



An Atypical Complex Regional Pain Syndrome Type 1 Following Diphtheria-Tetanus Vaccination

Ergenekon Karagoz¹, Emre Ata², Murat Kosem², Emre Ersoz², Selim Akarsu², Vedat Turhan¹

¹ Department of Infectious Diseases and Clinical Microbiology (IDCM), ² Department of Physical Therapy and Rehabilitation, GATA Haydarpasa Training Hospital, , Istanbul, Turkey.

Abstract

A 20-year-old male patient was admitted to Infectious diseases outpatient clinic with 25 days' history of pain and swelling of the left hand and forearm. He had received a single dose of diphtheria tetanus-diphtheria toxoid vaccine (Td; vaccines with reduced content of diphtheria toxoid) in the left deltoid muscle. The patient was diagnosed as Complex regional pain syndrome type 1. He was administered gabapentin (initial dose 1200 mg per day in two divided doses and maintenance dose 1800 mg per day, in three divided doses), etodolac 600 mg per day, acetylcystein 1200 mg per day, 3000 mg calcium carbonate with 8.8 mg colecalciferol at bed time and left upper extremity physiotherapy, including whirlpool, contrast bath and range of movement exercises. As a result, although complex regional pain syndrome type 1 (CRPS I) is a rare entity, it should be recognized in patients with severe pain, swelling and restricted extremity movement that occurred after immunization.

Keywords: Complex regional pain syndrome, tetanus-diphtheria toxoid vaccine, immunization

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Corresponding Author: Ergenekon Karagöz, GATA Haydarpasa Training Hospital, Department of Infectious Diseases and Clinical Microbiology (IDCM), Istanbul, Turkey
E-mail: ergenekonkaragoz@hotmail.com

Introduction

Complex regional pain syndrome type 1 (CRPS I) is a complex disorder of extremities characterized by pain, swelling, limited range of motion, increased sensitivity (allodynia), vasomotor-sudomotor instability and dystrophic changes in the skin[1,2]. CRPS may develop following fractures, infections, soft tissue contusion, surgery, myocardial infarction (also known as postinfarct sclerodactili), lesions of central and peripheral nervous system, electric and thermal burns. The diagnosis is based on clinical parameters, as there is no pathognomonic laboratory test for CRPS I. The pathogenesis of CRPS I is unclear. Multidisciplinary treatment combining TENS, physical therapy, psychotherapy and oral medications is effective in most patients.

There are several case reports of CRPS I following immunization with different vaccines [3-5]. However, there are only a few reports related with tetanus-diphtheria toxoid (Td) vaccination in medical literature [3]. We present a case of atypical CRPS I affecting the left shoulder and elbow joint after Td vaccination in the left deltoid muscle. The left forearm, the wrist, the metacarpophalangeal and the proximal-distal interphalangeal joints were affected less than the same side shoulder and elbow joints.

Case Report

A 20-year-old male patient was admitted to Infectious diseases outpatient clinic with 25 days' history of pain and swelling of the left hand and forearm. He had received a single dose of diphtheria tetanus-diphtheria toxoid vaccine (Td; vaccines with reduced content of diphtheria toxoid) in the left deltoid muscle on August 17, 2014 after joining the army as a soldier. He had a small localized reaction at the injection site; however 2 days after vaccine injection, he developed pain in the left arm and difficulty with movement. Symptoms were progressed and were associated with weakness and inability to use the affected extremity. His past history did not disclose any previous trauma of the shoulder or systemic disease. All other immunizations had been well tolerated and he reported no allergy. He was a smoker, did not drink alcohol, and had no prior psychiatric history.

At first he had visited a neurologist. He had a normal neurological exam and simple analgesia was prescribed. EMG had also been performed to exclude the brachial plexus pathologies but

found to be normal. The symptoms did not resolve with this therapy. Due to his ongoing complaints, he visited our infectious diseases outpatient clinic in his twenty fifth day of vaccination. The patient was evaluated with physical therapy and rehabilitation specialists.



Figure 1: Increased left arm circumference with edema

On physical examination, his left arm was edematous, warm and had limited range of motion of the left shoulder. The arm circumference, measured fifteen centimeters proximal from the olecranon, was two centimeters increased at the affected side than the contralateral side (Fig 1). Regional pain was graded as 10/10 points on the pain visual assessment scale. Tenderness was maximal at the left shoulder and elbow joint and minimal at the wrist. Sensation of the arm to light touch was increased and there was hyperalgesia. His left shoulder was dropped because of pain (Fig.2).



Figure 2: Dropped left shoulder of the patient because of pain

The remainder of the physical examination including the same side digits and also other upper and lower limbs were normal. All the following studies were normal, including C reactive protein, hemoglobin, white blood cell count, biochemistry parameters, 25-hydroxy vitamin D level, x-rays of the left shoulder, arm and hand, except erythrocyte sedimentation rate (ESR). ESR was 20 mm/h. Nerve conduction velocity showed no pathologic changes. Magnetic resonance imaging showed muscular strain of the left deltoid muscle. Three phase bone scintigraphy showed no increased uptake in the left upper extremity.

The patient was diagnosed as Complex regional pain syndrome type 1. He was administered gabapentin (initial dose 1200 mg per day in two divided doses and maintenance dose 1800 mg per day, in three divided doses), etodolac 600 mg per day, acetylcystein 1200 mg per day, 3000 mg calcium carbonate with 8.8 mg colecalciferol at bed time and left upper extremity physiotherapy, including whirlpool, contrast bath and range of movement exercises. The patient was also evaluated by a psychiatrist and pharmacotherapy was recommended because of the emotional distress. Sertraline 50 mg per was added to his medical treatment. After the 1-week hospital stay, patient's pain did not respond to non-steroidal anti-inflammatory and gabapentin therapy so 75 mg of tramadol was added as well as 14 mg betamethasone

intramuscular injection in two divided doses per day. After 3-week of therapy, partial improvement in his condition was observed and his complaints were reduced.

Discussion

Two forms of complex regional pain syndrome have been defined: type 1, previously called reflex sympathetic dystrophy (RSD) and type 2, previously called causalgia. The term CRPS, provides a descriptive terminology based on clinical findings, location and specifics of the injury, without implying mechanism or cause. CRPS I is a disorder with no unified definition because of the incomplete understanding of the pathophysiologic mechanisms [6]. The diagnosis of CRPS I is based exclusively on clinical parameters as there is no typical laboratory parameter characteristic of CRPS I [7,8]. Some radiological workup can also help

[6-8]. An important feature of CRPS I is that the severity of symptoms is disproportionate to the severity of trauma. According to the published criteria for the diagnosis of CRPS I, it seems likely that the syndrome was precipitated by tetanus-diphtheria (Td) vaccination in our patient. Additionally, the quality of the pain and objective findings on physical examination were consistent with the diagnosis of CRPS I.

CRPS I may be precipitated by a number of factors including trauma, infection, surgery, soft tissue contusions, fractures, tendon ruptures and burns. Cases of CRPS I following vaccines such as rubella, influenza A (H1N1), hepatitis B and diphtheria-tetanus toxoid were also reported in medical literature. Present case is the report of CRPS I after Td vaccination, in which the seriously affected part of the body is shoulder and elbow joints and the other joints of the same side limb are poorly affected. Tetanus toxoid consists of a formaldehyde-treated toxin. The toxoid is standardized for potency in animal tests according to Food and Drug Administration (FDA). Tetanus toxoid is available as a single-antigen preparation, combined with diphtheria toxoid as pediatric diphtheria-tetanus toxoid (DT) or adult tetanus-diphtheria (Td). Local adverse reactions (e.g. erythema, induration, pain at the injection site) are common but are usually self-limited and require no therapy. A few cases of peripheral neuropathy and Guillain-Barre Syndrome (GBS) have been reported following tetanus toxoid administration. The Institute of Medicine has concluded that the available evidence favors a causal relationship between tetanus toxoid and both brachial neuritis and GBS, although these reactions are very rare.

As a result, although complex regional pain syndrome type 1 (CRPS I) is a rare entity, it should be recognized in patients with severe pain, swelling and restricted extremity movement that occurred after immunization. It is vital to initiate early treatment and physiotherapy to avoid trophic extremity alterations and to preserve limb functions either in the pediatric population or in adults. Multidisciplinary approach is required to optimize clinical outcomes and minimize complications of this syndrome.

Informed Consent:

Written informed consent was obtained from patient who participated in this case.

Conflict of interests :

We have no competing interests to declare.

Financial Disclosure:

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References

1. Muñoz-Gomez J, Collado A, Gratacós J, Campistol JM, Lomeña F, Llena J, Andreu. Reflex sympathetic dystrophy syndrome of the lower limbs in renal transplant patients treated with cyclosporin A. *Arthritis Rheum.* 1991;34(5):625-30.
2. Stanton-Hicks M, Jänig W, Hassenbusch S, Haddox JD, Boas R, Wilson P. *Pain.* 1995;63(1):127-33.
3. Durmuş O, Dandinoglu T, Cakar E, Dincer U, Tekin L, Kiralp MZ. Can Tetanus Vaccination Cause Complex Regional Pain Syndrome? *Turk J Phys Med Rehab.* 2013;16:22-4
4. Kwun BS, Park JW, Lee HJ, Kim AS, Ryu GH. Complex regional pain syndrome by vaccination: a case of complex regional pain syndrome after vaccination of influenza A(H1N1). *Pediatr Int.* 2012;54(3):4-6.
5. Jastaniah WA, Dobson S, Lugsdin JG, Petty RE. Complex regional pain syndrome after hepatitis B vaccine. *J Pediatr.* 2003;143(6):802-4.
6. Pontell D. A clinical approach to complex regional pain syndrome. *Clin Podiatr Med Surg.* 2008;25(3):361-80.
7. Wasner G, Schattschneider J, Binder A, Baron R. Complex regional pain syndrome--diagnostic, mechanisms, CNS involvement and therapy. *Spinal Cord.* 2003;41(2):61-75.
8. Albazaz R1, Wong YT, Homer-Vanniasinkam S. Complex regional pain syndrome: a review. *Ann Vasc Surg.* 2008;22(2):297-306.