

A CASE OF TETANUS MIMICKING ACUTE ABDOMEN

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ABSTRACT

A 47-year-old man presented with backache and signs of acute abdomen. An exploratory laparotomy was performed. Post-operatively he developed hypoxaemia in the operating theatre and was brought to the Surgical Intensive Care Unit for ventilatory support and further investigations.

History was then retaken and revealed a minor foot injury one month ago with subsequent development of muscle spasm and dysphagia. The diagnosis of tetanus was made. The patient was then treated with human antitetanus immune globulin and crystalline penicillin. Ventilatory support was continued, aided by infusion of morphine, diazepam and alcuronium. The recovery course was complicated by chest infection, urinary tract infection and sympathetic overactivity. He improved later and ventilatory support was discontinued three weeks after admission. He then made uneventful recovery and was discharged from the hospital forty days after admission.

Keywords: tetanus, backache, acute abdomen, post-operative hypoxaemia

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CASE REPORT

A 47-year-old Chinese vegetable farmer presented at the Accident and Emergency Department with a three-day history of low back pain with difficulty in micturition. He was seen by the orthopaedic surgeon on duty who noted that he was in severe pain but there was no history of back injury.

Clinical examination showed that his heart rate was 104 beats per minute. Blood pressure was 140/90 mmHg. There was marked paravertebral spasm with limited back movement. His abdomen was found to be guarded with tenderness in the right iliac fossa. Bowel sound was absent. His bladder was distended. There was no neurological deficit detected and the neck was not stiff. Full blood count and serum electrolytes were normal. Arterial blood gases were not measured pre-operatively. ECG and chest X-ray were normal. The abdominal X-ray showed dilated sigmoid colon. A general surgeon was consulted and a diagnosis of acute abdomen was made. An emergency exploratory laparotomy was scheduled.

The patient was then seen by the anaesthetist on duty. Trismus was not present. No muscle spasm was observed. Pulse oximeter showed that his oxygen saturation was only 91% when breathing room air. Induction of general anaesthesia was uneventful. Rapid sequence intubation was performed aided with thiopentone and suxamethonium with no difficulty. Muscle relaxation was maintained with tubocurarine 30 mg throughout the operation. Anaesthesia was maintained with nitrous oxide, oxygen and isoflurane. Pethidine 40 mg was given for pain relief intra-operatively. Dilated sigmoid colon was noted during the operation but no other abnormality was found. The patient was stable haemodynamically throughout the two-hour operation.

Neuromuscular blockade was reversed at the end of surgery. As tidal volume was noted to be small, a second dose of reversal drugs was given (total dose of atropine 1.2 mg and neostigmine

3.75 mg). Fifteen minutes later, respiratory effort was judged to be adequate. Extubation was done and the patient was observed in the recovery area of the operating theatre.

Thirty minutes after extubation, the patient was found to be hypoventilating. He was conscious with no sign of airway obstruction. Breathing movement was jerky and twitching movements were observed over the chest, abdomen and calves. Oxygen saturation fell to 80% while breathing room air. He was reintubated and brought to surgical intensive care unit for ventilatory support and further investigations.

The history was taken from his wife who recalled that he had a minor injury to his right foot one month prior to admission. He did not seek any medical attention. Two weeks later, intermittent muscle spasms were noticed over his limbs, gradually increasing in frequency. Difficulty in swallowing was also observed during the same time.

The physician on duty was consulted and a diagnosis of tetanus was made. Intramuscular human antitetanus immune globulin 500U was given immediately and eight hours later. Intravenous crystalline penicillin 2 megaunits was administered six hourly over the next two weeks. The injured foot was examined but the wound had healed completely.

Ventilatory support was continued and tracheostomy was performed one week later. He was sedated with continuous infusion of morphine 2 mg/hour and diazepam 5 mg/hour. As muscle spasms persisted despite sedation, infusion of alcuronium at 5 mg/hour was added.

Chest infection and urinary tract infection developed in the post-operative period. Sputum culture grew *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Acinetobacter*. Urine culture grew *Pseudomonas aeruginosa*. Fortum^R 1 g 8 hourly and Unasyn^R 1.5 g 8 hourly were administered intravenously over a period of eight days and later intravenous Imipenem 500 mg 6 hourly was added for 10 days until the repeat cultures became negative.

Sympathetic overactivity was evident from the sixth post-operative day onwards. Heart rate of 160 beats per minute with blood pressure as high as 220/140 mmHg were observed. There was no hypotensive episode. Intravenous infusion of propranolol at 0.1 mg/hour was carefully administered for four days with successful control of hypertension and tachycardia.

Total parenteral nutrition was started on the fourth post-operative day as the patient was in ileus. Enteral feeding resumed ten days later. Requirements for morphine, diazepam, and alcuronium decreased as the patient showed clinical

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improvement. These were discontinued eighteen days after admission to surgical intensive care unit and the patient was successfully weaned off the ventilator three days later, after receiving ventilatory support for three weeks. He was then transferred to a general ward and was discharged from the hospital sixteen days later.

DISCUSSION

Tetanus is a toxin mediated disease caused by *Clostridium tetani*. It is predominantly a disease of under-developed countries and is relatively uncommon in Singapore.

After an incubation period of approximately two weeks, the patient developed muscle spasms. Trismus is absent in his case although it was reported to be the presenting symptom in 75% of cases of tetanus⁽¹⁾. Instead, this patient complained of backache and was found to have clinical signs suggestive of peritonitis and ileus probably due to muscle spasms and sympathetic overactivity. There was associated dysphagia. Difficulty in micturition could be due to spasm of perineal muscles and paralysis of bladder musculature⁽²⁾. Unfortunately, as the history of injury was not elicited then, the correct diagnosis of tetanus was only made post-operatively. In retrospect, this patient could have avoided a major operation if a more detailed history was available pre-operatively.

Prior to anaesthetic induction, the patient was already hypoxic according to the pulse oximeter. Induction was uneventful and suxamethonium was administered without any clinical evidence of hyperkalaemia, which is a cause of cardiac arrest in patients with tetanus following administration of suxamethonium⁽³⁾.

Post-operatively, respiratory efforts were further weakened by residual effects of general anaesthetic drugs and muscle relaxants. The effects of suxamethonium may last longer than expected as the level of pseudocholinesterase is known to be reduced in tetanus⁽⁴⁾. Surgical pain might have further aggravated muscle spasms, contributing to hypoventilation and hypoxaemia.

Alcuronium was used in the surgical intensive care unit to control muscle spasm and facilitate ventilatory support. Vecuronium is thought to be superior because of its haemodynamic stability and lack of cumulative effect when used for long period⁽⁵⁾. Alcuronium was chosen in this case in view of the higher price of vecuronium. There was no significant haemodynamic instability due to alcuronium which can manifest as hypotension and the weaning of the patient from ventilatory support after three weeks was not excessively difficult.

The post-operative course was complicated by secondary infections and autonomic dysfunction. Propranolol was used successfully to control tachycardia and hypertension. However, it should be remembered that the use of propranolol in tetanus has been associated with pulmonary oedema and cardiac arrest⁽⁶⁾. In fact, it was recommended that anti-sympathomimetic therapy should only be considered if an adequately sedated, well-hydrated and unstimulated patient on ventilatory support is still showing signs of sympathetic overactivity⁽⁷⁾.

Infusion of magnesium sulphate has also been used successfully in the management of autonomic dysfunction in tetanus. Magnesium is known to inhibit release of adrenaline and noradrenaline from both the adrenal gland and nerve terminals. It also reduces the sensitivity of receptors to adrenaline and potentiates neuromuscular blockade to reduce muscle spasms⁽⁸⁾. It has been suggested that infusion of magnesium sulphate alone may be inadequate to control sympathetic overactivity because magnesium is a poor central sedative. When used alone, the patient's increased level of consciousness may lead to an increase in sympathetic tone. Thus, it is best used as an adjunct to deep sedation⁽⁹⁾.

Continuous lumbar epidural infusion of 0.25% bupivacaine was used by Southorn and his colleagues in the management of one patient with tetanus induced autonomic dysfunction. The bupivacaine infusion successfully controlled the swings in blood pressure when the pulmonary capillary wedge pressure was maintained between 12 to 15 mmHg. There was associated decrease in muscle spasm and urinary excretion of metanephrine⁽¹⁰⁾. However, this technique can cause hypotension which can be aggravated by septicaemia caused by secondary infection. Development of an epidural abscess is also possible in the presence of septicaemia.

As tetanus is not a common condition in an urban country like Singapore and the clinical presentation can be atypical as in this case when it mimicked an acute abdomen, awareness and a high index of suspicion are essential for early diagnosis and prompt initiation of the correct management to reduce morbidity and mortality associated with the condition.

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