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TETANUS INFECTION IN AN HIV-POSITIVE PATIENT WITH A HISTORY OF PRIOR TETANUS VACCINATIONS: CASE REPORT

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SUMMARY

An HIV-positive woman (previously vaccinated against tetanus) presented with tetanus infection after uvulectomy and manual vacuum aspiration (MVA).The course of her disease and treatment exposed critical issues in the proper prophylaxis and management of tetanus, particularly in a limited-resource setting with a high prevalence of both HIV and tetanus infections.

INTRODUCTION

Uvulectomy is performed in several African and Middle Eastern countries (1,2). Although controversial, it is often undertaken to avert neonatal death from "swelling of the uvula" or to treat/prevent pharyngitis. Complications of this procedure include haemorrhage, future palate abnormalities, and infections, especially tetanus (1,2). Since HIV infection can decrease the immune response to tetanus vaccine (3,4,5,6,7), this case highlights the importance of considering tetanus infection in HIV-positive patients presenting with risk factors and symptoms suspicious for the disease, despite prior tetanus immuniSation.

CASE REPORT

A 24 year old HIV-positive woman presented for re-admission to Sagam Community Hospital(SCH) with a one-week history of pain with swallowing, four days of general weakness, and severe burning pain on the plantar surfaces of her feet bilaterally. She reported no history of fever, vomiting, diarrhoea, or abdominal pain. She did note recent weight loss and increased spitting, which she attributed to her poor appetite and difficulty swallowing.

The patient described that her health began to decline about six weeks prior. At that time, she had a sore throat and sought medical treatment from an outside health facility. She underwent an outpatient uvulectomy and received a dose of tetanus toxoid vaccine. No antibiotics were given. She was also diagnosed with HIV infection (a CD4 count was not available)and started on co-trimoxazole for prophylaxis against Pneumocystis jirovecii (PCP) pneumonia. Following the procedure, the patient developed oropharyngeal pain and was admitted to SCH with a diagnosis of post-operative palatal infection. She was 13 weeks pregnant with her third child.

During that ten-day admission, she improved after administration of IV fluids, pain control, IV antibiotics (penicillin and gentamicin for two days, followed by ceftriaxone for five days and metronidazole for seven days), and fluconazole (continued for 14 days total). Anti-retroviral (ARV) therapy of tenofovir/lamivudine/efavirenz was started and co-trimoxazole was continued. Five days after discharge, the patient experienced an incomplete spontaneous abortion and had an uncomplicated MVA at a different outside medical clinic. She recovered well and was asymptomatic until one week before her re-admission.

Upon presentation for her second admission to SCH, the patient's vital signs were as follows:

Temp= 37.6degrees Celsius HR= 130 beats/minute
RR= 32 breaths/minute
BP= 110/50 mm HgSpO2= 97%Wt= 43 kg (was 51 kg 3.5 weeks prior)

On physical examination, she appeared thin and uncomfortable. Conjunctival pallor was present without scleral icterus. She had limited ability to open her mouth secondary to pain in the region of the temporomandibular joint, but the oropharynx was clear and moist with no tonsillar hypertrophy, exudate, or erythema. No cervical lymphadenopathy was palpated. Musculoskeletal examination showed bilateral tenderness over the plantar surfaces of her feet. Cardiac, pulmonary, abdominal, gynaecological and central nervous system examinations did not reveal any abnormalities.

The admission diagnoses included esophageal candidiasis, neuropathic pain, and endometritis following MVA (less likely). She was started on oral fluconazole, IV ceftriaxone, IVmetronidazole, and amitriptyline (for the neuropathic pain). She also continued to take her ARV therapy and PCP prophylaxis.

An initial laboratory test of a complete blood count was done, with the following results:

White Blood Count:1,500 with normal distribution of cells
Hemoglobin/Hematocrit: 6.4 g/dL/17.6% (Hgb had been 9.7 g/dL 3.5 weeks prior)
Platelets: 677,000

Due to fever (axillary temperature of 38.4 degrees Celsius) and tachypnea (36 breaths/minute)on Day 1 of admission, a blood smear for malaria parasites and a chest x-ray were done. Both were unremarkable. Ferrous sulfate, folic acid, and multivitamins were added to the patient's treatment plan, as her drop in hemoglobin was attributed to blood loss from her recent incomplete abortion and subsequent MVA.

After 48 hours of treatment with antibiotics and fluconazole, the patient showed no signs of improvement. Upon review of her history and physical, the following constellation of key signs, symptoms, and facts were noted: new onset of sore throat/odynophagia, trismus, fever, burning pain in the feet, history of instrumentation during MVA, history of uvulectomy with subsequent infection of the palate, and HIV-positive status with recent initiation of ARV therapy.

Despite the patient's report that she had received a tetanus toxoid vaccine at the time of uvulectomy and with two prior pregnancies (no paperwork available), the combination of factors above pointed toward a diagnosis of tetanus infection. Tetanus immunoglobulin was not in the hospital pharmacy and a search for supply from neighboring pharmacies was initiated. In the meantime, the patient was given another dose of tetanus toxoid vaccine. The immunoglobulin was eventually located and 1500 IU were administered to the patient intramuscularly on the morning of Day 4 of admission.

On Day 5, the patient became afebrile and had marked improvement in her symptoms: she was able to open her jaw wider without pain, she could swallow solids and liquids effectively, and the burning sensation in her feet had decreased. She left the hospital on Day 8 with a plan to continue ARV medications, PCP prophylaxis, and ferrous sulfate/folic acid and return in one week for follow-up. The patient was feeling completely well, with good appetite as well as full resolution of all pain.

DISCUSSION

Tetanus infection is caused by the Gram-positive anaerobic bacterium known as *Clostridium tetani*. The spores formed by this organism are ubiquitous in the environment, inhabiting soil and the gastrointestinal tracts of both animals and humans (8). Inoculation and subsequent infection of a person occur when the spores enter the body through damaged tissue. After an average incubation period of 3-21 days, muscle rigidity usually begins in the masseter muscles, leading to the "lockjaw" that is characteristic of tetanus infection (9). Additional early symptoms may include dysphagia and stiffness/pain in the neck and upper back that progresses caudally to muscles throughout the body.

The diagnosis of tetanus infection is made on clinical grounds, as *C. tetani* cultures from wound sites are neither sensitive nor specific (8). In the case presented here, the signs and symptoms, combined with the patient's history of two recent procedures, led to the presumptive diagnosis of tetanus. Her rapid improvement following the administration of tetanus immunoglobulin added strong support for that diagnosis. In light of the high likelihood of tetanus infection, there are atypical features of her disease course that warrant further discussion:

First of all,this patient was not clinically affected until four to five weeks after the uvulectomy and symptoms of tetanus usually appear within three weeks of bacterial inoculation. There are a few possible explanations for the later onset of disease. For example, incubation periods lasting longer than one month have been reported (9). Also, it is possible that the spores did not enter during the uvulectomy, but rather while she had persistent tissue damage from her post-operative infection. Another hypothesis would be that the tetanus was contracted during the MVA (unrelated to the uvulectomy). Alternatively, she may have had partial immunity from prior tetanus vaccinations that led to a delayed presentation. Last of all, there is serologic evidence in HIV-positive children that some patients with baseline detectable antibody titers for tetanus convert to a non-immune (undetectable antibody) status within six months after initiation of highly active anti-retroviral therapy (HAART) (6). It could, therefore, be postulated that the patient had sufficient protection from tetanus

infection initially, but then experienced a reduction in antibodies when started on HAART.

Secondly, the presentation of her disease was relatively mild and the progression of it quite slow. In a typical case of tetanus infection, painful muscle spasms occur one to three days after the start of muscle rigidity (8,9). In this case, the patient's illness began with odynophagia and progressed to include mild trismus and peripheral neuropathy within one week. Fever developed upon admission, but other symptoms remained stagnant during the three hospital days prior to receipt of the immunoglobulin. She never experienced painful muscle spasms. The likely reasons for this phenomenon include a) partial immune protection from prior tetanus vaccinations, b) altered immune response due to HIV infection, and / or c) a very low level of tetanus spore inoculation.

CONCLUSION

This case emphasizes the importance for clinicians to think broadly when evaluating patients with HIV infection, since the alterations in their immune system may lead to non-classic presentations of disease (5). Additionally, it demonstrates the need for improved availability of human tetanus immunoglobulin in health facilities located in areas with a higher prevalence of tetanus infections. While the patient in this case remained stable despite the delay in obtaining proper treatment, in instances of typical tetanus disease progression, a lapse of 24 hours between diagnosis and administration of immunoglobulin could lead to considerable morbidity and the rapid onset of death. Finally, further studies are needed on the clinical significance of the antibody response following HAART initiation, specifically to determine the need (and, if so, timing) of booster tetanus vaccine administration to protect these patients from the potentially-fatal consequences of tetanus, a preventable disease (10).

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