

Anaesthesia in a Patient with Cutaneous Anthrax - A Case Report

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Summary:

Anthrax is a disease of domestic animals. In human beings it is an occupational disease, commonly encountered in farmers, butchers and dealers in hides, hair and wool in endemic areas. Cutaneous, gastrointestinal, inhalational and meningeal anthrax are the different types. Inoculation of spores is the commonest mode of disease transmission. We present one such rare case of cutaneous Anthrax, who presented for emergency surgery and anaesthesia. proper sterilisation of anaesthetic and surgical equipment and role of vaccines is discussed.

Key words:

Anthrax, Cutaneous, Anaesthesia, Sterilisation

Case Report:

A 49 year old patient, farmer by occupation, presented with a swelling in the right forearm. Four days prior to the onset of swelling, there was a history of injury to that region while grazing sheep and cattle. The swelling was painful and rapidly progressed to involve the whole of right upper limb (RUL). On examination, patient was afebrile, respiratory rate was 20/min with pulse rate of 90/min and blood pressure 90/70 mm Hg. Respiratory, cardiac, nervous system and abdominal examination revealed no abnormality. Oxygen saturation was >95%. Airway was normal. Local examination of the RUL showed a swelling, which was tender, edematous and warm. Subcutaneous emphysema in the RUL was present. Right radial pulse was weak. Fingertips were bluish and the capillary refill was delayed.

A clinical diagnosis of cellulitis was made. Since the vascularity of the limb was compromised, and subcutaneous emphysema in the RUL was rapidly progressing, the patient was posted for emergency decompression fasciotomy. Electrocardiography (ECG), Chest radiograph, hematological and biochemical investigations were within normal limits. Patient was on intravenous fluids and empirical antibiotics (Cephalosporins and Metronidazole). Fasting period was adequate.

Patient was taken up for emergency decompression fasciotomy, with informed high risk consent in view of the compromised vascularity of the limb. Inj. Ranitidine 150 mg and inj. Metoclopramide 50 mg iv administered as premedication. Anaesthesia procedure was explained and patient reassured. On arrival in the operation theatre SPO2 was 95%. Following pre oxygenation with 100% oxygen, SPO2 was achieved to

100% and non invasive monitoring was setup (ECG, pulse oximeter and non invasive blood pressure (NIBP). Inj glycopyrolate 0.2 mg iv given. General Anaesthesia was induced with Inj. Thiopental sodium 250 mg and tracheal intubation was facilitated by succinylscoline 100 mg. O₂ + N₂O (4 lit. of Oxygen, 6 ltrs of Nitrous oxide), halothane, vecuronium was used for maintenance of anaesthesia. Inj. Pethidine iv was administered as analgesic. Capnography was connected. Decompression fasciotomy of the whole limb was performed. The discharge and part of necrosed tissue sent for gram stain and culture sensitivity for microbiology lab. After adequate debridement and fasciotomy, the wound was packed with magnesium sulfate and glycerine dressings. Intra op period was uneventful. Neuro muscular blockade was reversed and tracheal tube removed. Patient was shifted to recovery room with post oxygenation 4 liters per minute by Hudson mask and monitoring continued. Hemodynamically patient was stable. Further post operative period was uneventful. Bacillus anthracis were grown in the culture and appropriate antibiotics changed. Patient received skin grafting under general anaesthesia at a later date and the same was uneventful.

Discussion:

Anthrax, caused by bacillus anthracis is primarily a disease of domestic animals¹. They become infected by inhaling or ingesting spores of bacillus anthracis. Human beings who come in contact with these animals are at risk of contracting this disease. As our patient's occupation involved grazing of sheep and cattle, he was at risk of contracting the disease from the animals.

Bacillus anthracis is a gram positive, non motile, aerobic, spore forming rod shaped bacterium². It produces an antigenic exotoxin that is believed to be responsible for many of the clinical symptoms. In greek anthrax means coal, because in its cutaneous form it causes black coal like lesions. Inoculation of spores subcutaneously is more common than their spread by inhalation or ingestion and the incubation period is usually 4-6 days. Our patient gave history of injury on the forearm 4 days prior to the onset of the swelling. At the time of injury with a wood, the anthrax spores might have been inoculated.

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cutaneous anthrax a small papule appears first. This enlarges to form a vesicle filled with serosanguinous fluid surrounded by gross oedema termed as "Malignant Pustule"³. In endemic areas the constitutional symptoms can be mild, whereas in non immune persons high fever, toxemia and fatal septicemia can develop. Increased levels of Cyclic AMP upset water homeostasis and is believed to be responsible for massive oedema in cutaneous anthrax. The common description "Malignant Pustule" is actually a misnomer because the cutaneous lesion is not purulent and is characteristically painless³. A painful pustular eschar in a febrile patient indicates a secondary infection. In our patient the swelling was painful probably due to secondary infection. Malignant edema involving neck and thorax region can lead to breathing difficulties that may require intubation. In our patient the subcutaneous emphysema was rapidly progressing in a span of few hours and it involved the whole right upper limb. Pharyngeal infection or fatal gastroenteritis can develop when infected meat is eaten. Anthrax should be suspected if a group of people who have eaten a sickened and dead animal are abruptly taken ill with severe gastroenteritis. *Bacillus anthracis* can be cultured in the faeces from these patients. Inhalation of spores can lead to acute laryngitis or a virulent hemorrhagic bronchopneumonia termed as "Wool Sorters Disease"¹. Inhalational anthrax is not considered a true pneumonia because there is no infection in the lung². Rather the spores are engulfed by alveolar macrophages and carried to mediastinal and hilar lymph nodes (LN). Mediastinal widening will be present. Meningeal involvement is rare and fatal. In meningeal cases, gross examination at autopsy finds extensive hemorrhage of the leptomeninges which gives them a dark red appearance described as CARDINAL'S CAP³.

Diagnosis is by gram stain, culture and enzyme assay studies. In our patient the discharge and necrosed tissue were sent for microbiology lab for gram staining. Gram stain showed typical anthrax bacilli and the same were shown in the culture medium. It has been shown that within few hours of treatment with penicillin, cultures can become negative. Penicillin has been the drug of choice for anthrax for many decades². Other commonly used antibiotics include Quinolones, Tetracyclines, Chloramphenicol and 1st generation Cephalosporins. Oral antibiotics are sufficient for cutaneous form. IV

antibiotics are recommended for other types of anthrax. In our patient, empirical antibiotics were started initially, and inj. Penicillin was instituted after the Gram Stain report. Regarding the duration of treatment, center for disease control (CDC) recommends a 60 days course². Corticosteroids are recommended in patients with massive edema and meningeal anthrax. Autoclaving and incineration are acceptable procedures for the decontamination of lab materials. In our case after the surgery operation theatre was fumigated routinely and the instruments and circuits were autoclaved and E.O. sterilization was done respectively. Usual precautions including protective gowns, gloves etc. were used. All personnel who are at risk in a situation like this should be vaccinated. Anthrax vaccine, cell free filtrate of an attenuated, non encapsulated strain of *Bacillus anthracis* is available. Recommended subcutaneous dose is 0.5 ml at 0, 2, 4 and 6 weeks and at 6, 12 and 18 months interval^{2,3}. Since it is a public health issue, Public Health Department of Karnataka was notified.

Conclusion:

Because of the effective public health measures, Anthrax has been virtually eradicated. But now with the potential threat of using anthrax bacilli in biological weapons, it has now become relevant for physicians to refamiliarize themselves with clinical anthrax. Cutaneous anthrax the most common form is usually curable with early recognition and treatment. But massive edema involving airway associated with cutaneous anthrax can present with airway problems. Management of this air way problem is very crucial. Anthrax vaccine should be administered to persons at risk for exposure to anthrax spores. Asymptomatic patients with suspected exposure to anthrax spores can be managed with a course of prophylactic antibiotics and concurrent anthrax vaccine administration.

References:

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