

Unprotected People #7

Tetanus

Montana newborn of an unvaccinated mother contracts neonatal tetanus after application of nonsterile clay to the umbilical cord

A case report of neonatal tetanus was published in Morbidity and Mortality Weekly Report (MMWR) on November 6, 1998, in an article entitled "Neonatal Tetanus—Montana, 1998." The article states that "the findings indicated that tetanus occurred after application of nonsterile clay to the umbilical cord."

The editorial note includes mention of the Center for Disease Control and Prevention's Advisory Committee on Immunization Practices (ACIP) recommendation to give a booster dose of Td to previously vaccinated pregnant women who have not received a Td vaccination within the preceding 10 years, and unvaccinated or partially vaccinated pregnant women should complete the primary series of three doses of Td.

The article and editorial note are printed below:

Neonatal Tetanus — Montana, 1998

Neonatal tetanus (NT) is a severe, often fatal disease caused by a toxin of *Clostridium tetani*, a ubiquitous spore-forming bacterium found in high concentrations in soil and animal excrements. NT is associated with nonsterile delivery and umbilical cord-care practices for newborns of mothers with antitoxin levels insufficient to protect the newborn by transplacental transfer of maternal antibody. In 1997, NT accounted for an estimated 277,400 deaths worldwide (1) but is rare in the U.S. During 1995-1997, of 124 tetanus cases reported in the United States, only one occurred in a neonate (2,3). This report summarizes the investigation in March 1998 of an NT case by the Missoula City-County Health Department (MCCHD) and the Montana Department of Health and Human Services (MDHHS). The findings indicated that tetanus in a newborn of an unvaccinated mother occurred after application of nonsterile clay to the umbilical cord.

On March 21, 1998, a 9-day-old newborn, who had no previous medical problems, was taken to a hospital by her parents who reported a 10-hour history of an inability to nurse and difficulty in opening her jaw. Her parents also had noticed a foul-smelling discharge from her umbilical cord during the preceding 1-2 days. No

other symptoms were noted by the parents. On admission, the newborn had trismus, increased general muscle tone, and hyperresponsiveness to external stimuli. The umbilical cord was covered with dried clay, which when retracted revealed a foul-smelling yellow-green discharge. Culture from the umbilical cord grew several anaerobic (*C. perfringens*, *C. sporogenes*) and aerobic (*Staphylococcus*, *Streptococcus*, and *Bacillus* sp.) bacterial species. NT was diagnosed based on the clinical characteristics.

The newborn was treated with tetanus immune globulin (500 units intramuscularly) and penicillin G (300,000 U/kg/day intravenously) for 10 days. On March 24, she required mechanical ventilation and remained ventilated for 12 days. She was discharged on April 10, with no apparent neurologic sequelae and was developing normally on follow-up at age 7 months.

The mother, a 32-year-old non-Hispanic white woman born in the United States, had never been vaccinated because of her family's philosophic beliefs. She had no complications during her pregnancy and was attended throughout her pregnancy by a licensed "direct-entry" midwife* from her community. The newborn was delivered in a local hospital by cesarean section. While in the hospital, she received standard umbilical cord care with isopropyl alcohol. The newborn was discharged at 3 days of age. For home umbilical cord care, the parents applied a "Health and Beauty Clay" powder provided by the midwife. This clay powder was applied to the umbilical cord up to three times daily with a clean cotton-tipped swab. The family lived in a rural area in a house adjacent to a horse pasture. Although the newborn and her mother stayed primarily indoors, the family's dog often ran between the house and the pasture.

The "Health and Beauty Clay" was a bentonite clay from Death Valley, California. According to the manufacturer, it had been sold for 21 years as a cosmetic product without reported adverse health outcomes.

(continued on next page)

The manufacturing process of the clay did not include sterilization. The clay was shipped in 2-lb. containers, sold by weight in a local store, and dispensed to local midwives in smaller containers. The midwives would further aliquot the clay into 2-oz., presumably clean vials for distribution to their patients. The use of the clay for umbilical cord care was common among local direct-entry midwives because they believed it accelerated drying of the umbilical cord.

On April 9, MCCHD distributed a health-care advisory to more than 60 health-care providers in the area that emphasized the importance of tetanus toxoid vaccination, particularly for pregnant women, and cautioned against using nonsterile products for umbilical cord care. Following this case, use of clay for umbilical cord care was discontinued by midwives in the community. The mother of the case-patient has since been vaccinated with tetanus and diphtheria toxoids (Td), but as of October 1998 has not initiated vaccination for her infant because of concern about potential adverse effects.

Editorial Note: In the United States, NT is rare. Tetanus-associated deaths among children aged less than one year, an indicator for NT deaths (most tetanus deaths in this age group are caused by NT), declined from 64.0 per 100,000 population in 1900 to 4.5 by the 1940s. By 1967 in the United States, NT incidence was less than 0.01 per 1000 live-born infants.** This decline is associated with improvements in birth practices and increased levels of population immunity following the initiation of routine tetanus toxoid vaccination since the 1940s. Since 1972, 31 cases of NT have been reported to CDC. Of these cases, only five (16%) mothers had a history of ever having received tetanus toxoid, and only one was known to have received more than one dose.

Factors contributing to this case include the lack of maternal vaccination, the anaerobic conditions and *C. tetani* contamination of the umbilical cord resulting from the application of a nonsterile clay, and the potential exposure to *C. tetani* spores from the nearby horse pasture. The case described in this report is the first since 1984 in an infant of a mother born in the United States and with philosophic objections to vaccination. Since 1984, only two other cases of NT have been reported, both in infants of unvaccinated or inadequately vaccinated mothers born outside of the United States (3,4). The case in this report was the first NT case and

one of only four tetanus cases reported from Montana since 1965.

Vaccination with tetanus toxoid during pregnancy is safe and effective in preventing NT (5). The ACIP recommends giving a booster dose of Td to previously vaccinated pregnant women who have not received a Td vaccination within the preceding 10 years, and unvaccinated or partially vaccinated pregnant women should complete the primary series of three doses of Td (6,7).

To prevent NT cases in the United States, health-care professionals should review and update the vaccination status of childbearing-aged women and particularly those who are pregnant. In addition, targeted education regarding the importance and safety of tetanus vaccination is needed among parents and direct-entry midwifery groups, and parents and health-care providers should avoid applying nonsterile products to the umbilical cord of newborns, including products that create anaerobic conditions. Unless all women giving birth are vaccinated appropriately with tetanus toxoid, even hospital-born infants in the United States are at risk for developing NT, especially if unconventional practices of umbilical cord care are followed.

* Direct-entry midwives are a group distinct from certified nurse midwives; in Montana, they are licensed to attend women during uncomplicated pregnancies, labor, and postpartum periods.

** Data on NT incidence per 1000 live-born infants were not available until the 1960s.

References

1. Expanded Program on Immunization. WHO/EPI Information System. Geneva, Switzerland: World Health Organization, Sept., 1998; document no. WHO/EPI/GEN/98.10.
2. Bardenheier B, Prevots DR, Khetsuriani N, Wharton M. Tetanus surveillance – United States, 1995-1997. In: CDC surveillance summaries (July). *MMWR* 1998; 47(no.SS-2): 1-13.
3. Craig AS, Reed GW, Mohon RT, et al. Neonatal tetanus in the United States: a sentinel event in the foreign-born. *Pediatr Infect Dis J* 1997;16:955-9.
4. Kumar S, Malecki LM. A case of neonatal tetanus. *South Med J* 1991;84:396-8.
5. Galazka AM. Tetanus: the immunological basis for immunization. Geneva, Switzerland: World Health Organization, Expanded Program on Immunization, 1990; document no. WHO/EPI/GEN/93.13.
6. CDC. General recommendations on immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 1994;43(no. RR-1):20-1.
7. CDC. Update on adult immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 1991;40 (no. RR-12):12-3.