

# Tetanus of the Child after Extraction of *Tunga penetrans* in Brazzaville: One Case

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**How to cite this paper:** Moyen, E., Kambourou, J., Okoko, A.R., Ekouya-Bowassa, G., Mboutol Mandavo, C., Bomelefa-Bomel, V., Lamah, L., Pandzou, N.S., Moyen, G. and Nkoua, J.L. (2017) Tetanus of the Child after Extraction of *Tunga penetrans* in Brazzaville: One Case. *Open Journal of Pediatrics*, 7, 294-299.

<https://doi.org/10.4236/ojped.2017.74034>

**Received:** September 19, 2017

**Accepted:** November 28, 2017

**Published:** December 1, 2017

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## Abstract

Tetanus has become rare even exceptional in the West. On the contrary, it is common in developing countries such as Congo because of low immunization coverage. Its diagnosis, which is essentially clinical, is easy but necessitates a fine semeiological analysis under certain circumstances. We are reporting here a case of tetanus involving an 8-year-old unvaccinated, indigenous aboriginal boy that was caused by the extraction of a *Tunga penetrans*. The symptomatology of abdominal contractures led to an exploratory laparotomy. The evolution was favorable.

## Keywords

Tetanus, Children, Extraction, *Tunga penetrans*, Brazzaville

## 1. Introduction

Tetanus is a poisoning-severe acute infection caused by a neurotoxin produced by a gram positive bacillus *Clostridium tetani* or bacillus Nicolaier [1]. It has rarely become uncommon in the West due to, among other things, improved hygiene, higher socioeconomic status and widespread vaccination [1] [2]. In developing countries, however, it remains endemic [1]. The target set by WHO in 2012 to eradicate neonatal tetanus by 2005 has not been achieved but real progress has been made [3]. In Congo, the rate of tetanus vaccination coverage, provided by the expanded immunization program, amounted to 72% for infants aged 12 to 23 months [4]. Similarly, tetanus vaccination for pregnant women is systematic. But, beyond this age and apart from this physiological state, primary immunization and boosters are on individuals' initiative and dependent on them. Thus tetanus persists in Congo, especially since other favorable factors coexist.

We are reporting a case of tetanus occurring in an eight-year-old child from an indigenous population whose symptoms of abdominal contractures led to an exploratory laparotomy.

## 2. Observation

This eight-year-old boy was admitted to the pediatric intensive care unit in August 2016, sent by the surgical emergency unit for respiratory distress observed five hours after a laparotomy.

Eight days earlier, *Tunga penetrans* was extracted from several toes and reported diffuse abdominal pain in the form of cramps followed 24 hours later by spontaneous generalized spasms induced by stimuli. He was then taken to an integrated health centre and then to the hospital of reference of the department. The checkup that was carried out, and the treatment that was administered were not specified. The intensification of spasms and the appearance of abdominal contractures with the absence of passage of flatus and feces accounted for his being sent to the surgical emergencies of Brazzaville Teaching Hospital. The diagnosis of peritonitis was evoked and an emergency laparotomy was carried out. The abdominal cavity being healthy, an appendectomy of principle was made. Due to respiratory discomfort, the patient was transferred to the pediatric intensive care unit at the fifth postoperative hour (**Figure 1**).

Second of a family of six children that have all never been vaccinated like him, and son of illiterate indigenous cultivators, this patient is a first year primary school pupil who had to cover five kilometres daily to go to school and back home.

Upon his admission to our service, he was conscious and well colored. He had a respiratory discomfort with a discreet flapping of the wings of his nose. Oxygen saturation amounted to 88% in ambient air. The temperature was at 38.5°C, heart rate at 102 beats per minute, respiratory rate at 24 cycles per minute. He weighed 18 kg for a height of 95 cm; hence a body mass index of 14.87 kg/m<sup>2</sup>, the height-age and weight ratio was less than three Z-score (for a target size of 155 cm). His father and mother were 149 cm and 147 cm tall respectively.



**Figure 1.** Clinical presentation on admission-trismus and generalized muscle rigidity.



**Figure 2.** (a) Extraction of *Tunga penetrans* on the left foot; (b) Extraction of *Tunga penetrans* on the right foot.

The physical examination revealed a sardonic facies, a lower limbs trismus in hyper extension with generalized spasms, accentuated with the least stimuli. The neck was in hyper extension with contracture of the extensors of the back (attitude in opisthotonos), a painful and invincible contracture with palpation of the great right muscles of the abdomen. There were soiled lesions of the toes, extraction points of *Tunga penetrans*, and the presence of others that were not extracted (**Figure 2(a)** & **Figure 2(b)**).

The diagnosis of generalized acute tetanus at the cutaneous entrance, from Score 1 of Dakar was retained. The treatment consisted of: oxygen therapy, hydrolysis, nasogastric tube feeding, diazepam 5 mg/kg per 24 hours slow intravenous, serum 750 U intramuscular, tetanus toxoid, Ceftriaxone at 100 mg/kg/day, metronidazole at 30 mg/kg/day. A local disinfection of the entrance doors was made as well as the care of the surgical wounds and the extraction of the remaining *Tunga penetrans*.

Within 72 hours the respiratory discomfort disappeared. Then, spasms and contractures gradually regressed with complete disappearance on the 13<sup>th</sup> day. The patient was discharged without sequelae on the 17<sup>th</sup> day with a vaccination catch-up program.

### 3. Discussion

Tetanus is a non-infectious, non-contagious, severe anaerobic, sporulating, telluric and ubiquitous, severe, non-infectious bacterium known as *Clostridium tetani* or Nicolaer bacillus [1]. In the industrialized countries, it has almost disappeared, its incidence having been assessed in France [5] at 0.33 per million inhabitants in 2004 for a lethality of 35%. In developing countries, it remains a public health problem [6]-[11], mainly due to poor immunization coverage. In Congo for example, some infants, particularly those from disadvantaged socio-economic backgrounds, are excluded from routine tetanus vaccination by the expanded immunization program until the age of 11 months, and often boosters are not made. Thus, tetanus is often found in children of low socio-economic parents living in densely

populated sandy areas in precarious conditions [6] [7] [8] [9] [10] [12] [13]. This was the case of our patient as well as that reported by Ribéreau-Gayon [12] in the Democratic Republic of Congo, where indigenous peoples often live in forests, outside the education and health system, traveling long distances barefooted daily.

The entrance doors are multiple and varied. They were not identified in 32% to 62%. [7] [8] [14]. They are dominated by integumentary lesions (73.9% of the 440 cases reported by Seydi *et al.* [7], and 32.6% by Barakat *et al.* [12] [13]. Some cases have been reported after circumcision [9] [10] [12], and piercing of the ears [7]. The tungose as tetanus entrance door was well-known. This infestation with *Tunga penetrans* favours by itself, but also by the conditions of extraction of the chics, the favorable conditions for the development of strictly anaerobic and telluric bacteria, affecting populations living in poverty and precariousness. [10] [15] Thus, our patient cumulated all the risk factors.

The diagnosis of tetanus is essentially clinical [16]. It is usually easy when tetanus is widespread. Before this stage, and in particular before a trismus, the most characteristic early manifestation associated with rigidity and spasms, several diagnostic hypotheses could explain the impossibility of opening the mouth [16]: angina, phlegmon Amygdala, temporomandibular arthritis, parotitis, dyskinesias due to neuroleptics. In one case [17], a coma, a stiff neck, and tight myosis pupils evoked meningoencephalitis. But the lumbar puncture and CT scan showed no abnormalities. In abdominal tetanus [18], one of the localized forms of tetanus, an isolated abdominal contracture associated with fever simulated a surgical emergency, including peritonitis, and led to an exploratory laparotomy. Our patient was admitted to the stage of generalized contracture, and in fact presented signs which, with more attention and experience, evoke the diagnosis: this poses the problem of the responsibility of the various members of a Care team and the role of seniors.

The lethality of tetanus is still exorbitant: 15.5% among the 27 cases reported by Kakou *et al* [18], or even 17.7% in the hypothesis of maximum bias. It ranged from 21.4% to 57.2% for other authors [7] [11], and in 32 studies compiled by WHO [13] from 10 African countries it amounted to an average of 44%. In a Teaching Hospital in Nigeria [14], a 4.1% lethality was reported: the authors explained this by improving care and the policy of free care for children under 12 Years, which has favoured a more prompt use of health centres and a greater availability of medicines. Of our 42 previously reported cases [9], 13, that is 30.9%, died. Gateways are prognostic factors. Thus, cases of otogenic, surgical, and umbilical entry tetanus have the highest lethality [6] [8] [19]. But tetanus with an integumentary entrance door is not devoid of gravity [9]. The prognosis of tetanus in relation to a tungose is all the more severe as the patients experience poor socio-economic conditions; they are excluded from the health system, and therefore not vaccinated, with more severe toe lesions, they are taken care of late in inadequate care facilities.

#### 4. Conclusion

Tetanus is still a common pathology in Congo. Diagnosis is often easy in acute

forms, in its generalized state stage, but may lead to confusion in the absence of a detailed symptoms analysis. Such is the case of certain localized forms including, localized tetanus of abdomen which can be confused with a surgical abdomen. The importance and the severity of this pathology impose preventive measures which go through the reinforcement of the expanded program of immunization, the information, the communication for the change of behavior, and the improvement of the socio-economic and cultural conditions of the populations.

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