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Neonatal Tetanus at the Dawn of 2023: A Case Report

R. Dahni[1*], F. Z. Khayi[1], S. El Moussaoui[1, 2], W. Lahmini[1, 2], M. Bourrous[1]

[1]Pediatric Emergency Department, Mother & Child Hospital, CHU Mohammed VI, Marrakech, Morocco
[2]Child Health and Development Research Laboratory, Marrakech Faculty of Medicine, Cadi Ayyad University, Morocco

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***Corresponding author:** R. Dahni
Pediatric Emergency Department, Mother & Child Hospital, CHU Mohammed VI, Marrakech, Morocco

Abstract **Case Report**

Neonatal tetanus is a toxi-infection caused by Clostridium tetani, with a neurological tropism, causing significant morbidity and mortality in newborns in developing countries. The infection almost always starts in the umbilical cord. Diagnosis is clinical. Treatment is two-pronged: etiological (specific immunoglobulins, antibiotic therapy, anti-tetanus vaccination and treatment of the portal of entry) and symptomatic (sedatives and muscle relaxants, curarization). Prevention is the only effective option, and relies on vaccination of mothers during pregnancy and health education of the population. We report the case of a newborn hospitalized for neonatal tetanus and treated with antibiotic therapy combined with intrathecal serotherapy, with a good evolution.

Keywords: Neonatal tetanus, vaccination, tetanus serum, intrathecal.

INTRODUCTION

Tetanus is a non-immunizing, non-contagious infection caused by Clostridium tetani or Nicolaier's bacillus. The World Health Organization (WHO) defines neonatal tetanus as a disease that occurs in a newborn who suckles and cries normally during the first 2 days of life, but loses this ability between days the 3rd and 28th, presenting rigidity and spasms [1]. Neonatal tetanus is a vaccine-preventable disease, but it is still a major cause of neonatal morbidity and mortality, particularly in African and South-East Asian countries [2]. According to the WHO, the number of deaths from neonatal tetanus worldwide in 2015 was estimated at 34000 [3]. In March 2002, Morocco was the first country in the WHO EMRO Region to validate the elimination of neonatal tetanus as a public health problem [4]. However, neonatal tetanus persists and represents a problem for hospital management.

In this article, based on a clinical observation and a review of the literature, we will illustrate the clinical, therapeutic, prognostic and preventive aspects of neonatal tetanus.

OBSERVATION

Female newborn admitted at 7 days of age to the pediatric emergency department of CHU Mohammed VI, Marrakech, with muscular hypertonia and difficulty suckling. The pregnancy was not followed up and estimated to be full term. Her mother, aged 32, had not been vaccinated against tetanus. She was born at home, the umbilical cord cut with a blade and a soiled product (khôl) applied to the umbilicus. One day before admission, she had refused to suckle, with a generalized contracture.

Clinical examination revealed a conscious, febrile newborn at 38.5°C, with trismus, muscle spasms and contractures of the limbs and trunk. During the examination, muscle spasms of brief duration occurred, and the umbilicus was soiled with khôl. These signs led to the diagnosis of neonatal tetanus.

On lumbar puncture, the CSF was normal and sterile, and the blood count was unremarkable. CRP was negative.

The treatment included isolation from noise and light, basic care with umbilical cord care, antibiotic therapy with penicillin G for 10 days and an intrathecal administration of tetanus immunoglobulin.

After 15 days of care, the evolution was marked by the disappearance of the trismus and the resumption to feeding, and a reduction in the number of tonic spasms per day.

Figure 1: Generalized contracture with opisthotonos

Figure 2: Opisthotonos and trismus

DISCUSSION

Tetanus is an acute intoxication by a neurotoxin produced by an anaerobic telluric bacillus, Clostridium tetani, responsible for incessant activation of the motor neuron, manifested by contractures and reflex spasms [5]. Neonatal tetanus occurs in newborns whose mothers are insufficiently immunized against tetanus. In 2015, the number of deaths due to neonatal tetanus worldwide was estimated at 34000 [3]. The most common portal of entry is the umbilical stump, where contamination usually occurs when the umbilical cord is cut using non-sterile instruments, or when soiled traditional remedies are applied to the umbilical cord. However, infection of the umbilical stump is not always obvious [6]. Our observation highlights the notion of ritual care of the umbilicus, notably with "Khôl". The clinical presentation is divided into three periods: the incubation period, the invasion period and the state period [7]:

- The incubation period varies from 3 days to 3 weeks. The average incubation period is 5 to 7 days. It is silent, and its duration has a prognostic value. Thus, when clinical signs appear less than seven days after birth, clinical symptoms are often very severe, and mortality is very high.
- A period of invasion begins with incessant crying, agitation and progressive inability to suck, with a tendency to permanent and invincible masseter squeezing, aggravated when attempts are made to overcome it, thus prohibiting all feeding. Difficulty in suckling, seen as a refusal of the breast in a previously healthy newborn, is incomprehensible to families and always causes considerable anxiety.
- A state period marked by the generalization and persistence of contractures maintaining the upper limbs in flexion and the lower limbs in extension. The spine is maintained in hyper-extension by contracture of the paravertebral muscles, resulting in an opisthotonos posture. These contractures are aggravated by spontaneous paroxysms, or by sensory stimulation such as light, noise, clinical

examination and medical care, and can lead to the death of the newborn by apnea or glottic spasm. In rare, severe cases of neonatal tetanus, a dysautonomic syndrome may develop at this stage, with hypertension, tachycardia and fever. Episodes of bradycardia and arterial hypotension may also be observed. This dysautonomic syndrome can lead to cardiac arrest [8].

Diagnosis of neonatal tetanus is essentially clinical, based on anamnesis and clinical examination. Hospitalization is systematic in cases of neonatal tetanus. The aim of treatment is to neutralize the toxin by administering specific immunoglobulins (intramuscular or intrathecal), combined with antibiotic therapy to destroy tetanus bacilli persisting at the site of entry. Penicillin G is usually used at a dose of 100 000 IU/kg/d IVL for 10 to 15 days [7]; other therapeutic measures include local treatment of the site of entry and tetanus vaccination.

Intrathecal tetanus serotherapy has been tested in a number of studies, demonstrating its efficacy in the treatment of tetanus, compared with subcutaneous or intramuscular administration. In a study by Wateba (Togo), intrathecal serotherapy, compared with intramuscular serotherapy, increased the cure rate from 48% to 88% ($p = 0.00002$), and reduced the complication rate and hospital stay from 19 days to 7.4 days [10].

The symptomatic treatment is essential, based on sedatives and, when technical and human conditions allow, artificial ventilation combined with curares. The sedatives most frequently used in tetanus are benzodiazepines. Diazepam (Valium) is the most commonly used. High doses are often required. The initial dose is 0.3-0.5 mg/kg by slow intravenous infusion, followed by 3-10 mg/kg/d by continuous infusion, or more if paroxysms persist [7].

In the absence of treatment, the disease is generally fatal. Mortality rates are generally high in the various series. Whereas mortality was close to 100% in the 1980s, it currently varies between 10 and 60% [7]. Poor prognostic factors include: a short incubation period of less than 7 days; a short invasion period; frequent paroxysmal attacks and inadequate patient response to sedation; impairment of vegetative functions, particularly thermal disturbances (fever or hypothermia) [9]. Preventing tetanus is therefore essential, and relies on widespread vaccination, improved hygiene conditions at birth, and effective surveillance. Pregnant women should be vaccinated as soon as possible during prenatal visits, with two doses of tetanus toxoid administered at intervals of at least four weeks [7]. Indeed, the administration of at least two doses has been shown to be effective in eliminating not only neonatal tetanus, but also maternal tetanus [6, 8]. The second injection should therefore be administered at least 15 days before delivery, to ensure good protection for the newborn [7].

CONCLUSION

Neonatal tetanus is still a major public health problem, despite the existence of an effective vaccine. Untreated, this disease has a mortality rate approaching 100%. Thus, the only way to combat this disease is to prevent it from occurring in the first place, by vaccinating mothers during pregnancy and promoting hygiene during childbirth.

Conflicts of Interest: The authors declare no conflicts of interest.

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