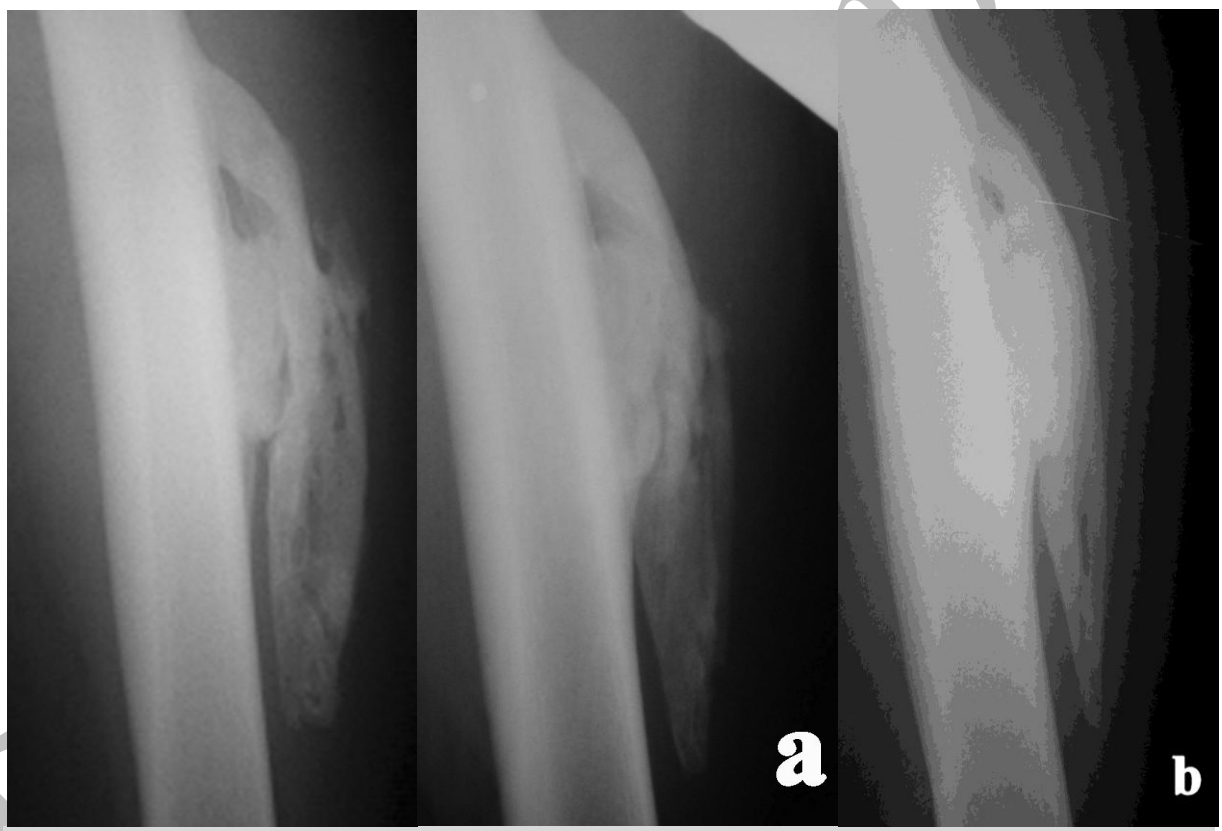

Figure 4. Lateral radiograph four months after the initial injury.

Figure 5. Lateral radiograph eight (a) and fifteen months (b) after the initial injury.

greatest diameter of the mass to be 19.48 cm in length, 2.82 cm in width, and 2.39 cm in thickness (Figure 6). These results represent a decrease in the height and width, but also a discrete increase in the length of the existing mass.

Figure 6. Follow-up radiograph five years after the initial injury.

DISCUSSION

MO is usually posttraumatic and potentialy complicates hematoma formation of the muscles [2, 12]. MO is common in active males, predominantly in healthy, vigorous young men. Any part of the body may be involved, but the anterior thigh is the most common site [4]. The incidences of this process range from 9% to 20% in athletes who have sustained a direct blow from the body part of an opponent, most often the knee [4].

The initial damage is followed by soft tissue swelling, which grows within 1 to 2 months into a solid, painful mass. The form is absolutely benign, and develops over a period of twelve to twenty-four months, with spontaneous maturation and partial regression [2, 4, 5, 12].

Presented case had typical clinical features and disease course. One important characteristic sets it apart. According to its size, it is one of the largest ossification described in the literature [5, 7-13], (Table 2).

Table 2. Comparison of the myositis ossificans (MO) to the dimension and location-the greatest diameter of the mass.

Autors	Location of ossification	Dimension of MO (the largest mass) (length) x (width) x (thickness) (cm)
Orava et al. [11]	Vastus lateralis m.	15 x 3 x 2
Srikanth et al. [7]	Rectus femoris m.	15 x 6
Bagnulo et al. [8]	Vastus lateralis m.	13.6 x 3.7 x 1.2
Yochum al. [9]	Vastus intermedius m.	18.33 x 4.04
Torrance et al. [10]	Vastus lateralis m.	12 x 8
Drobnič et al. [12]	Vastus lateralis m.	12 x 5
Sodl et al. [5]	Bilateral - vastus lateralis m.	13.3 x 2.3 x 3.5 left; 12.2 x 2.2 right
Carmichael et al. [13]	Hamstring m.	19 x 3
Presented case	Rectus femoris m. Vastus intermedius m.	19.48 x 2.82 x 2.39

Data about therapy are unproven with relevant research. It may be difficult to gain a consensus on optimal management of myositis ossificans. „Tretment is not required in the vast majority of cases of heterotopic osssification“ [14]. Various non-operative treatments were reported [5, 8-11]. Apart from the large palpable mass, physical therapy and indomethacin showed good results [5]. The administration of physiotherapy alone was unsuccessful and only when treatment with shock waves was added did the management of MO become efficient [2]. On the other side, extremely effective potential for the therapeutic program of acetic acid iontophoresis and ultrasound in eliminating MO was reflected in the rapid recovery (after three weeks of treatment and 6 weeks after injuries) and a

98.9% decrease in the size of the ossified mass [15]. Similarly, all patients showed signs of functional improvement immediately after shock wave therapy. Two months after the therapy, a normal range of motion and no signs of weakness were observed. Three months after treatment, 87.5% of patients resumed regular sports activities [2]. This versatility makes it clear that the gold standard has not been established.

The data from the literature are often not comparable. However, surgery is indicated in those athletes who develop a large mass of mature lamellar bone which is painful and is associated with muscle weakness and a significant loss of joint motion [4, 11,12]. In presented case, patient decided not to accept surgical intervention. Recreational sports activities was achiewed eight months after the initial injury. An extremely large ossification and devastating clinical picture at the start of therapy application, are the main reasons for the length of the recovery in the presented case.

In most cases there is a slight change in the dimensions of the lesion, as well as partial resorption and stabilization of the ossification after conservative management, but again like in our case report, a full functional recovery was achieved, regardless of the ossification size [2]. The dimensons of the ossification in our case study were measured with different types of equipment (MRI, X-ray, ultrasonud) and therefore the change in the size of the ossification during the five-year monitoring period should be taken with caution. Nevertheless, it can be concluded that the height and width of the ossification was reduced. Increasing the length of the ossification, if not the result of measurement errors, can be the result of repeated micro-injuries, which require new precise research.

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