

## FIVE CASES OF PUERPERAL TETANUS (ONE ASSOCIATED WITH ECLAMPSIA)

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Tetanus is a rare complication of pregnancy, being more often seen during the puerperium. Schneider (1926) collected 109 cases from the literature, and Weinstein and Beacham (1941) reviewed 170 cases of post-abort tetanus with a mortality of 84%. In tropical countries, especially India, China, and Africa, the condition is undoubtedly more common than these surveys of the literature would indicate.

Tetanus is said to follow abortion more frequently than it does labour at term. Infection often results from criminal interference or operative procedures, as in Case 1. In Cases 2 and 4 there was no such interference so far as could be ascertained, though native medicines are often introduced into the vagina. In Cases 3 and 5 a history of an unsterile procedure at home was elicited.

*Clostridium tetani* has been isolated from uterine lochia, but was not found in the two cases of the present series investigated bacteriologically. De Lee (1947) records that in Peiping approximately one-third of the population are carriers of the tetanus bacillus, but he does not specify whether this refers to the flora of the vagina or of the intestinal tract.

The incubation period of puerperal tetanus varies from four to twenty-one days (De Lee, 1947). The shorter the incubation period the worse the prognosis. According to Stander (1935) the first symptoms have been known to appear before the completion of labour. In Cases 1 and 4 the incubation period was eight days; in Cases 2 and 5 it was five days; and in Case 3 the first symptom was on the tenth day.

De Lee (1947) states that the incubation period for puerperal tetanus "is shorter than the incubation period in non-pregnant individuals." This is not borne out by the figures for the incubation period for non-puerperal tetanus given by most authors (Whitby, 1938; Brain, 1940; Price, 1946; Cecil, 1947; Harries and Mitman, 1947; Tidy, 1949).

Ibadan is the largest native city in Africa, with a population of over half a million. Living conditions are primitive and a knowledge of hygiene is almost completely lacking. Most of the inhabitants live in crumbling mud-brick houses. Tetanus is common, especially during the dry dusty season, and the portals of entry are often trivial—for example, tropical ulcers, infected "jigger" burrows (*Tunga penetrans*), the umbilical cord in the newborn (Jelliffe, 1950), etc. In India, Rogers (1944) emphasized the importance of dust-contaminated wounds as a cause of tetanus.

A labour managed according to native custom is favourable to the introduction of *Cl. tetani* into the birth canal, as the following brief description illustrates.

At the beginning of labour the patient is removed to the backyard or to a room in a mud house, the floor of which has been prepared by polishing with leaves. When the contractions assume a bearing-down character the patient is placed in a squatting or kneeling position, so that her

buttocks are resting on the ground or on her heels and with the vulva touching or close to the ground. She remains in this position throughout the second and third stages of labour. If labour is delayed she may stay in this position for many hours or days, to the extent that lower-limb palsies are not uncommon.

The floor is very apt to be contaminated by goat faeces, which have been shown on many occasions to contain spores of *Cl. tetani*. In addition, Kerrin (1929) found that about 18% of a series of hen faeces examined by him contained *Cl. tetani*. In Ibadan, hens stray inside the houses as commonly as goats.

During the descent of the presenting part, a pad, which is usually a dirty cloth, is placed over the anus in order to protect the perineum, and on occasion native medicines are introduced into the vagina or smeared on the vulva, especially in cases of abnormal labour. After the completion of labour the vulva is cleaned with an unsterile decoction of herbs. This is repeated on the morning and evening of the next day. A torn perineum is similarly treated.

### Case 1

An Ibo primipara aged 18 was admitted on March 20, 1950. She was at term and gave a history of having had two fits at about one and a half and two hours before admission. Labour had not begun. She had attended another antenatal clinic, and the pregnancy was reported to have been uneventful until March 16, when marked oedema was found, but she refused admission. Immediately before the first fit she had complained of frontal headache. While being admitted a third eclamptic fit occurred.

On examination the temperature was 99.8° F. (37.7° C.), pulse 88, respirations 22, and blood pressure 130/110 mm. Hg. There was marked oedema of the legs, abdominal wall, and face. Crepitations were heard at both lung bases. Abdominal examination revealed a tense uterus, reaching to the xiphisternum, suggesting hydramnios. Only one foetal heart was heard. Per rectum the cervical canal was felt to be taken up and the position of the head was high mid-cavity. Albumin was not found in a catheter specimen of urine. A modified Stroganoff method of treatment was instituted, using morphine, paraldehyde, and magnesium sulphate, together with a post-partum course of quinine sulphate as an antimalarial.

Eight fits followed in the next 12 hours, five of which were precipitated at short intervals by the onset of uterine contractions, necessitating further sedation and the administration of chloroform. Fifteen hours after admission the urine was found to be solid with albumin. The temperature was 102° F. (38.9° C.), pulse 124, and blood pressure 164/90 mm. Hg. The cervix became fully dilated some 19 hours after admission. After one and a half hours in the second stage, forceps were applied and a fresh stillbirth, weight 5 lb. 2 oz. (2.3 kg.), was delivered. A second foetus was found presenting by the head, but, as it failed to engage on rupturing the membranes, an internal version and breech extraction was performed. This was followed by manual removal of the placenta, which weighed 29 oz. (0.82 kg.) and macroscopically did not seem unduly infarcted. The baby, which weighed 5 lb. 4 oz. (2.4 kg.), has survived.

Next day the patient's temperature was 104.4° F. (40.2° C.), pulse 168, respirations 36, and blood pressure 124/94 mm. Hg. The urine was solid with albumin. Crepitations were not heard at the lung bases. Sedation was continued, together with penicillin, sulphathiazole, and quinine. Her general condition improved rapidly, but she had two further fits at an interval of five minutes, occurring 48 hours after the last fit and 40 hours after delivery. Thereafter the temperature and the pulse settled, the urine contained a trace of albumin, and the blood pressure fell to 108/60 mm. Hg.

The patient seemed to have made an uneventful recovery, when, on the eighth day after delivery at 2.30 a.m., she developed a severe pain in the back of the head and neck.

There were no definite signs. Morphine,  $\frac{1}{4}$  gr. (16 mg.), was given. At 9 a.m. opisthotonos and considerable neck rigidity had developed. The muscles of the abdominal wall were board-like. Kernig's sign was markedly positive. Moderate trismus was present. She was fully conscious. Her temperature was 98.6° F. (37° C.) and the pulse 90. A lumbar puncture showed crystal-clear fluid under no increase of pressure.

Treatment was begun with antitetanus serum, 100,000 units intravenously, together with 100,000 units intramuscularly, sodium amyral, 0.5 g. intramuscularly at 9.30 a.m. and at 1 p.m., and procaine penicillin 1 ml. intramuscularly. At 1.30 p.m. she was much worse. Nuchal rigidity, opisthotonos, and trismus were marked. The body was held in hyperextension. There were no true generalized spasms, but repeated localized spasms of the jaw muscles made swallowing difficult and caused her to bite her tongue repeatedly. Morphine,  $\frac{1}{4}$  gr., was given.

At 4.30 p.m. the patient was drowsy. Spasms were less frequent, her temperature was 99° F. (37.2° C.), and pulse 105. Sodium amyral, 0.5 g., was given intramuscularly. Following this, she slept through the night, and began having localized tetanic spasms only early the next morning.

At 8.30 a.m. on March 29 sodium amyral, 0.5 g., was given intramuscularly, as the patient had become restless and was having frequent generalized spasms. Trismus was very marked, and nasal feeding was started with a Ryle's tube. A vaginal examination showed the fundus uteri to be at the level of the umbilicus. The lochia were noted to be offensive and a high vaginal swab was taken, but *Cl. tetani* was not identified.

At 1 p.m. she had become comatose, although still in hyperextension. Sodium amyral, 0.25 g., was given at 9.30 a.m. and at 12 noon. The temperature had now risen to 104° F. (40° C.) with a pulse of 168. No new physical signs could be found. The lungs were clear. Procaine penicillin, 1 ml. intramuscularly, and quinine dihydrochloride, 10 gr. (0.65 g.) intramuscularly, were given. The temperature continued to rise during the night (107° F. (41.7° C.) at 2 a.m.) despite repeated tepid sponging. The patient did not recover consciousness, and died at 6 a.m. on March 30.

*Impression.*—A fulminating case of puerperal tetanus, with terminal hyperpyrexia, following eclampsia.

### Case 2

A Yoruba woman of about 40 was admitted on January 12, 1950, at 1 a.m. She was a 4-para and gave a history of having aborted spontaneously 10 days before admission, after two months' amenorrhoea. On the fifth day after aborting she developed a stiff neck. Examination showed considerable neck rigidity, together with moderate trismus and rigidity of the muscles of the anterior abdominal wall. Kernig's sign was negative. There were no other abnormal physical signs. Her temperature was 99° F. (37.2° C.) and her pulse 120.

On admission she was given 200,000 units of antitetanus serum intravenously and morphine  $\frac{1}{4}$  gr. This was followed by sodium amyral, 0.5 g. intramuscularly at 9 a.m. and 3 p.m., and phenobarbitone, 2 gr. (0.13 g.) three times a day. On January 13 the patient's condition was rather worse. Generalized spasms occurred if she was disturbed. Neck rigidity was more marked. At 2 p.m. her condition had deteriorated considerably. Generalized spasms were occurring every few minutes. Trismus was pronounced and the recti were board-like. A further injection of sodium amyral, 0.5 g., was given at 3 p.m. At 7.15 p.m. she became restless. The spasms recurred every two minutes or so, and she died at 7.50 p.m.

*Impression.*—A fulminating case of puerperal tetanus with a short incubation period.

### Case 3

A Yoruba woman of about 30 was admitted on March 8, 1950, at 10.30 p.m. She was a primipara and gave a history of having had a normal full-time delivery at home 14 days previously. The delivery was conducted according to native custom with the patient kneeling throughout the later stages of labour. She stated that after expulsion of the placenta something protruded from the vagina (? cervix). Her attend-

ants gave her a sitz bath containing native medicines, replaced the prolapsed tissue with a rag, and applied a dirty pad. Ten days after delivery the patient complained of difficulty in opening her mouth and of stiffness of the neck. Examination showed considerable nuchal rigidity, the neck being held in hyperextension, together with a moderate degree of trismus. The muscles of the abdominal wall were slightly rigid. Kernig's sign was negative. No generalized spasms were observed.

A purulent discharge was the only abnormality revealed by vaginal examination, the involution of the uterus being normal. Bacteriological examination did not show *Cl. tetani*. Her temperature was 99° F. (37.2° C.) and pulse 110. Her tongue was heavily furred and superficial ulceration was present around the edge. She was moderately well nourished, not anaemic, and showed no abnormality in either the respiratory or the cardiovascular system.

Treatment was begun with antitetanus serum, 200,000 units intravenously, sodium amyral, 0.5 g. intramuscularly at 11 a.m. and 5 p.m., and phenobarbitone, 3 gr. (0.2 g.) orally three times a day.

On March 9 the patient was having generalized spasms whenever she was disturbed, but was otherwise sleeping most of the time. Trismus was more marked, so that feeding was difficult. The temperature varied from 99.8° to 100.2° F. (37.7° to 37.9° C.). Sodium amyral, 0.5 g., was given intramuscularly at 5 a.m. and a course of crystalline penicillin was started (100,000 units intramuscularly twice daily). On March 10 generalized spasms were occurring more often, at about half-hourly intervals. On March 12 the fits were rather less frequent. The bowels had not been open since admission, so an enema was given. Fluids were taken fairly well. She was having phenobarbitone, 3 gr. by mouth three times a day.

On March 14 there was considerable improvement, although an occasional spasm of the face and neck occurred. The generalized spasms had stopped. She was able to swallow quite well. The vaginal discharge had also stopped. On March 17 there was considerable residual stiffness, the neck being still held in hyperextension, with rigid abdominal muscles. Absolute constipation persisted, enemas being required every third day. The mouth was clean and she was able to drink easily. Phenobarbitone was reduced to 2 gr. three times a day. On March 21 there had been no recurrence of the tetanic spasms, and the patient slept most of the time. Phenobarbitone was reduced to 1 gr. thrice daily, and on March 24 it was discontinued.

On March 30 there was no hyperextension of the neck, but residual nuchal stiffness was still present. She was able to walk if supported, but was very stiff-legged. Her back was still held in hyperextension and the abdominal muscles were very rigid. She could open her mouth three-quarters of the way and her bowels opened unaided. She insisted on taking her own discharge.

*Impression.*—A case of puerperal tetanus of moderate severity, responding rapidly to treatment.

### Case 4

An Ibo woman aged about 27 was admitted on June 6, 1950, 10 days after the birth of her first child—a normal male infant. She had conducted her own confinement in her house. Labour had been uncomplicated and had lasted only five hours. No native medicines had been administered. Clean rags had been used as a vaginal pad. The patient gave a two-day history of difficulty in opening the mouth and of stiffness of the neck. No vaginal discharge had been noticed.

On examination definite trismus, neck retraction, and cervical stiffness were found. There was no abdominal rigidity or stiffness of the back. Her temperature was 99.5° F. (37.5° C.) and her pulse 100. Vaginal examination revealed no abnormality, the uterus being at the normal stage of involution. Treatment was begun with antitetanus serum, 200,000 units intravenously, sodium amyral, 0.5 g. intramuscularly, phenobarbitone, 2 gr. (0.13 g.) orally three times a day, and a course of crystalline penicillin (100,000 units intramuscularly twice daily).

On June 7 the trismus and neck rigidity had become much more pronounced, though she was still able to swallow. Stiffness of the muscles of the back and the abdomen had developed. There were no generalized tetanic spasms. Treatment was continued with phenobarbitone, 2 gr. four-hourly, and crystalline penicillin, 100,000 units intramuscularly twice daily. During the following week no real change occurred in the patient's condition. She was able to swallow and continued to feed the baby. On June 16 she had improved considerably, the stiffness of the cervical, abdominal, and back muscles having become much less. Phenobarbitone was reduced to 2 gr. three times a day and the penicillin was discontinued.

On June 18 she was able to walk about unaided, though she still had a minimal degree of trismus, neck rigidity, and stiffness of the musculature of the back. She was discharged at her own request.

*Impression.*—A mild case of puerperal tetanus responding rapidly to treatment.

### Case 5

A Yoruba woman aged about 25 was admitted to hospital on June 17, 1950. She was a primipara, having given birth to a normal male child 10 days before admission. The early stages of labour had been easy, lasting only a few hours. Expulsion of the placenta, however, had been incomplete. The patient had then been made to blow into a calabash horn in an attempt to force out the retained portion of placenta. This had been unsuccessful. Attendant relatives had then tried to assist by swabbing out the vagina with plugs of fresh kapok. The woman was not certain whether the remainder of the placenta had been eventually removed or not. No native medicines had been administered during labour. Dirty rags had been used as a vaginal pad.

The patient had been quite well, save for a profuse white vaginal discharge, until five days after delivery, when she developed slight stiffness of the neck and trismus. This had become progressively worse, and on admission the trismus and cervical stiffness had become very severe. Swallowing had become difficult, and in addition she complained of lower abdominal pain and backache.

Examination showed an ill, poorly nourished young woman. Her skin was covered with the pigmented macules of old smallpox. There was marked trismus, neck retraction, and rigidity of the abdominal and back muscles. Her temperature was 101° F. (38.3° C.) and the pulse 104. The gynaecological report (Dr. J. G. Dumoulin) was: "Per abdomen, the fundus is up to the umbilicus and slightly tender; there is no tenderness in the iliac fossae. Per vaginam, a slight greenish-yellow discharge is present. The uterus is bulky and tender. There is nothing abnormal in the fornices. No active gynaecological treatment is required."

Treatment was started with antitetanus serum, 200,000 units intramuscularly, sodium amyral, 0.5 g. intramuscularly at 10 a.m. and 6 p.m., phenobarbitone 2 gr. orally four-hourly day and night, and procaine penicillin 1 ml. intramuscularly daily.

On June 18 the patient had developed full tetanic spasms. These occurred every two minutes. The temperature was 102.5° F. (39.15° C.) and the pulse 120. She was still able to swallow with difficulty. Sodium amyral, 0.5 g., was given at 10 a.m., 2 p.m., and 10 p.m. On June 19 the tetanic spasms had become almost continuous. Sodium amyral, 0.5 g., was given intramuscularly at 6 a.m. At 10 a.m. the temperature rose to 104° F. (40° C.) and the patient became stuporous. She died at 11 a.m.

*Impression.*—A severe and rapidly fatal case of puerperal tetanus, with terminal hyperpyrexia.

### Discussion

It is not the purpose of this paper to discuss the treatment of tetanus, other than to advocate the prophylactic administration of antitetanus serum in the Tropics before undertaking any gynaecological operation, major or minor, and to all obstetrical cases that require intervention. In patients

admitted with a retained placenta it is also advisable to give antitetanus serum to the baby in view of the local method of treating the cord before admission.

Tetanus associated with eclampsia seems to have been unrecorded. In Case 1 there was an interval of five and a half days between the last eclamptic fit and the onset of tetanus, from which the patient died two days later. The difference between the two types of fits was striking and clear-cut. Despite the onset of tetanus, the signs of toxæmia of pregnancy did not recur. In addition, the naked-eye and microscopical appearances at necropsy did not reveal any abnormality that could be attributed to eclampsia, from which, therefore, the patient seems to have recovered completely.

The terms "tetanus uteri," "tetanic contraction of the uterus," and "tetany of the uterus," as used by most American authors, are confusing and illustrate the need for greater uniformity and precision in obstetric nomenclature.

It is probable that the incidence of tetanus in Ibadan is much higher than case records indicate, as local women prefer domiciliary confinements and do not readily seek hospital advice for puerperal complications.

### Summary

Five cases of puerperal tetanus are recorded, one of which followed eclampsia. The prevalence of tetanus is discussed in especial relation to local primitive conditions. The importance of prophylactic antitetanus serum in obstetrical and gynaecological practice in tropical countries is stressed.

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In co-operation with national government, and with Unicef, W.H.O. has launched practical malaria-control projects in four rural areas in India, as well as one in Thailand and two in Afghanistan, since the opening of its regional office in New Delhi in January, 1949. A W.H.O. venereal-disease-control project is operating successfully in North India. Maternal and child-health projects have begun in India and, in co-operation with Unicef, in Afghanistan. W.H.O. is participating with Unicef in yaws-control projects in Indonesia and Thailand. W.H.O. fellowships have enabled 61 doctors and health workers from countries of South-east Asia to obtain advanced training abroad, and a sum of \$40,600 has been allotted by W.H.O. to countries in the region for the purchase of urgently needed medical literature and teaching equipment. Assistance has been given to Ceylon in its anti-filaria campaign, and to Afghanistan in fighting louse-borne typhus. W.H.O. experts in the treatment and rehabilitation of poliomyelitis victims have given training courses in India to local health workers. This W.H.O. regional office for South-east Asia is one of the three regional offices already established by the organization, the other two serving the eastern Mediterranean region and the Americas (Pan-American Sanitary Bureau). In addition, temporary offices for Europe and the Western Pacific are functioning in Geneva and Hong Kong, respectively.