J Korean Med Sci 2002; 17: 260-2
ISSN 1011-8934

A Case of Maternal Tetanus in Korea

Tetanus is uncommon in Korea due to the introduction of vaccination programs and advances in public health. A case of maternal tetanus occurred on the 9 day postpartum in a 29-yr-old woman, who had not received a 10-yr-booster of tetanus-diphtheria toxoid after receiving the primary series of tetanus-toxoid-containing vaccine. There has hitherto been no reports on maternal tetanus in Korea. This case illustrates that tetanus remains a medical problem, principally among non- and underimmunized adults. The only way to fully prevent this disease is to ensure adequate immunization in all adults.

Key Words : *Clostridium tetani; Tetanus; Immunization*

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Received : 20 March 2001
Accepted : 27 April 2001

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INTRODUCTION

Tetanus is preventable through both vaccination and appropriate wound prophylaxis. Primary vaccination with a three-dose series of tetanus-toxoid-containing vaccine, with a booster of tetanus-diphtheria toxoid (Td) every 10 yr, is highly effective in preventing tetanus (1). Very little attention has been paid to adult tetanus in Korea, although a comprehensive, nationwide vaccination program against tetanus began in 1956, and major efforts have been made to increase immunization coverage among children since then (2).

Since the 10-yr-booster Td vaccination has been neglected, the risk for tetanus may increase with age. This report describes a case of generalized tetanus in a postpartum woman who was not adequately immunized.

CASE REPORT

A healthy 29-yr-old woman underwent a successful vaginal delivery in a hospital where standard aseptic techniques were practiced, and was then discharged on the 3rd day postpartum uneventfully. On the 9th day postpartum, she developed cold sweats and neck pain, and had difficulty in opening her mouth, which made the general practitioner to admit her to the hospital with an initial diagnosis of cervical sprain or demyelinating disorder. Her condition deteriorated over the next week and she was transferred to Chonnam National University Hospital (a tertiary care hospital with 900 beds) on the 15th day postpartum.

In the emergency room, her vital signs were: blood pressure 150/110 mmHg, pulse rate 72 beats/min, respirations 20 breaths/min, and axillary temperature 36.9°C. The patient was alert and well-oriented. She was diaphoretic and in moderate distress due to back pain, and complained of dysphagia, stiff neck, jaw muscle spasms, and shortness of breath with accompanying back spasms. She denied any trauma before the episode, and had no history of recurrent infections, and had resided in an urban area. Physical examination revealed trismus and opisthotonus, with diffusely firm and tender paraspinous muscles in the cervical and thoracic regions (Fig. 1). Laboratory results for blood cell counts, urea, creatinine and electrolyte values, and urine were unremarkable. The chest radiograph and electrocardiogram were unremarkable, but abdomen radiographs disclosed gaseous bowel dilation. Vaginal examination revealed the sutured episiotomy wound, but was otherwise unremarkable.

The provisional diagnosis was generalized tetanus, possibly occurring in the absence of trauma, and probably beginning after delivery. She had received no 10-yr booster after the primary series of tetanus-toxoid-containing vaccine. She was treated intramuscularly with human tetanus immunoglobulin 3,000 IU and diphtheria-tetanus toxoid (DT) 0.5 mL subcutaneously, due to the unavailability of Td in Korea. Treatment with intravenous metronidazole (500 mg t.i.d.) was started. On the second day post-admission, she complained of intermittent spasms with generalized rigidity and chest discomfort that were easily induced by either light or noxious

Fig. 1. Rigidity of the masseter muscles (trismus).

stimuli. Subsequently, she was sedated with diazepam, and cared for in a dark, quiet room, in which environmental stimuli and unnecessary patient manipulation were minimized.

Over the course of the following two weeks, the frequency of tetanic contractions gradually diminished, and the patient was able to fully open her mouth. Diazepam was discontinued, a full recovery ensued, and the patient was discharge on the 22nd day. As of two months postpartum, the infant's health remained uneventful.

DISCUSSION

Tetanus is a fatal disease that is caused by the toxin of *Clostridium tetani*, an anaerobic, spore-forming, Gram-positive bacillus, that is ubiquitous in the environment and in the intestines of domestic animals, horses, chickens, and humans. Tetanus is due to the introduction of these spores into the body, through either accidental or surgical wounds.

Since the introduction of protective vaccination programs and public health advances, tetanus has become rare in developed countries, primarily affecting only adults or the elderly who were unvaccinated or inadequately vaccinated (3-5). A total of eight cases of tetanus have been reported in Korea between 1990 and 1999 (6-8).

Maternal tetanus had been attributed to contamination of the puerperal uterus as a result of unhygienic delivery practices, and to the insertion of contaminated materials into the vaginal canal to induce abortion (9-11). Once in a wet, poorly oxygenated, necrotic tissue, such as a piece of retained placenta, spores germinate and begin to produce the neurotoxin tetanospasmin. This toxin spreads along neural pathways to the spinal cord and the central nervous system, where it affects a number of vital functions. Maternal tetanus remains a significant problem in developing countries, where in the region of 15,000 to 30,000 cases occur each year and the fatality rate remains between 52-54% (12). There has been no documented case of maternal tetanus in Korea.

This patient was diagnosed with maternal tetanus, based on her clinical history and physical examination. The diagnosis of tetanus is primarily clinical, and is made through exclusion of other diseases with similar presentation, because a definitive laboratory test for tetanus is not routinely available (13). The results of organism isolation from wounds are neither sensitive nor specific, because both anaerobic tissue and aspirate cultures are usually negative, and the organism may develop from wounds without clinical signs or symptoms of the disease (14, 15). The patient displayed acute hypertonia and painful muscular contractions of the neck and jaw, and generalized back muscle spasm with no other apparent medical cause, such as dental or pharyngeal abscesses, mandibular fracture or arthritis, diphtheria, or mumps. In addition, meningitis, strychnine poisoning, epilepsy, tetany, hysteria, retroperitoneal abscess, and rabies should be excluded. The most important differential diagnosis is postpartum eclampsia, which rarely occurs after the 4th day postpartum, while postpartum tetanus cannot occur before the 4th day postpartum (12).

Most tetanus cases occur after sustaining an acute injury (3), but recent surgery or delivery may be an additional risk factor in unvaccinated or inadequately vaccinated individuals. No wound is safe in an unimmunized individual.

Simply avoiding introduction of tetanus spores into the genital tract during the pregnancy, delivery, and postpartum period can prevent maternal tetanus. This is easily accomplished by maintaining standard, sterile practices during delivery and/or abortion in the hospitals.

Symptoms of tetanus occurred in this patient on the 9th day postpartum. The patient denied any acute injury before the onset of tetanus, with the exception of delivery trauma. The genital tract may have been colonized with *C. tetani* before delivery, making it a potential portal of entry, since *C. tetani* is ubiquitous and can colonize the intestines.

The patient had received no 10-yr boosters after the initial series of tetanus-toxoid-containing vaccine. The serum level of tetanus-toxoid antibody was not assayed. Adequate immunization alone does not necessarily equate with adequate levels of circulating antibodies, nor do adequate antibody levels necessarily equate with disease prevention. However, her tetanus-toxoid antibody level may have been lower than the currently accepted minimum protective level of 0.01 IU/mL (16). The most important measure for maternal tetanus prophylaxis may be the implementation of a system of tetanus immunization for all women of childbearing age.

World Health Organization recommends that a total of five doses of tetanus-toxoid-containing vaccinations are adminis-

tered to protect women through the childbearing years (17). If four doses of tetanus-toxoid-containing vaccines are given by school age, a single dose of tetanus-toxoid given during the first pregnancy should provide protection for at least 20 more years (17). In a random sample of adults, a single dose of tetanus-toxoid given up to 30 yr after primary vaccination was found to induce protective titers of antitoxin (18).

In Korea, the true incidence of this disease may be underestimated due to passive reporting by physicians. However, without proper adult immunization the incidence of tetanus may increase gradually in the future, and the only way to fully prevent all cases of tetanus is to ensure full immunization in all individuals. In Korea, where there is a trend of negligence toward adult immunization, contacts with the medical system should be viewed as an opportunity for patients to be re-immunized.

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