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## CASE REPORT

### Generalized tetanus in adults without antitetanus booster vaccination in southern Mauritania

Boushab Mohamed Boushab<sup>1</sup> , Fatim-Zahra Fall-Malick<sup>2</sup>, Mamoudou Savadogo<sup>3</sup> & Leonardo K. Basco<sup>4</sup>

<sup>1</sup>Department of Internal Medicine and Infectious Diseases, Kiffa Regional Hospital, Assaba, Mauritania

<sup>2</sup>National Institute of Hepatitis and Virology, School of Medicine, Nouakchott, Mauritania

<sup>3</sup>Department of Infectious Diseases, University Teaching Hospital Yalgado Ouédraogo, Ouagadougou, Burkina Faso

<sup>4</sup>Aix-Marseille Université, Institut de Recherche pour le Développement, Assistance Publique–Hôpitaux de Marseille, Service de Santé des Armées, Unité Mixte de Recherche Vecteurs–Infections Tropicales et Méditerranéennes (VITROME), Institut Hospitalo-Universitaire–Méditerranée Infection, Marseille, France

#### Correspondence

Boushab Mohamed Boushab, Department of Internal Medicine and Infectious Diseases, Kiffa Regional Hospital, Assaba, Mauritania.  
Tel: +222 46749087; Fax: +222 45633141;  
E-mail: [bboushab@gmail.com](mailto:bboushab@gmail.com)

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#### Key Clinical Message

Tetanus has become rare in countries with high levels of vaccination coverage and hygiene but may still occur in adults without booster vaccination. In addition to the expanded program on immunization for children and maternal immunization against neonatal tetanus, a systematic vaccination of the population, including boosters, is recommended.

#### Keywords

*Clostridium tetani*, Mauritania, tetanus, vaccination.

#### Introduction

Tetanus is a noncommunicable, nonimmunizing infectious disease caused by anaerobic gram-positive bacteria [1]. Transmission to humans usually occurs through contamination of wounds or burns by spores of *Clostridium tetani* [1, 2]. The incubation period is usually from 3 to 21 days although in some exceptional cases it may take several months [2]. The sources of *C. tetani* spores include soil, animal feces, and, to a much lesser extent, saliva. The spores germinate in anaerobic conditions and produce toxins, in particular tetanospasmin, a potent exotoxin that acts on the nervous system and causes the characteristic increased muscular tone and spasms.

The most common form, generalized tetanus, typically presents with early spasms of the facial muscles (trismus) and difficulty in swallowing, followed by difficulty in breathing, spasms of the back muscles (opisthotonos), and sudden generalized tonic posture [3, 4]. In severe cases, death may occur due to spasm of the respiratory

muscles [2]. There are two uncommon forms of tetanus. In localized tetanus, persistent contraction of muscles occurs near the injury site, which can lead to a diagnostic error by uninformed practitioners [1]. Cephalic tetanus involves cranial nerves. Suspicion of generalized tetanus should be raised in the presence of trismus associated with paroxysmal contractures and relevant clinical history, including wound and vaccination history.

Tetanus has become rare in developed countries but is still a public health problem in developing countries with varying frequency from country to country [5]. In Mauritania, the vaccination effort has significantly reduced the incidence of the disease leading to an increased tendency toward eradication of neonatal tetanus. However, sporadic cases in unvaccinated subjects are still recorded in health facilities. We report here three adult cases of generalized tetanus observed in the Department of Internal Medicine and Infectious Diseases of Kiffa regional hospital center (Assaba region) in southern Mauritania, situated about 600 km from the capital city of Nouakchott.

## Case Reports

### Case 1

A 35-year-old male artisan was admitted on 13 August 2016, for dysphagia and abdominal contractures. Medical history did not show any antitetanus vaccination. On clinical examination, he exhibited behavioral disturbances with agitation and confusion, signs of mild dehydration, blood pressure of 130/80 mmHg, body temperature of 38°C, trismus, and generalized tonic contractures. This presentation initially suggested an encephalopathy of infectious or metabolic origin associated with dehydration, electrolytes disorder, hypoglycemia, or cerebral malaria. Other conditions that may present similar manifestations, including strychnine poisoning and dental infections, were not considered. On the second day of hospitalization, the patient presented a sudden rise in temperature to 40°C, generalized contractures, trismus, and laryngospasm, leading to the diagnosis of tetanus. No portal of entry was found. The patient was immediately sedated with intravenous administration of drugs. Treatment included metronidazole (500 mg every 8 h), ceftriaxone (1 g every 8 h), and intravenous infusion of thiocolchicoside (8 mg every 8 h) and diazepam (40 mg/24 h) in 5% dextrose infusion at the rate of 3 cc/h. On the third day, sedation was increased with the administration of diazepam (50 mg/24 h), and there was a marked clinical improvement with a body temperature of 37°C. Further treatment with oral diazepam was administered until contractures disappeared. The progression was favorable, and the patient was discharged on day 20. The patient received the complete dose of antitetanus vaccine on an outpatient basis.

### Case 2

A 22-year-old male shepherd was admitted on 21 December 2016, for trismus. Ten days earlier, the patient was accidentally injured with a piece of wood at the right elbow. Past medical history showed the absence of antitetanus vaccination. On clinical examination, the patient was mildly agitated and had tachycardia (120 beats/min), normal blood pressure (120/80 mmHg), excessive perspiration, and trismus associated with generalized tonic contractures. The diagnosis of tetanus was immediately established. Partial debridement of the wound using saline solution was performed. Treatment included intravenous metronidazole, ceftriaxone, thiocolchicoside, and diazepam, as in case 1. On the third day, sedation was increased with the administration of diazepam (50 mg/24 h). The patient's condition improved considerably from day 18, and he was discharged on day 21 without

sequelae. A complete dose of antitetanus vaccine was provided on an outpatient basis.

### Case 3

A shepherd aged 39 years old was admitted on 4 January 2017, for neck pain, dysphagia, and muscular contractures of the lower limbs. Fifteen days prior to admission, the patient had been injured by a piece of wood at the right calf. Past medical history showed that he was not vaccinated against tetanus. Clinical examination on admission showed clear consciousness, normal body temperature (37°C), trismus, generalized tonic contractures, and a dirty wound in the right calf. The diagnosis of tetanus was made. Partial debridement of the wound using saline solution was carried out. The same intravenous treatment as the two previous cases was administered. The patient responded favorably and was discharged without any sequelae on day 19. During outpatient follow-up, a complete dose of antitetanus vaccination was given.

## Discussion

Despite the implementation of the expanded immunization program recommended by the World Health Organization (WHO), tetanus remains a public health problem in developing countries [4, 6–8]. In Mauritania, the annual immunization coverage of the first and third doses of diphtheria–tetanus–pertussis vaccine (DTP1 and DTP3) between 2010 and 2016 ranged from 82% to 99% and 64% to 86%, respectively [9]. If efforts are being made to eradicate neonatal tetanus and vaccinate infants, it is not the same for the rest of the population. The adult male predominance of the disease has been documented [3, 4, 7]. This appears to be related, on the one hand, to the implementation of the policy for the eradication of neonatal tetanus through repeated campaigns of antitetanus vaccination targeting women of childbearing age [8] and, on the other hand, the occupational exposure of men, vaccinated or not, to wounds and injuries related to agriculture, carpentry, market gardening, and other activities in both rural areas and on the outskirts of cities while working in very precarious conditions. Following antitetanus immunization in early childhood as part of the expanded immunization program, there is currently no program of booster vaccination in the country to promote tetanus control in adults, thereby exposing them to risk in case of injuries [8, 10]. The annual incidence of tetanus is unknown in Mauritania, and recent data on the number of reported cases of tetanus between 2014 and 2018 are unavailable. However, the Mauritanian Ministry of Health reported four cases of tetanus in 2012–2013 [11, 12].

Our patients live in rural areas, and none of them had been vaccinated against tetanus, which is generally reported in the literature for adult cases of tetanus [7, 13]. The absence of antitetanus vaccination may be due to the ignorance of the population and also due to poverty. Indeed, as there is no tetanus control program for adults in Mauritania, a dose of tetanus vaccine has to be purchased by patients. The subcutaneous antitetanus serotherapy was adopted by our hospital for economic reasons. However, the superiority of this route of administration over others has not been demonstrated [7].

The management of tetanus patients is highly demanding, prolonged, and expensive in terms of materials, care, and manpower. The goals of therapy are to eliminate the source of toxins, neutralize unbound toxin, and prevent muscle spasms while monitoring the patient's condition and improving support, especially respiratory support, until recovery [6, 14, 15]. Treatment is essentially based on symptomatic and supportive measures and includes the following: (i) wound cleansing; (ii) cardiorespiratory supervision, if possible, in intensive care unit; (iii) bladder catheterization; (iv) parenteral nutritional support and fluid and electrolyte balance; (v) muscle and joint massages during the acute phase, followed by passive physiotherapy; and (vi) prevention of venous thromboembolism using heparin [4, 8, 14, 16]. It is important to note that antibiotherapy appears to have little value in treating this infection.

In our patients, the outcome was favorable. The duration of hospitalization was, on the average, 20 days, which is comparable to most of the published series [3–5]. The case fatality rate of tetanus is generally high in Africa [5–7, 10, 15–17]. This may be due to several factors, including the absence of antitetanus booster program, ignorance and neglect of basic wound care, delay in medical consultation, and the absence of an intensive care unit in infectious disease services [4].

## Conclusion

Tetanus remains a public health problem in developing countries despite the fact that it is a vaccine-preventable disease. Diagnosis should be established in patients presenting with trismus with or without generalized paroxysmal contracture. Treatment is essentially symptomatic and supportive. The national vaccination program should include boosters and extended to all adults, if possible provided free of charge.

## Authorship

BMB: collected and performed the analysis of case data, wrote original draft, performed literature review, and

contributed to supervision. FZFM: contributed to review and editing. MS: contributed to review and editing. LKB: contributed to review and editing, performed literature review, and revised the manuscript. All authors have read and approved the final manuscript.

## Conflict of Interest

None declared.

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