A RARE CAUSE OF BLINDNESS: CUTANEOUS ANTHRAX

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ABSTRACT

Introduction: Anthrax is an infectious disease caused by Bacillus anthracis. The disease affects domestic herbivorous animals such as sheep, horses, cattle, and others. It is transmitted to humans via infected animals and animal products. Entrance routes for the organism include the skin, gastrointestinal tract, and lungs. The most frequently seen form is cutaneous anthrax. Culture is the gold standard for diagnosis. Penicillin is the first-choice therapeutic agent. Successful results can be achieved with timely diagnosis and proper treatment of cutaneous anthrax.

Case presentation: A 34-year-old male patient was referred to our clinic complaining of an inability to open the right upper and lower eyelid and the presence of necrotic black eschar. Examination revealed the presence of serosanguinous leak, hyperemia and extensive edema. Anamnesis, including slaughter of a sick bovine animal 15 days previously and the presence of a typical lesion, suggested the diagnosis.

Conclusion: Eyelid involvement of anthrax is rarely seen. Anthrax on the eyelid may result in cicatricial ectropion, corneal scarring and blindness. It should be considered in the differential diagnosis of pustules or ulcers of the eyelids.

Key words: anthrax, blindness, eyelid.

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Introduction

Anthrax is an infectious zoonotic disease. It is transmitted to humans via infected animals and infected animal products. It was estimated that worldwide between 20,000 and 100,000 cases occurred annually. Anthrax can be seen in Africa, Central America, Albania, Central Asia, the Middle East, Spain, Greece, Romania, and Turkey. Anthrax is rare in the United States and Canada. The prevalence is decreasing in the world, although it is still endemic in Turkey. Anthrax is still an important health problem in Turkey.

Since 1960 till 1969, the number of human anthrax reported is 10724. From 1980 to 1989, 4423 cases of anthrax have been encountered. According to the report of the Ministry of Health, 262 cases were reported in 2007, 126 in 2008 and 132 in 2009 in Turkey. The etiological agent of the disease is Bacillus anthracis. This is a gram-positive bacillus, non-motile, encapsulate, that may be found in either aerobic or facultative anaerobic form. The incubation period was between 1 and 17 days usually 2-7 days. It is significant biological warfare agent.

Anthrax has three different clinical forms: cutaneous, gastrointestinal, and pulmonary. At present, cutaneous anthrax cases account for 95 percent of human cases of anthrax. Inhalation anthrax is the most serious form. It has a high case fatality rate. Natural cases of inhalational anthrax are
There is no gender difference in some studies\(^\text{7,8}\). The male gender rates from the studies by Doğanay et al.\(^\text{3}\), Baykam et al.\(^\text{9}\) and Ozcan et al.\(^\text{5}\) are 68%, 63.8% and 56.5% respectively. Due to men participate more effective in active life, they are more often exposed to infection. The female gender rate from the study by Caksen et al.\(^\text{10}\) is 61.9%.

Lesions are mostly found on the upper extremities, face and neck\(^\text{8,11}\). They may also be seen occasionally on the eyelid, oropharynx, dorsal area, and meninx\(^\text{8}\). The eyelid involvement is rarely seen. The main complication of eyelid anthrax is cicatricial ectropion. Moreover, a lesion on the eyelid may result in exophthalmos, optic atrophy, and panophthalmitis\(^\text{8,12-14}\). In this case, cutaneous anthrax developed on the upper and lower eyelid, leading to reported vision loss.

**Case presentation**

A 34-year-old male working in animal livestock reported having slaughtered a sick bovine animal and scratching his eye during the procedure. Approximately 10 days later, a papule-like lesion with pruritus developed on his right upper and lower eyelids. Irritation, pruritus, rubor, and edema were also present on the right side of the eye. His body temperature was 40°C, accompanied by chills and shivering. He had been referred to a university hospital and was given quinolone and ampicillin-sulbactam for 1-2 days. However, the patient exhibited no significant progress and was transferred to our clinic and hospitalized.

Physical examination revealed extensive edema on the right eye, panicula on the anterior chest wall, and rubor. An erythema-based 3x3 cm black hemorrhagic, crusted ulcerate lesion with irregular, well-defined margins was also observed on the medial side of the right eye and the upper and lower eyelids. The patient had difficulty opening his eyelids. Body temperature was 39°C, arterial blood pressure was 110/70 mm/Hg, and pulse was 89/beats per minute. Case laboratory values are shown in Table 1. Due to the previously administered antibiotics, there was no reproduction in blood culture, and no bacteria were seen in gram stain. The rubor and swelling regressed.

In our case, the lethal factor was 0.978 (positive control: 0.672), and the right eye protective antigen count was 12.69415 (cutoff: 0.29). Intravenous crystalline penicillin G was administered empirically with a diagnosis of cutaneous anthrax. Treatment was discontinued in 7-10 days. The patient was invited to attend check-up. Two weeks after discharge, he was referred back to our clinic. The necrotic crusted lesions on the upper and lower eyelids were infected but responded well to antibiotic (ampicillin-sulbactam) therapy. The patient was able to open his eyelids but said that he could not see. Ocular examination was performed. Direct light reflex in the right eye was negative, and indirect light reflex was positive. At magnetic resonance imaging of the orbital, the optical disc was reported to be normal, although the ophthalmology department diagnosed optic atrophy due to pressure effect. The conclusion of the ophthalmological evaluation was visual loss in the right eye (Figure 1).

**Discussion**

Anthrax is a biological warfare agent of considerable global concern, even though it is under the control of developed countries. In Turkey, the dis-
ease is still endemic, although there has been a significant decrease in the prevalence of human cases. Anthrax is widespread due to the practice of animal husbandry in the provinces of Erzurum and Kars in the Eastern part of the country. More cases occur in the poorer, Eastern regions than in the Western part of the country because of this extensive animal husbandry. Anthrax is mostly seen in cattle, goats, and sheep. It is transmitted to humans via direct contact with infected animals and contaminated animal products. Risk factors include the slaughter, skinning, and processing of infected animal products. Farmers who raise livestock, butchers, and veterinarians are at risk for anthrax infection. Our patient reported contact with and slaughter of a sick animal.

Cutaneous anthrax starts with a small pruritic papule that grows in size within 24 to 48 hours. This turns into an ulcer surrounded by vesicles. The middle of each vesicle is dished and filled with fluid. The lesion expands, as it is surrounded by an erythematous area. The disease characteristics include non-pitting edema and a black, necrotic, and indolent cutaneous lesion with a central eschar. Unless treated, the vesicles turn into indolent ulcers and eschar. Similar cutaneous lesions were observed in our case.

A definitive diagnosis for anthrax can be established by identifying a gram-positive bacillus in specimens derived from the lesion and by bacillus reproduction in culture. The lesion can be sterilized within 24 hours using antibiotics. If bacteria are not identified in the diagnosis, polymerase chain reaction (PCR) methods can be useful. The Enzyme Linked Immunosorbent Assay (ELISA) and microhemoagglutination serological methods can also be used. The disease can be easily diagnosed on the basis of anamnesis including animal contact, living in an endemic area, and the presence of a typical necrotic ulcer. In our case, we determined no bacteria at direct inspection, and no reproduction occurred in cultures due to the treatment administered before referral to our clinic. Oedema is extensive and disseminative, especially in the case of periorbital area involvement. It may spread to the face, the neck, and the anterior chest wall, leading to respiratory distress. The eschar that develops in 7 to 10 days leads to scarring and cicatrical ectropion. In our case, the edema and rubor were distinctive, extends to the right anterior chest wall. There was no respiratory distress. Response to treatment was achieved, and the oedema decreased.

In cases of cutaneous anthrax, lesions may resolve without no sequelae. Deboue et al. reported no complications in three cases of pediatric eyelid anthrax. The main complication is periocular anthrax cicatricial ectropion. Yourtan and Foster reported this complication in 8 of 11 cases of eyelid anthrax. They reported that 3 out of 7 cases of children with cicatrical ectropion involved blindness. Sayouti et al. reported the case of a 36-year-old patient who responded well to penicillin therapy, although cicatrical ectropion persisted. Baha et al. reported that 2 out of 8 eyelid anthrax cases developed cicatrical ectropion and palpebral symphysis. The other cases resolved with no sequelae.

During the acute period of cutaneous anthrax, surgical incision is unadvisable, since this may lead to progressive infection and sepsis. Soysal et al. reported ectropion on the lower eyelid and achieved significant success with the application of a full-thickness skin graft. Several plastic surgeons reported good functional and cosmetic results in 7 cases using full-thickness skin grafts. Caksen et al. reported eyelid involvement in 1 case out of 21. That case responded well to medical treatment, but reconstructive plastic surgery was required due to the development of dermal defect.

Gülaçti et al. reported 3 cases of cutaneous anthrax in 2012 with high C-reactive protein (CRP) levels and high body temperature. Doğanay et al. reported leukocytosis, hypoalbuminemia, high levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) and high body temperature in some of the 22 cases they monitored. Amraoui et al. reported high fever in one out of 2 cases of eyelid anthrax that were examined ophthalmologically and reported as normal. High fever and high CRP levels were present in our case.

Orf virus, tularemia, erysipelas, cellulite, carbuncle, primary syphilis chancre, necrotizing cellulites, and tropical ulcer should be considered at differential diagnosis. In contrast to erysipelas and cellulite, no pain, sensitivity, demarcation line, or suppuration are observed in anthrax. At differential diagnosis of ulcerative lesions such as preseptal cellulitis and ocular cellulitis, clinicians should consider the possibility of anthrax in the presence of any history of contact with animals. Çelebi et al. reported that even a few anthrax bacteria may give rise to preseptal cellulitis. They reported that this should be considered in individuals who work with animal and agricultural products.
Seasonal variation in anthrax runs parallel to diseases such as malaria and trachoma. In rainy seasons, the number of adult and pediatric cases may increase dramatically. Contaminated fingers or insect vectors have been incriminated in transmission[18].

All three forms of anthrax can be fatal. The meningoencephalitis form always results in mortality. In liver anthrax, the mortality rate is 90 percent, while in gastrointestinal anthrax the mortality rate ranges between 25 percent and 75 percent[21]. In cases of cutaneous anthrax, patients may die due to lack of or delayed treatment[15].

The first-choice therapeutic agent is parenteral penicillin. In vitro studies have shown that doxycycline, quinolone, amikacin, erythromycin, chloramphenicol, and cephalosporin are effective against B. anthracis strains[8,11]. In our case, we diagnosed anthrax on the basis of clinical findings and administered penicillin therapy. The edema decreased in size, and the rubor regressed.

Conclusion

Anthrax is a decremental, global zoonotic infection. It is also still a matter for concern, due to its potential use as a bioterrorism agent. Early diagnosis and accurate treatment are essential. Black necrotic eschar tissue is pathognomonic for anthrax. Although it is not reproductive in culture, it is still identifiable by clinicians. Widespread animal immunization programs, educating individuals employed in animal husbandry, the prevention of illegal animal slaughter, and the cremation of infected carcasses may help control the disease. Eyelid anthrax is a rare form of cutaneous anthrax that should be considered at differential diagnosis of preseptal cellulitis. Eyelid anthrax suggests that the infection has spread in a partial manner but is still serious. Eyelid complications were included cicatricial ecropion, corneal scars and palpebral symphysis. Physicians should be alert to the possibility of its complications.

References