



## CASE REPORT

# Tetanus after Application of Traditional Topical on Severe Burn

Irié bi GS<sup>1\*</sup>, Asse V<sup>2</sup>, Kadiane NJ<sup>3</sup>, Pete Y<sup>1</sup>, Koffi N<sup>1</sup>, Benie AC<sup>2</sup>, Kouadio S<sup>1</sup>, Nda-koffi C<sup>1</sup>, Ogondon B<sup>1</sup>, Kouame KE<sup>1</sup>, Brouh Y<sup>1</sup>

<sup>1</sup>Anesthesia-resuscitation Service, University Hospital Centre of Bouake, Ivory Coast

<sup>2</sup>Department of Pediatrics, University Hospital Center of Bouake, Ivory Coast

<sup>3</sup>Department of Infectious Diseases, University Hospital Center of Bouake, Ivory Coast

\*Corresponding author: Irié Bi Gohi Serge, Head of Clinics, Anesthesia-resuscitation Service, University Hospital Centre of Bouake, Bouake, Ivory Coast, Po-Box 1174, Tel: 0022507673862, E-mail: [iriebi\\_gohiserge@yahoo.fr](mailto:iriebi_gohiserge@yahoo.fr)



## Summary

**Introduction:** The possibility of the occurrence of tetanus after application of a traditional topical for the treatment of a severe burn is a reality in tropical environment. This is true for this case.

**Observation:** A child girl of 2-year-old was accompanied by her parents to the pediatric emergencies for refusing to eat, trismus and generalized contractures four days after the application of a traditional topical on lesions of a severe thermal burn. When she entered the hospital, she had a temperature of 38 °C, a heart rate at 114 beat/min and a blood pressure at 90/60 mmHg. No notion of injury was found during examination and tetanus vaccine coverage was not up to date incomplete. The child received doses of 6 weeks, 10 weeks, 14 weeks and not the first vaccination reminder of 16 months of life. The diagnosis of tetanus was immediately made. Anti-tetanus serotherapy combined with antibiotic therapy, benzodiazepine treatment and local care were also provided. The outcome was unfavorable with the death of the child in 24 hours.

**Discussion:** This case of tetanus is very unusual. The presence of tetanus spores can be explained by the contamination of certain components of the topical applied burn injuries, especially cassava leaves when dried on soil.

**Conclusion:** A severe burn is a way of tetanus inoculation after application of a herbal topical that has remained on soiled soil.

## Keywords

Tetanus, Severe burn, Traditional topical

## Introduction

Tetanus is an acute, non-immunizing poisoning caused by a telluric bacillus, *Clostridium tetani*. It is a public

health problem in many developing countries despite the existence of a global immunization program [1]. The infection occurs when *Clostridium tetani* spores in the soil of the world and in the digestive tract of animals enter the body through open wounds, skin perforations or surgery. The occurrence of tetanus after contamination of burn injuries by *Clostridium tetani* spores has rarely been reported in the literature [2-4]. We report a case of generalized tetanus in a 2-year-old child after application of traditional topicals to severe burn injuries.

## Observation

A child girl of 2-years-old, was admitted for a refusal to feed, a stiff neck with a trismus. The story reported the occurrence of a thermal burn four days before the onset of symptoms and which would have been treated by applying poultice made from dried cassava leaves. Tetanus vaccine coverage was not up to date incomplete. The child received doses of 6 weeks, 10 weeks, 14 weeks and not the first vaccination reminder of 16 months of life. No symptoms of injury were reported in the days prior to onset of symptoms. At the entrance, the patient was conscious; the temperature at 38 °C, the pulse at 114 beat/min, the blood pressure at 90/60 mmHg, the weight at 10 kg. They presented an impossibility of the mouth opening, a contracture of the muscles of the face and neck. Examination of the child showed areas of 2<sup>nd</sup> degree deep burns and 3<sup>rd</sup> degree burns with soiled wounds and burned body surface area estimated at 25% of total body surface area (Figure 1). The burn injuries involved the upper left limb, the low-



**Figure 1:** 2-year-old child with burn injuries with muscle paroxysms under examination.

er limbs, the perineum, and the trunk. The occurrence of muscular paroxysms during the examination made it possible to evoke the diagnosis of generalized tetanus. The hemogram showed leukocytosis at  $11000/\text{mm}^3$  with 84% neutrophils, platelets at  $196,000/\text{mm}^3$ , and hemoglobin at 11 g/dL. The thick drop was negative, the blood ionogram was normal and the cerebrospinal fluid was normal. The treatment involved the administration of serotherapy in order to neutralize the circulating toxin with anti-tetanus serum of equine origin 750 IU and 25 mg of hydrocortisone hemisuccinate intrathecally. A parenteral antibiotic therapy with amoxicillin-clavulanic acid (266 mg/8 h) was instigated. The patient was also given 10 mg diazepam diluted in 48 mL of isotonic saline administered three times a day to the electric syringe, in combination with 500 ml per day of 10% glucose serum enriched with electrolytes. Local care consisted of cleansing the burn injuries and dressing them with Chlorhexidine soaked compresses. The outcome was unfavorable with her death 24 hours after admission.

## Discussion

This observation reports a case of tetanus occurring after a traditional topical application of a mixture of water and powdered dried manioc leaves on burn injuries. Tetanus is caused by a telluric bacterium and its occurrence requires the presence of tetanus spore at an entrance port with anaerobic conditions. Any break-in of the tegument with sufficient anaerobic conditions constitutes a gateway to *Clostridium tetani* spores conveyed by dust, earth, contaminated objects or instruments [5]. *Clostridium tetani* [5] is characterized by deep, narrow wounds with weak opening to the outside or chronic wounds (varicose ulcers, burns, scratching lesions). Often they are small wounds such as a rose bug, splinters or an animal bite [2]. In devel-

oping countries, umbilical cord, gynecological pathways (childbirth, abortion), drug injections, surgical or spontaneous wounds and circumcision are another frequent cause of tetanus [6]. Tetanus may occur following burns [2-4]. In our observation tetanus was secondary to the application of poultice on burn injuries. The risk of tetanus increases strongly after a burn and the burnt area is an easy entry point for tetanus in the days following the burn. The presence of tetanus spore at the level of the burn injuries of our patient can be explained by the contamination of the cassava leaves during their drying on the ground. These cassava leaves during their drying are in contact with soil contaminated by spores which can survive for many years and withstand most disinfectants [7]. The overlap of burn injuries with the traditional topical of this dried cassava leaves allowed infection with *Clostridium tetani* into the organism and favored the anaerobiosis conditions conducive to the growth of the germ and the release of the toxin responsible for the occurrence of tetanus. Inoculation through skin lesions is frequent but the occurrence of tetanus after administration of poultices on burn injuries is rarely described. It is the precision by the interrogation of the notion of application of traditional topical on the lesions of burns which made it possible to make the link with the symptomatology. This observation also raises the problem of the policy of vaccine recalls in Côte d'Ivoire. The national immunization program provides free vaccine coverage for children aged 0 to 11 months and women aged 15 to 49 years for tetanus. Beyond 11 months, the financial burdens associated with the vaccines return to the parents limiting the access of the recalls of the vaccines to certain children. Also, immunological immaturity of the child limits the persistence of antibodies acquired by primary vaccination in childhood [8]. As a result, immunity to tetanus declines with time in the vaccinated

child, so that between 10 and 16 years, about one in five cases no longer have protective antibodies [9]. For this reason, vaccine recalls are recommended in order to establish lasting protection against tetanus. WHO recommends 3 doses of tetanus toxoid by 12 months of age with a 4<sup>th</sup> in childhood and fifth in adolescence [10].

## Conclusion

This observation shows that tetanus after application of a poultice on burn injuries is a reality in a tropical environment. It stresses the need to raise awareness of the risks associated with certain traditional practices and reiterates the importance of respecting the tetanus vaccine regimen.

## Conflicts of Interest

The authors state that they have no conflict of interest.

## References

1. WHO/AFRO (2003) Progress towards maternal and neonatal elimination (MNTE) in the African Region. *Vaccine Preventable Diseases Bulletin* 36: 1-3.
2. Karyoute SM, Badran IZ (1988) Tetanus following a burn injury. *Burns Incl Therm Inj* 14: 241-243.
3. Larkin JM, Moylan JA (1975) Tetanus following a minor burn. *J Trauma* 15: 546-548.
4. Uba AF, Edino ST, Yakubu AA (2007) Paediatric burns: Management problems in a teaching hospital in north western Nigeria. *Trop Doct* 37: 114-115.
5. Mani N, Dupuy B (2001) Regulation of toxin synthesis in *Clostridium difficile* by an alternative RNA polymerase sigma factor. *Proc Natl Acad Sci U S A* 98: 5844-5849.
6. Popoff MR, Poulain B (2005) Tetanus: physiopathology, epidemiology, clinical forms, treatments and vaccination. *Antibiotics* 7: 23-41
7. Ryan JR (2004) *Clostridium*, *Peptostreptococcus*, *Bacteroids*, and other Anaerobes. In: Ryan KJ, Ray CG, Sherris Medical Microbiology: An Introduction to Infectious Diseases. (4<sup>th</sup> edn), McGraw-Hill, USA, 309-326.
8. Posfay-Barbe KM, Kobela M, Sottas C, Grillet S, Taguebue J, et al. (2010) Frequent failure of adolescent booster responses to tetanus toxoid despite infant immunization: waning of infancy-induced immune memory? *Vaccine* 28: 4356-4361.
9. Gergen PJ, McQuillan GM, Kiely M, Trena M Ezzati-Rice, Roland W Sutter, et al. (1995) A population-based survey of immunity to tetanus in the United States. *N Engl J Med* 332: 761-766.
10. WHO (1998) Global Program for Vaccines and Immunization 1995. Immunization policy.