Acquiring Tetanus After Hemorrhoid Banding and Other Gastrointestinal Procedures

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Published online: 17 January 2007
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Abstract Tetanus after hemorrhoidal banding is an extremely rare but serious complication of the procedure. We describe the second reported case of this complication and review the literature concerning tetanus after different gastrointestinal procedures. Although a rare complication, practicing physicians need to be aware of the clinical presentation of this deadly disease when encountered in at-risk patient populations. Such cases also reemphasize the importance of primary tetanus immunization and follow-up boosters for all vulnerable patients.

Keywords Tetanus · Hemorrhoids · Surgical procedures operative · Postoperative complications · Digestive system surgical procedures

Introduction

Tetanus is currently a rare disease in the United States and other developed countries where active immunization programs provide a considerable degree of immunity to the infection in the general population. The incidence of tetanus has dropped dramatically in the United States and other developed countries due to a successful vaccination program instituted in the 1940s.¹ During the period from 1998 to 2000, the Centers for Disease Control (CDC) reported the average annual incidence of tetanus to be 43 new cases in

the United States per year. This is equivalent to 0.16 cases/million people in the US.² The worldwide incidence of tetanus, however, is much higher and estimated to be around 500,000 to 1 million per year.³ In developed countries, tetanus is most commonly seen in immigrant patients who have never received a complete primary immunization series. Another at-risk group is the elderly people who have not received recent booster doses. Such cases in the older, previously vaccinated adult reflects waning immunity if a booster shot is not received every 10 years.

Tetanus is caused by the toxin-producing anaerobic bacterium *Clostridium tetani*. *C. tetani* is a spore-forming bacteria that once inside the body of susceptible host, produces a potent toxin named tetanospasmin. Tetanospasmin binds to the central nervous system causing diffuse muscle spasms and autonomic instability that characterizes tetanus. Tetanus is usually seen in association with soil contamination of a cutaneous wound; however, on rare occasions it may occur after a surgical procedure such as gastrointestinal surgery. In this paper, we describe the second reported case of tetanus after banding ligation of internal hemorrhoids and will review the other reported cases of tetanus after gastrointestinal procedures.

Case Report

A 63-year-old female with no significant past medical history presented with chief complaint of 5 days of anal

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discomfort due to hemorrhoids. Physical exam showed a 1.5 cm soft and inflamed external hemorrhoid. She was initially treated with pramoxine suppositories and a week later was scheduled for elective hemorrhoid banding. At the time of surgery, she was noted to have a small noninflamed external hemorrhoid as well as a grade III internal hemorrhoid at the eight o'clock position; there was no evidence of infection. The patient underwent rubber band ligation of the internal hemorrhoid with no immediate complications. After the procedure, the patient was instructed to take daily Sitz baths and given a prescription for docusate (oral) and psyllium to prevent constipation. Five days after the surgery, the patient returned to the hospital with a 1-day history of sore throat, pain upon swallowing, headache, and inability to open her mouth. She was noted to have a hoarse voice and stated that she had difficulty sticking out her tongue. Initial vital signs showed blood pressure of 150/70 mmHg, pulse of 95, temperature of 37.1°C, and respiratory rate of 18 per minute. Neurological examination was remarkable for inability to completely open the mouth; the rest of the neurological examination showed normal findings including muscle tone, bulk, and strength. A neck x-ray was obtained and it was normal. Patient's inability to open mouth prompted further evaluation and the diagnosis of tetanus was entertained. Further history revealed that patient had never been immunized against tetanus. She was subsequently admitted to the intensive care unit and initially treated with 1,000 units of intravenous (IV) human tetanus immune globulin, 2 g of IV ceftriaxone every 24 h, IV diazepam, and methylprednisolone. On the next day, the patient had severe pain on attempting to open her mouth and diffuse muscular spasms of jaw, neck, abdominal musculature consistent with trismus and generalized tetanus. A rectal exam at the time showed normal postoperative changes; there were no masses, bleeding, signs of infection, or hemorrhoids. She subsequently developed respiratory difficulties due to laryngeal spasms and required intubation and paralysis. In the next days, she developed a number of complications related to hospitalization and the underlying tetanus. The patient had autonomic lability with associated hypertension (systolic blood pressure up to 220 mmHg) and tachycardia (pulse of 110s); she developed an episode of chest pain and was found to have an acute anterior wall ST-elevation myocardial infarction confirmed with EKG abnormalities and elevated troponins. Additional complications included a small pneumothorax after placement of a Swann–Ganz catheter, left lung collapse due to mucous plugging, and nosocomial pneumonia due to *Acinetobacter baumannii*. Attempts to wean her during endotracheal intubation were unsuccessful and the patient required a tracheostomy. After about 2 months of hospitalization, she gradually improved and was weaned from the respirator. She had upper and lower muscle atrophy, global muscle weakness, and ankle

contractures bilaterally. She had no obvious sensory, cognitive, or language deficits. She was able to roll herself in bed and feed herself; however, she was unable to stand, walk, or place herself on bedpan. She was subsequently transferred to an inpatient rehabilitation facility for intensive physical and occupational therapy. At the completion of a month-long inpatient rehabilitation program, she showed some improvement but still had some lower extremity weakness (grade 3–4 out of 5 of muscle strength bilaterally) and residual ankle contractures; she could walk with assistance using a forearm crutch. The patient was discharged from the hospital with a continuing outpatient rehabilitation program.

Review of Literature

Methods

We searched the English language articles from 1966 to January 2005 in the MeSH system of PubMed for relevant case reports and articles. MeSH keywords identified included *tetanus*, combined with *digestive system surgical procedures*, *surgery*, *surgical procedures operative*, and *hemorrhoids*. All the relevant articles were reviewed, and their reference list examined for other relevant articles. Other articles were obtained and reviewed from these reference lists. Postoperative tetanus cases after obstetric–gynecology procedures in which the appendix was removed were not included; one such paper is included in the reference list however.⁴

Results

We found 14 case reports of tetanus after gastrointestinal procedures. Findings and case summaries are outlined in the tables below (see Tables 1 and 2).

Table 1 Reported Cases of Gastrointestinal Procedures Complicated by Tetanus

Cases	References
Open cholecystectomy	5–7
Cholecystectomy with exploration of bile duct	8
Resection for a gangrenous perforated small intestine	9,10
Rubber band ligation of hemorrhoids	11
Cryosurgery for internal hemorrhoids	12
Drainage of anorectal abscess	13
Sigmoidoscopic polypectomy	14
Gastrectomy, Billroth II, and transverse colectomy, (for large cell lymphoma)	15
Exploratory laparotomy (for carcinoma in omentum and liver)	5

Table 2 Summary of Presentations for the Reported Cases

Author	Year	Age (Year)	Gender (Male/Female)	Time to Initial Symptoms. (Days Postprocedure)	Initial Symptoms	Later Symptoms	Onset of Later Symptoms (Days Postprocedure)	Tetanus Immunization	Outcome
Open cholecystectomy: (four cases) ^{5–7}									
Parker & Mandal ⁵	1984	47	Female	10	No mention	Trismus	10	uncertain	Alive
Parker & Mandal ⁵	1984	59	Female	17	Spastic gait	No mention	22	No mention	Dead
O'Riordain, Buckley, & Kirwan ⁶	1991	46	Male	11	Abdominal spasm, pain, fever, mild trismus	Trismus	12	No	Dead
Crokaert, Glupczynski, Fastrez, Alle, & Yourassowsky ⁷	1984	44	No mention	6	Neck and face pain, stiffness	Opisthotonus	6	No mention	No mention
Cholecystectomy with exploration of bile duct: (two cases) ⁸									
Lennard, Gunn, Sellers, & Stoddart ⁸	1984	49	Female	12	Sub-costal pain, abdominal distention	Opisthotonus	No mention	No	Alive
Lennard et al. ⁸	1984	66	Female	16	Abdominal pain	Trismus	19	No	Alive
Resection for a gangrenous perforated small intestine: (two cases) ^{9,10}									
Furui et al. ⁹	1998	75	Male	1	Jerking, limb rigidity	Opisthotonus	1	No	Alive
Clay & Bolton ¹⁰	1964	61	Male	2	Jerking	Opisthotonus	4	No mention	Alive
Rubber band ligation of hemorrhoids: (two cases) ¹¹									
Murphy ¹¹	1978	33	Female	7	Dysphagia, neck pain	Trismus	9	No	Alive
Present case	1997	63	Female	4	Dysphagia	Trismus	6	No	Alive
Cryosurgery for internal hemorrhoids: (one case) ¹²									
Singh, Chhina, & Kaul ¹²	1992	42	Male	14	Fever, Dysphagia	Trismus	19	No	Alive
Drainage of anorectal abscess: (one case) ¹³									
Myers et al. ¹³	1984	62	Male	10	Restlessness, limb rigidity	Trismus	12	No	Alive
Sigmoidoscopic polypectomy: (one case) ¹⁴									
Segel & Shaff ¹⁴	1969	55	Female	10	Fatigue, weakness	Trismus	19	No	Alive
Gstrectomy, Billroth II, and transverse colectomy, for "large cell lymphoma": (one case) ¹⁵									
Fleshner, Hunter, & Rudick ¹⁵	1988	48	Male	21	Fever, abdomen, back pain, dysphagia	Trismus and opisthotonus	26	No	Alive
Exploratory laparotomy (for carcinoma in omentum and liver): (one case) ⁵									
Parker & Mandal ⁵	1984	65	Female	12	No mention	No mention	12	No	Dead

Discussion

This is the second case of tetanus after hemorrhoid banding that we were able to find in the literature. As noted in Table 1, tetanus can occur after a wide variety of gastrointestinal surgical procedures including major intra-abdominal surgery (e.g., cholecystectomy for cholecystitis; exploratory laparotomy for intestinal perforation), as well as relatively “trivial” procedures such as hemorrhoid surgery and sigmoidoscopic polypectomy. Tetanus occurs after germination of the spores and subsequent production of toxin by the organism. *Clostridium tetani* will not grow in healthy tissue, therefore a number of factors need to be present for germination to occur including ischemia, devitalized tissue, coinfection, and injury from penetration or foreign body.¹ In gastrointestinal surgical procedures, presence of ischemic or devitalized tissues permits proliferation of *C. tetani* and subsequent toxin production. In our case, the devitalized tissue from banded hemorrhoid was the likely entry point for the organism with subclinical *C. tetani* infection occurring at the site. *C. tetani* may be isolated from stool flora in asymptomatic individuals; in farming regions where individuals are in constant contact with soiled domestic animals (e.g., horses, cattle), up to 1/3 of individuals may have *C. tetani* in their stools.¹⁶ Given standard sterilization procedures, tetanus associated with infected surgical instruments is extremely uncommon in industrialized countries—our patient most likely developed the condition after contamination of the wound with organisms from the stool or external environment. In our experience with patients from Latin America, it has come to our attention that some of them use herbal products such as out-door plants known as aloe vera (“buena herba” in Spanish) for treatment of local wounds. Although we are not aware of any documented case report of this practice causing transmission of tetanus, we wonder if application of contaminated outdoor plants might play a role in some of the postoperative cases. Our patient did not provide history of such practice and the exact mode of contamination will not change the clinical presentation or management. Once suspicion arises for presence of tetanus, identification depends upon recognition of the characteristic clinical syndrome. Although isolation of *C. tetani* from a wound is supportive of the diagnosis, many patients have negative wound cultures and presence of the characteristic clinical syndrome is adequate evidence to support the diagnosis.¹

Although rare, it is prudent for practitioners to be mindful of signs that suggest the possibility of postoperative tetanus. Patients with tetanus usually have painful spasms and contractions of their skeletal muscles; this can present as stiff neck, trismus, or opisthotonus. Lockjaw, also known as trismus, leads to inability to open the mouth and the characteristic sardonic smile (risus sardonicus)—it

is a sign of spasm of muscles of mastication. Trismus, along with back pain and diffuse muscle spasms, is one of the most frequent findings in tetanus.¹⁷ Opisthotonus is a sign of generalized tetanus and is characterized by painful involuntary bending of spine and extremities. It leads to forward convexity of the body, with patient’s torso arching upward and body supported on head and heels. There can also be periods of apnea due to thoracic, glottal, pharyngeal muscle contractions often requiring intubation and respiratory support. Irritability, restlessness, sweating, labile vitals signs, or even a myocardial infarction can occur due to autonomic instability. Presence of these signs or symptoms could be due to underlying tetanus and should alert the practitioner of possibility of the condition. Despite the case reports in Table 1, it should be emphasized that tetanus is a highly unusual complication of gastrointestinal surgical procedures. Given the extremely rare incidence of this complication, it does not appear to be practical to require evidence of full tetanus immunization before a procedure. Nevertheless, our case reemphasizes the importance of routine tetanus immunization, especially in patient populations that were not immunized in childhood or failed to receive a complete series of vaccinations. As part of their general health maintenance, adults should continue to receive periodic booster shots every 10 years as recommended by public health authorities.¹⁸ Furthermore, despite its rarity, practitioners need to be aware of the clinical presentation of tetanus and consider the diagnosis in at-risk patients who present with characteristic symptoms such as trismus and muscle rigidity.

Conclusion

Postoperative cases of tetanus have been reported after a number of different gastrointestinal procedures. Tetanus can occur after relatively minor procedures such as hemorrhoidal banding. Practicing physicians need to be aware of the clinical presentation of this deadly disease when encountered in vulnerable patient populations.

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