

Localized Tetanus in an Adult Patient: Case Report

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What to Learn from this Article?

This case report signifies the existence of a rare form of an infectious disease, i.e., localized tetanus and emphasizes the importance of early recognition and prompt management to prevent life-threatening complications.

Abstract

Introduction: Tetanus is a severe and potentially fatal infection caused by the bacterium *Clostridium tetani*. Of all the cases described in literature, generalized tetanus is by far the most common presentation, but it may also present as neonatal tetanus, cephalic tetanus, and localized tetanus, the latter two being much rarer. In this case report, we present the rare form of this disease, i.e., localized tetanus in an adult male with a history of minimal trauma as well as a late, unusual mode of presentation.

Case Report: A 35-year-old Caucasian male presented with an acutely painful, swollen right thumb associated with a small superficial collection on the dorsal aspect of the base of the thumb. A formal wound exploration and washout were carried out in theater, however, at the time of tourniquet inflation, the right hand went into a carpopedal spasm and remained in that position until an infusion of a muscle relaxant was given. The findings were consistent with a case of localized tetanus. The patient was treated with human immunoglobulin and tetanus toxoid and safely discharged home 48 h later without any complications.

Conclusion: This case report emphasizes the importance of the recognition of a rare form of this fatal infectious disease, which may present with prodromal symptoms before the generalized form shows its clinical effects. Moreover, the astute clinician should be aware of the variable presentations of this infectious disease, with early identification greatly reducing the associated risks of morbidity and mortality.

Keywords: Localized tetanus, carpopedal spasm, wound exploration.

Introduction

Tetanus is a serious and a life-threatening infectious disease with a grave outcome if not detected and treated at an early stage. An infection found more frequently in Tropical climates; it accounted for 58,900 deaths worldwide in 2013 [1]. In the UK,

however, tetanus is rare, with only six reported cases in England and Wales in 2013 [2].

Majority of the cases described in clinical practice involve the classical generalized form of the disease with disabling and fatal sequel, mandating ventilator support. However, the atypical forms of this entity, i.e., neonatal,

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cephalic, and even rarer subtype; localized tetanus is seldom reported. The unfamiliarity surrounding this subtype of tetanus further strengthens the necessity of reporting this case which highlights the unusual manner of clinical presentation as in our case which would have otherwise gone unnoticed, had the patient not have had the wound explored following the admission.

Case Report

A 35-year-old right-handed male presented to the emergency department at our hospital with a 24 history of a painful swollen right thumb with surrounding cellulitis. The patient worked at a metal fabrication factory, dealing with cutting, and welding of various metals from international suppliers. Other than a lumbar decompression a few years ago, he had no previous medical history of note. As a child, the patient had received a full immunization program but had no further boosters. There was no history of acute trauma, and he was systemically well. He was sent home with oral flucloxacillin and advised to return if symptoms worsened.

A few hours later, he developed a high temperature with chills and returned to the emergency department where he was referred to the on-call orthopedic team. On further questioning, the episode had started with pain and swelling in the distal phalanx of the thumb the previous day. While at dinner, he experienced an episode lasting 30-60 s, when his thumb had become rigid, and he was unable to use cutlery, but this resolved spontaneously.

On examination, his right thumb and thenar eminence were grossly swollen, erythematous, and exquisitely tender to palpation. He held the thumb in flexion, with the interphalangeal and metacarpophalangeal joint movements very limited and painful. There was a small superficial collection dorsally on the radial aspect of the proximal phalanx base. Ascending lymphangitis was present extending into the axilla but without palpable lymph nodes. Furthermore, noted was a small, nearly completely healed puncture wound at the fingertip. He recalled that 2 weeks ago, he had been injured with a metal splinter that he was able to extract it using a needle; however, the wound became infected. It discharged pus for a few days, and then seemingly resolved of its own accord, so he did not seek help.

The patient was then admitted for intravenous antibiotics and strict elevation. Blood tests showed mild neutrophilia (8.8) and elevated C-reactive protein (114). Calcium, magnesium, liver function, and thyroid function tests were all within range. All investigations carried out on admission are summarized in Table 1.

The patient was taken to theater the next morning for a formal wound exploration and washout. At the time of tourniquet inflation, his right hand went into a carpopedal spasm, with full flexion of the metacarpophalangeal

joints and wrist joint of the right hand with extension of the interphalangeal joints. His hand would remain in this position until an infusion of a muscle relaxant was given to allow surgery to proceed. At surgery, there was only a superficial collection with no tendon sheath involvement.

The unusual intra-operative events were discussed with a consultant microbiologist, who agreed that the signs would be consistent with a case of localized tetanus. Metronidazole was added to the antibiotic regimen, and a single infusion of human immunoglobulin (10,000 units) was given, as no tetanus immunoglobulin was available within the trust.

A single dose of tetanus toxoid was also given as a booster, and the patient was then sent home after 48 h of monitoring. Wound swab taken intraoperatively did not grow any organisms.

Discussion

Clostridium tetani is an anaerobic bacterium found commonly in soil in spore form or in the gastrointestinal tracts of mammals and produce a potent neurotoxin, tetanospasmin. Incubation period ranges from 3 to 21 days, with most average incubation period being 10 days. Tetanospasmin causes violent spastic paralysis by blocking the release of γ -aminobutyric acid, an inhibitory neurotransmitter acting on motor neurones.

Generalized tetanus is far more common than the localized form, which involves painful spasms of the muscle adjacent to the wound site, and this eventually leads to the former variety. Cephalic tetanus is a rarer subtype of localized tetanus, which presents as dysphagia, trismus, retracted eyelids, deviated gaze, and risus sardonicus; all primarily involving bulbar musculature [3]. Localized tetanus involving other groups of muscles is even rarer with limited evidence of similar cases in published literature, often masquerading as alternative pathologies [4].

In 2001, a retrospective analysis by Kakou *et al.* examined similar cases over 22 exams, 38% of the cases contracted the infection through limb wounds and only 2% cases through abdominal wounds. Furthermore, 37 patients (82%) were cured with 5 cases (11%) having sequelae, and a total of 7 deaths were observed (16%). All patients included in this series lacked adequate immunoprophylaxis, and the major risk factor was a secondary generalization of tetanus [5].

There is no doubt that national immunization programs have indeed abolished almost all cases of tetanus in developed countries. However, there are still a small number of cases, which present with ambiguous or non-specific symptoms such as dysphagia, neck stiffness, and other oropharyngeal symptoms portraying a prodromal state of the illness, which could eventually lead to full-blown generalized tetanus. Once developed or allowed to progress, it ultimately leads to respiratory or autonomic dysfunction necessitating long-term intensive care or even death in more severe cases [6].

Another diagnostic challenge lies in the distinction between localized and other forms of this disease. The former involves muscle spasms limited to specific body areas with generally good outcomes, but rare cases go on to involving vital structures such as the cranial nerves leading to cephalic tetanus and increasing the risk of developing generalized tetanus with high mortality rates [7].

Moreover, there have been reports of similar cases in the past whereby partially or completely immunized individuals have been misdiagnosed

Table 1: Investigations

Blood test	Result	Normal values
White cell count	11.1	4-11 $\times 10^9$ /L
Neutrophils	8.8	1.9-7.5 $\times 10^9$ /L
C reactive protein	114	0-10 mg/L
Calcium	2.45	2.2-2.6 mmol/L
Phosphate	0.89	0.8-1.5 mmol/L
Magnesium	0.77	0.7-1.1 mmol/L
Thyroid stimulating hormone	1.2	0.3-4.2 μ /L

as suffering from illnesses other than tetanus and physicians have taken their immunization status for granted [8]. This highlights an important aspect of diagnosing this rare infection, considering some cases may even present without an acute wound as evident in our case and in another case series [9].

Treatment of tetanus involves wound debridement, antibiotics to decrease bacterial load, and supportive care. Some studies have shown metronidazole to be more efficacious when compared to penicillin, as penicillin is thought to enhance inhibitory effects on neuromuscular junctions aggravating the disease further [10].

The second step and the most vital aspect of managing this disease is the administration of tetanus immunoglobulin, which greatly reduces the mortality from generalized tetanus. It is generally recommended that tetanus accelerated immunization course should include immunization when the patient presents or is at high risk, at discharge, and 4 weeks later to confer concrete immunity and greatly reduce further risks.

Conclusion

Localized tetanus is indeed a rare form of tetanus, which may present with variable symptoms before a full-blown generalized state occurs.

The inconstant presentation of this infectious disease still exists in the developed countries and can equally occur in previously immunized individuals. Early diagnosis and management greatly reduce the risk of respiratory arrest and ultimately death. Furthermore, this case report also signifies the fact that all open wounds including minor puncture wounds should be routinely screened for tetanus and early prophylaxis should be given if required. Finally, while taking a history, particular attention needs to be paid to points such as handling of goods from international suppliers as they could be a potential source of many infectious organisms.

Clinical Message

This case demonstrates the importance of keeping an open mind when treating patients in our increasingly globalized world. Taking a thorough history including occupation, recent travel, and contact with non-indigenous people or materials will yield valuable clues when making a diagnosis, where signs or symptoms are unexpected.

It would also be prudent to consider educating people who work with many international suppliers about the dangers of imported pathogens and the importance of keeping up to date with vaccinations.

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