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Case Report
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Spontaneous compartment syndrome in a patient receiving oral anticoagulation therapy

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ABSTRACT

Compartment syndrome (CS) is an emergency condition caused by muscle necrosis that can lead to locomotor dysfunctions. Intra-fascial bleeding of a limb due to direct trauma, reduction of fractures, or tight casting or bandages may cause acute CS. Although acute CS has many causes, few cases of spontaneous CS have been reported in the literature without any clear reasons. We present a case of a 53-year-old male who had a spontaneous CS in his right forearm. There was no any evidence of acute major or minor repetitive trauma. He had a history of taking multiple anticoagulants due to previous femoral artery repair and still uses anticoagulants. After evaluation, we performed fasciotomy and removed an organized haematoma between the deep and superficial flexor tendons. The patient has recovered completely without any relapse at the 2-year follow-up. Detailed information should be given to patients who are taking anticoagulants about acute CS.

Key words: *Spontaneous compartment syndrome, anticoagulants, fasciotomy*

Introduction

Compartment syndrome is an increase of pressure due to various reasons in a closed osteofascial or fascial area [1,2]. As a result of the increase in pressure, tissues such as muscles, veins and nerves in the affected area can be irreversibly damaged [3]. Therefore, it is essential to diagnose this condition in a timely manner and to administer appropriate therapy as quickly as possible [4]. In this article, we present a case of compartment syndrome that spontaneously developed due to the use of anticoagulation medication, a rare condition in the literature, which was diagnosed and treated in our clinic.

Case Report

A 53-year-old male patient was admitted to the emergency service due to pain, swelling and stiffness in his right forearm. He described pain in the right forearm that started 2 days prior after he cut down a tree with a chainsaw. The patient specified that the sensation of pain and discomfort in the forearm increased over time and became unbearable about 30 minutes

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before he arrived at the hospital. It was then discovered that three years ago, the patient underwent arterial repair with a vein graft due to a perforating injury of the right femoral artery with a piece of wood as a result of an accident at work. The patient, who started taking anticoagulants after his discharge following the surgical intervention, was continuing his regular check-ups and continuously receiving oral anticoagulants at the recommendation of his physician. The drugs he was using were Pletal (Cilostazol) 100 mg 2x1, Coumadin (warfarin) 5 mg 2x1, Beloc (metoprolol) 50 mg 2x1 and Clexane (enoxaparin) 6000 IU 2x1. According to the patient's statement, no change had been made to the drug doses after his most recent check-ups and he had had no acute or minor recurrent trauma recently. The patient had left his previous job after the injury of the femoral artery and since retired.

The orthopedic examination of the patient revealed general swelling and stiffness on the volar surface of the right forearm, along with local tenderness in the same area. There was difficulty in an active extension movement of the fingers and pain was arising in the forearm with passive stretching. Peripheral pulses were palpable in both upper limbs. The neurological examination of the patient revealed hypoesthesia on all affected fingers and the palm of the right hand. A superficial ultrasonography (USG) examination was ordered, given that a hematoma may have developed due to the use of multiple anticoagulants that caused the current clinical situation. The superficial USG showed a hematoma, 5x6.5 cm in size, in the deep flexor compartment. Apart from Plt of $460x10^3$/ml, PT of 27.8 sec, INR of 2.76, a PTT of 39.9 sec, other laboratory values were within the normal limits for the patient's blood tests studied; the blood pressure was 135/85 mmHg, the pulse rate was 76/min, and the saturation was 98% in the room air. Since the complaints were not acute and the pain had been increasing for over an hour, the patient was hospitalized and monitored, while at the same time, preparations were started for surgery. The pain and hypoesthesia in the forearm radiating to the fingers were observed to have increased in the subsequent one-hour follow-up and it was decided to operate upon the patient and to perform a fasciotomy. The surgical procedure was initiated under general anesthesia. Beginning from the carpal tunnel level of the right wrist, an incision line was curved towards the ulnar line at the distal transverse fold of the wrist and towards the radial side in the middle of the forearm and was extended to the five-cm proximal of the elbow joint, passing through the anterior of the medial epicondyle of the humerus (Figures 1, 2).

The carpal tunnel was opened and the median nerve was decompressed by releasing the transverse carpal ligament. First, the superficial and then, the deep flexor muscle group compartments were reached, and an organized hematoma of 5x6.5 cm was detected among the deep flexor muscles (Figure 3).

After the hematoma was cleaned and irrigated, the superficial, deep and mobile wad muscles were fasciotomized. The lacertus fibrosus was released, and a fasciotomy was not performed since there was no stiffness found in the dorsal muscles. The tourniquet was opened and it was observed that there was no arterial or venous active hemorrhage. A minivac drain was inserted and the skin incision was closed up using a loose intermittent continuous suture technique so as not to cause tension. It was observed that the patient's pain and hypoesthesia complaints significantly decreased in the early post-surgical period, the range of motion of the wrist and fingers passively increased, and the pain was reduced with passive stretching. Elevation was applied to the right forearm and a close neurovascular monitoring was carried out. On the third postoperative day, the edema was found to have reduced significantly so the sutures were tightened and the wound lips were approximated. The wound was completely closed up by the seventh day. Since the complaints of the patient were completed addressed and the patient was discharged with instructions to return for a dressing fol-

Figure 1. Intraoperative photo of fasciotomy incision.

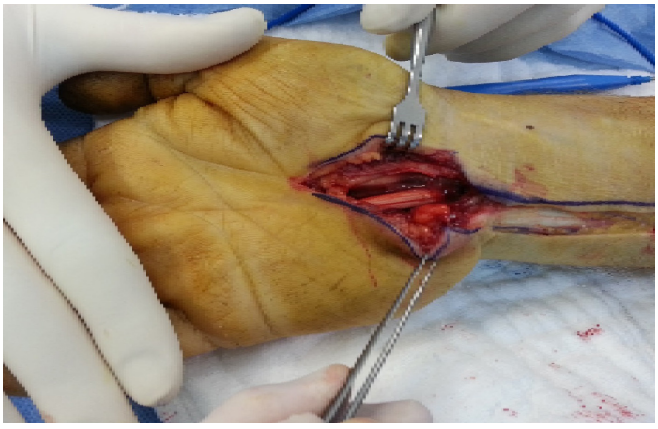

Figure 2. Intraoperative photo of median nerve exploration.

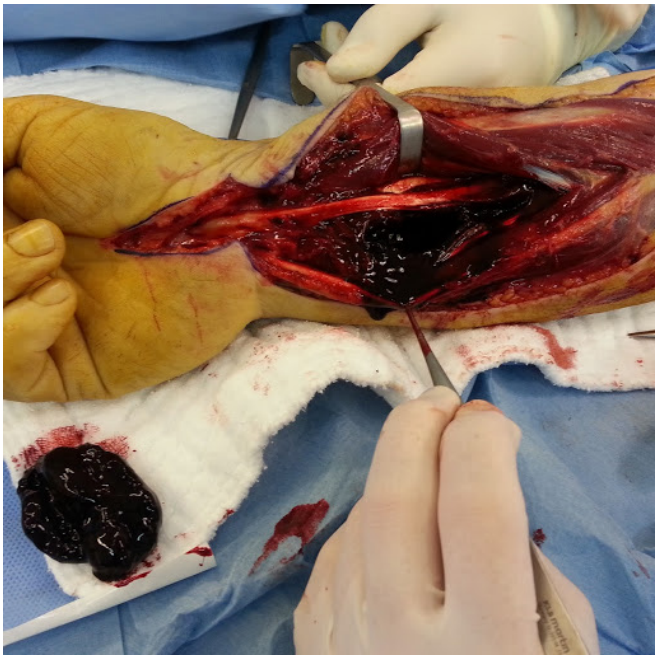

Figure 3. Intraoperative photo of haematoma between flexor tendons.

Figure 4. Postoperative second-year photo of the patient with full flexion of all fingers.

Figure 5. Postoperative second year photo of patient with full extension of all fingers.

low-up. The sutures of the patient were removed in the second postoperative week. During the second year check-up of the patient, who had postoperative six-months and one-year check-ups, the range of motion was found to be full, painless in the right elbow, wrist and all fingers, and the muscle strength and neurological examination was found to be equal when compared with the left side (Figures 4, 5).

Discussion

An acute compartment syndrome is a recoverable event without likely recurrence if it is diagnosed in a timely manner and treated urgently [1]. In the event of a missed or delayed diagnosis, it may rapidly progress and may cause necrosis and functional loss in the intracompartmental tissues [5]. Even though there are several causes in the etiology, acute compartment syndromes spontaneously developing without trauma are rare. There can be a rare cause of spontaneous compartment syndrome tied to the use of anticoagulants [6-8].

Patients usually present with pain and swelling in the affected limb, and rarely with the concomitant complaint of numbness. A detailed anamnesis should be collected from patients admitting to the emergency service

or polyclinic with any complaints of swelling and pain in a limb [1]. During the physical examination, swelling and pain accompanied by hematoma, ecchymosis, increased pain in the passive finger extension and the classical 6P findings of the circulation failure (pain, paresthesia, pallor, perishing cold and pulselessness) should be carefully observed and investigated [2,4].

Patients presenting with such an event should absolutely be hospitalized, kept under observation, and be closely monitored. In particular, it should be kept in mind that even if the situation seems to be benign in patients using anticoagulants, a crisis may progress rapidly, surgical intervention may be required, and the patient should be informed about this possibility [9]. Keeping in mind that compartment syndrome may occur in patients with bleeding disorders with an acute progress and due to repetitive movements on a chronic basis, even if there is no major trauma will help at the diagnosis stage [10,11].

Although the main task of imaging in the case of compartment syndrome is to exclude other pathologies, an increase in tissue size, edema and disordered fibrous appearance in the muscle along with fluid intensity in the fascial planes may be visualized using magnetic resonance imaging (MRI) [12]. In patients considered to have an intracompartmental hematoma, superficial USG may aid in the diagnosis. The measurement of the limp pressure using a manometer along with USG can assist in confirming the diagnosis and initiating immediate treatment. If the compartmental pressure is higher than 30mmHg in the measurement with a manometer, that is an indication for fasciotomy; however, pressure measurements are not always reliable [4,13,14]. Nevertheless, electroneuromyography (ENMG) can be performed in patients with neurological complaints in the forefront to support the diagnosis and to document possible nerve damage [15].

In summation, a detailed physical examination and blood tests, especially including coagulation tests, and imaging methods following anamnesis may be indicative in patients using anticoagulants who are suspected of having compartment syndrome. In addition, the measurement of the compartmental pressure with a manometer will be helpful in supporting this diagnosis. In cases where the complaints and clinical condition progress, fasciotomy should be conducted immediately.

In conclusion, acute compartment syndrome is a serious medical condition that may lead to various disabilities, psychosocial and medicolegal problems. In particular, a spontaneously developing acute compartment syndrome can be easily missed under emergency or overcrowded polyclinic conditions because of a lack of attention. Therefore, patients presenting with the complaints of edema and pain in a limb without trauma or because of minor trauma should be meticulously examined and approached skeptically considering the possibility of acute compartment syndrome.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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