



Case Report

Gastrointestinal and cutaneous anthrax: Case series

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A B S T R A C T

Introduction: Anthrax is a zoonosis affecting herbivorous animals. Its agent is *Bacillus anthracis* and it is gram positive, aerobic or facultative anaerobic, immobile and has a capsule in the polypeptide structure. The incidence is gradually decreasing in the world and in our country. The disease is especially seen in areas where stock breeding is common. In this case series, 3 cases, one of them was mortal, took place after anthrax infected cow was eaten in February 2018 in Trabzon was shared. **Case presentations:** In the first case, as a result of the animal's meat was eaten, gastrointestinal anthrax and associated sepsis were seen. This patient's blood culture was positive and she was died. Second case after contacting the patient who died, and third case after contacting the animal and eating its meat, diagnosed with cutaneous anthrax. Doxycycline treatment was started with cutaneous anthrax patients, these cases were recovered without any complications. **Conclusion:** We presented this article, to update our information about gastrointestinal anthrax and other anthrax types which are become a current issue again especially due to bioterrorism and also to keep it in mind in the differential diagnosis although it is rarely seen in our stock raising areas.

1. Introduction

Anthrax is a zoonotic infection mainly affecting herbivores such as cattle, sheep, goats and its agent is *Bacillus anthracis*.¹ It is subdivided into three category according to the location of the agent *B. anthracis*' entry into the body: skin anthrax, inhale anthrax and gastrointestinal system anthrax. The most common anthrax form in humans is skin anthrax with 95% rate.² In addition, anthrax bacillus has been now one of the most lethal weapon used worldwide for bioterrorism purposes.³

Although the frequency of anthrax cases in our country is gradually decreasing, it is still an endemic disease especially in Eastern and Southeastern Anatolia where stock breeding is common. In these regions where stock breeding is commonly performed, it is essential to consider anthrax in differential diagnosis as the incidence of human disease decreases.^{4,5} In this case series, cases took place after an anthrax infected cow was slaughtered and its meat distributed to inhabitants of the same village in February 2018 in Trabzon was presented.

2. Case presentations

2.1. Case 1

A 36-year-old woman was admitted to the emergency service with complaints of abdominal pain, nausea, vomiting, exhaustion and

headache. It was learned that antibiotherapy was started in another health care center because of swelling of her armpit. It was learned that the patient was farming livestock, and she had eaten the meat of the cow that had slaughtered and distributed about 20 days ago because it had been sick. Physical examination; overall situation was bad, conscious, oriented, cooperative, Glasgow Coma Scale (GCS): 15, blood pressure (BP): 50/30 mmHg, heart rate (HR): 140 beats/min, body temperature: 35.1 °C, respiratory rate (RR): 12/min, SaO₂: 95, ECG was sinus tachycardia. Head and neck examination was normal, and both lung sounds were natural when listened. In the left axillar region, there was a touch sensitive subcutaneous tissue that extended to the chest wall. Sensitivity to periumbilical region was present in the examination of the abdomen. No pathological findings were found in other systemic examinations. In laboratory tests; White blood cell (WBC): 16000, Hemoglobin (Hg): 18.2 g/dL, Platelet (Plt): 141000, Glucose (Gl): 340 mg/dL, Creatinine (Cr): 2.21, ALT: 51 U/L, AST: U/L, Na: 126 mEq/L, K: 5.5 mEq/L, C reactive protein (CRP): 10.98 mg/dL, Procalcitonin: 26.39 µg/L, Albumin: 1.6 d/dL and Lactate: 78 mmol/L. Ultrasonography of the axillary region revealed subcutaneous edema and increased echogenicity, abscess formation was not observed. In computerized tomography (CT) of the thorax area performed because of periumbilical sensitivity and high infective values, there was no pathologic finding except mild pleural effusion in the left lung, whereas abdominal CT showed widespread free abdominal fluid in the

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abdomen.

The patient who developed hypotensive during and after the emergency service admittance, fluid support, vasopressor infusion, sodium bicarbonate for acidosis, Imipenem and Vancomycin treatment was started. The patient with worsening general condition was intubated and taken to intensive care, and aggressive fluid resuscitation and inotropic support continued there. In the blood culture, gram-positive bacillus species and gram-negative *Escherichia coli* reproduction were observed and in the culture obtained from the aspirate of the intubation tube, no reproduction was observed. The patient who did not respond to medical treatment and deepened hypotension was died. It was learned that in the blood culture sample that had sent to Turkey Public Health Laboratory (TPHL) for definite diagnosis *B. anthracis* was reproducing.

2.2. Case 2

A 40 year-old female patient applied with a complaint of itchy scar on her upper lip for three days. It was learned that the cefazolin tablet was started in another health care center where she had gone for this complaint. It was found out from her medical history that she had stayed at the hospital with her relevant who died a week ago because of anhrax and she contacted her blood with bare hands during this period. Physical examination; the overall situation was good, conscious, oriented, cooperative. BP: 120/70 mmHg, HR: 77 beats/min, body temperature: 36.6 °C, RR: 14/min, SaO2: 97. On the head and neck, there was a scabbed, middle-sized hyperemic lesion on the right side of the upper lip (Fig. 1). No pathological findings were found in other systemic examinations. All laboratory tests were normal. The patient's lesions were sampled for gram staining, blood cultures were taken, and these samples were sent to TPHL. An anthrax polymerase chain reaction (PCR) sample was sent. Doxycycline treatment was initiated for the patient thought to had cutaneous anthrax. With suggested polyclinic control, the patient was discharged from the emergency department. The patient was found to have an anthrax PCR positive in the test results.

2.3. Case 3

A thirty five year old woman was admitted to the emergency service due to complaints of swelling following a wound on her right arm for 20 days. It was learned that an anthrax suspicious case was reported in a region near where the patient was living, but there was no contact with the suspicious animal. It was understood that the cefazolin tablet was started in another health care center where she had gone with this complaint. Physical examination; the overall situation was good, conscious, oriented, cooperative. BP: 110/70 mmHg, HR: 85 beats/min, body temperature: 37.6 °C, RR: 12/min, SaO2: 95. No pathological findings were found in the systemic examinations. On the extremity examination; the lower half of the right arm's arterial side had a peripheral lesion 2 × 2 cm sized, black scabbed in the middle, hyperemic



Fig. 1. Middle-sized hyperemic lesion on the right side of the upper lip.



Fig. 2. Lesion on the lower half of the right arm's arterial side.



Fig. 3. Lesion on the right hand's index finger's medial side.

and edematous appearing around, and no temperature increase was seen around this lesion (Fig. 2). In addition, on the right hand's index finger's medial side, a lesion round to 0.5 cm in size, with a scabbed middle, hyperemic and edematous around was seen (Fig. 3). All laboratory tests were normal. The patient's lesions were sampled for gram staining, blood cultures were taken, and these samples were sent to TPHL. An anthrax PCR sample was sent. Doxycycline treatment was initiated for the patient considered to be cutaneous anthrax. With suggested polyclinic control, the patient was discharged from the emergency department. The patient was found to have an Anthrax PCR positive in the test results.

3. Discussion

Although the incidence of anthrax is decreasing in the world, it is still an important public health problem in Central Asia and Africa. Anthrax is most often caused by the transfer of the bacteria into the body from any abrasion during the slaughtering of infected animals or during the skinning of dead animals.^{1,4} In also Turkey, its frequency has been gradually decreasing and endemic anthrax cases are seen in stock breeding regions. According to Ministry of Health data, the number of cases reported in Turkey in 1960 was over 10.000, as for 2004 and 2005, there were 268 and 319 cases respectively, and in 2010, 93

anthrax cases were reported.⁵

The skin anthrax composes 95% of all anthrax cases. The spores entering from a bruise on the skin become vegetative, their incubation time is approximately 1–7 days. A typical ulcerous lesion's basin characteristically becomes black. This lesion was called “anthrax” which means coal in Greek. Depending on the severity of the disease, edema, lymphadenopathy and fever may occur. In uncomplicated skin anthrax lesions heal within 2–3 weeks without scarring and systemic symptoms are rare. In pustular form, symptoms are usually heavier, severe edema may occur, and cases may progress to sepsis.^{6,7} In our cases, no systemic symptoms were seen in any of our patients who had cutaneous anthrax.

Gastrointestinal anthrax, infects by eating undercooked anthrax-contaminated meats or by consuming other contaminated foods or drinks. There are two forms of gastrointestinal anthrax. In oropharyngeal anthrax, lesions can be placed on the mouth, cheek mucosa, tongue and back wall of the pharynx. In intestinal anthrax, after the contaminated foods are taken through the gastrointestinal system, the spores settle in the intestinal mucosa of the terminal ileum or cecum. The duration of incubation lasts 3–7 days. Symptoms such as fever, abdominal pain, nausea, vomiting, bloody diarrhea and a clinical course like acute abdomen may occur. 3–4 days after the onset of symptoms, with hemorrhagic acid develops in abdomen, progress to peritonitis and sepsis and then may result in death.^{7,8} Sepsis is rarely seen in patients with cutaneous anthrax, however, it is more common in patients with inhalation or gastrointestinal anthrax.^{3,9} In the first case, systemic symptoms were seen in the patient and it was detected an appearance coherent with free abdominal fluid in abdomen CT. Gastrointestinal anthrax-related sepsis was considered because the patient had anthrax infected cow's meat consuming story, and the blood culture of the patient was positive in favor of anthrax.

The diagnosis of cutaneous anthrax can be made by taking the epidemiological story and observing characteristic skin lesions, but it is more difficult to make this diagnose in inhalation and gastrointestinal anthrax. Patient history is very important when trying to diagnose gastrointestinal anthrax. The differential diagnosis in gastrointestinal anthrax include food poisoning, acute abdomen of other reasons and hemorrhagic gastroenteritis.³ The definitive diagnosis is to made by demonstrating and producing the agent with grams staining in the sample taken from the lesion. The gold standard method for diagnosis is blood culture.^{7,10,11} Gram staining in the antibiotic area may result negative, in which case PCR analysis and immunohistological methods can be used.¹² In our cases, the diagnosis was made by taking an anamnesis and blood culture from a patient with gastrointestinal anthrax diagnosis. In the two cases who diagnosed with cutaneous anthrax; the diagnose was made by taking anamnesis and observing characteristic lesion. These two patients whose anthrax PCR samples were sent because of their previous antibiotic usage history, the results was positive for anthrax PCR.

Penicillin G is still the first choice drug. In uncomplicated cutaneous anthrax, doxycycline or ciprofloxacin are given orally.³ Penicillin G may be combined with clindamycin or clarithromycin or ciprofloxacin in treating inhalation anthrax or with an aminoglycoside in the case of gastrointestinal anthrax.^{3,9,13} Since *Bacillus anthracis* is resistant to third-generation cephalosporins and trimethoprim-sulfamethoxazole,

these drugs have no place in the anthrax treatment.^{8,10} It is thought that basils that have been subjected to genetic manipulation and used as biological weapons may have been rendered resistant to penicillins. Thus, in the presence of bioterrorism suspicion, doxycycline or ciprofloxacin is recommended for treatment.^{8,10,11} Nowadays there is also an acellular vaccine which is used to protect from anthrax. It is recommended to vaccinate risky individuals for protective purposes.^{6,7}

4. Conclusion

Anthrax, although the incidence in our country has been decreasing over the years, can still be a public health problem. Emergency physicians should bring anthrax to their mind, especially in areas where anthrax is endemic, in the case of observation of a typical skin lesion and presence of contacting with the animal.

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Conflicts of interest

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Author contribution statement

- 1) Conceived and designed the manuscript; Mucahit Gunaydin, Abdulkadir Gunduz, Firdevs Aksoy
- 2) Contributed data; Sinan Paslı, Vildan Ozer, Mucahit Gunaydin
- 3) Wrote the paper; Sinan Paslı and Vildan Ozer

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