Arch Clin Exp Med 2018;3(3):210-213. e-ISSN: 2564-6567

DOI: 10.25000/acem.457035 Olgu Sunumu / Case Report

A rare presentation of anthrax with sepsis: A case report

Şarbon'un sepsis ile seyrettiği nadir görülen bir durum: Bir olgu sunumu

Mahmut Dülger [1], Kenan Murat [2]

Abstract

Anthrax is a zoonotic infection caused by Bacillus anthracis. Although the incidence of the disease is decreasing in our country, it is still endemic in certain regions of the country. The cutaneous form of the disease is the most common clinical form, which is usually benign and rarely causes bacteriemia and sepsis. In this case report, a cutaneous anthrax case who had positive blood and wound cultures and were complicated with sepsis are presented.

A 39-years-old male patient living in Kars (Eastern Turkey) was admitted with fever, chills, and a wound with swelling redness on the right arm. In his medical history, the patient stated an insect (fly) bite three days ago and consequent development of a lesion on his right arm. He also stated that he had slaughtered a lamb ten days ago by himself. On admission, the patient was detected to have a 2-3 cm centrally necrotic and peripherally edematous wound confined to the right forehand. There was also fever, hyperemia and general edema confined to right arm up to the shoulder level. With the preliminary diagnosis of cutaneous anthrax, the patient was hospitalized, and ampicillin-sulbactam therapy was started, but due to the progression of the lesion and clinical deterioration, the treatment was changed to piperacillin-tazobactam and clindamycin. The swab samples from the wound were sent to the laboratory and revealed Gram-positive sporulated bacilli and following blood cultures were also positive for growth. The agent pathogen was identified as B.anthracis by Gram stains from wound samples and blood cultures which was susceptible to penicillin. MLVA method with 25 loci was used for genotyping, and it was determined that the genotype in our case is GK43 that is located in the major cluster A and subset 3. On the tenth day of hospitalization due to the widespread and necrotic lesions on his arm, compartment syndrome had occurred. Escharatomy had been established for the treatment of comparment syndrome. After three weeks of antibiotherapy, the patient has been discharged from the hospital with good health.

As a conclusion, this case report reminds need of high attention to the clinical course of cutaneous anthrax in order to avoid severe complications such as sepsis.

Key words: Cutaneous anthrax, sepsis, zoonotic infection

Öz

Şarbon, Bacillus anthracis'in etken olduğu zoonotik bir hastalıktır. Ülkemizde hastalığın insidansı genel olarak azalmakla birlikte belirli bölgelerde halen endemik olarak görülmektedir. Hastalığın en sık görülen klinik formu deri şarbonu olup, genellikle selim seyreder, bakteriyemi ve sepsis tablosu nadirdir. Bu çalışmada, yara ve kan kültürlerinden etkenin izole edildiği sepsis ile seyreden bir deri şarbonu olgusu sunulmuştur.

Türkiye'nin Doğu Anadolu bölgesinde yer alan Kars'ta yaşayan 39 yaşındaki bir erkek hasta ateş, üşüme, titreme, sağ kolda yara ve kızarıklık şikayetleriyle başvurdu. Öyküsünde, 3 gün önce sağ kolunu bir böcek (sinek) ısırdığı ve bu ısırık sonrası bir yara geliştiğini bildirdi. Ayrıca hasta bundan on gün önce de bir kuzu kestiğini ifade etti. Hastanın başvuru anında sağ ön kolda 2-3 cm büyüklükte, ortası nekrotik ve ödemli bir lezyon saptandı. Bunun yanında hastanın sağ kolunda ellerden başlayıp omuz seviyesine kadar çıkan ısı artışı, kızarıklık ve ödem mevcuttu. Deri şarbonu ön tanısıyla yatırılan hastaya ampisilin-sulbaktam tedavisi başlandı ancak lezyonlarda kötüleşme ve yayılma olması üzerine tedavisi piperasilin-tazobaktam ve klindamisin olarak değiştirildi. Hastanın lezyonundan gönderilen sürüntü örneklerinin Gram boyasında Gram pozitif sporlu basiller görüldü ve takibinde kan kültürlerinde üreme saptandı. Kan kültürlerinden ve yara sürüntülerinden yapılan Gram boyalarla etken patojen olarak B. anthracis tanımlandı ve yapılan antibiyogramda penisiline duyarlı bulundu. Genotipleme için 25 lokuslu MLVA metodu kullanıldı ve bizim olgumuzdaki genotipin ana küme A ve alt küme 3'te yer alan GK43 olduğu belirlendi. Hospitalizasyonun onuncu gününde kolundaki geniş ve nekrotik lezyonlar nedeniyle hastada kompartman sendromu gelişti; tedavisi amacıyla eskarotomi uygulandı. Üç hafta süren antibiyoterapi ardından hasta şifa ile hastaneden taburcu edildi. Sonuç olarak, deri şarbonu genel olarak antibiyotik tedavisi ile iyileşen bir hastalık olmasına rağmen nadir de olsa sepsisle karakterize mortal bir tabloya dönüşebileceği göz önünde bulundurulmalıdır.

Anahtar sözcükler: Deri şarbonu, sepsis, zoonotik enfeksiyon.

[1] Medicalpark Fatih Hastanesi, Fatih, Istanbul, Turkey.
[2] Kars Harakani Devlet Hastanesi, Kars, Turkey.

Informed Consent: The written consent was received from the patient who was presented in this study.
Hasta Onamı: Çalışmada sunulan hastadan yazılı onam alınmıştır.

Conflict of Interest: No conflict of interest was declared by the authors.
Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Financial Disclosure: The authors declared that this case has received no financial support.
Finansal Destek: Yazarlar bu olgu için finansal destek almadıklarını beyan etmişlerdir.

Geliş Tarihi / Received: 03.09.2018
Kabul Tarihi / Accepted: 07.11.2018
Yayın Tarihi / Published: 30.11.2018

Sorumlu yazar / Corresponding author
Mahmut Dülger

Adres/Address: Medicalpark Fatih Hastanesi, İskenderpaşa Mahallesi, Horhor Cad. No: 4 Fatih, İstanbul, Türkiye.
e-mail: mahmutkars36@mynet.com
Tel/Phone: +90 543 240 59 00

Introduction

Anthrax is a zoonotic disease that is caused by Bacillus anthracis, which is transmitted to humans directly or indirectly from grass-eating animals [1]. Skin, gastrointestinal and respiratory system anthrax occurs according to the location of entry into the body of the agent. Cutaneous anthrax may develop by cutting of dead sick animals, skin stripping, meat chopping; gastrointestinal system anthrax may develop by eating infected meats, and lung anthrax by inhalation of spores [1, 2]. Most human cases are cutaneous anthrax. Livestock workers, butchers, and veterinarians are occupational groups at risk [1, 2].

Anthrax is an infectious disease whose frequency is gradually decreasing. It is still seen as endemic in our country, and it keeps its importance especially in Central Anatolia and Eastern Anatolia regions. Although the anthrax is still an endemic disease in Turkey; its incidence has been decreased in recent years [3]. The most common type is (%95) cutaneous anthrax [3]. Preventing direct contact with sick animals will significantly reduce transmission. Kars is a region where cattle, sheep and, goat livestock are extensively built and is one of the places where anthrax is still widespread and seasonal outbreaks develop.

This case report is a reminder for clinicians that inadequate treatment and follow-up of cutaneous anthrax can lead to serious complications such as sepsis.

Case report

A 39-year-old male patient living in the village of Tomali, Arpaçay, Kars (Eastern Turkey) was admitted with complaints of fever, chills, redness and wound on the right arm. The patient stated that a fly had bitten fly in his right arm while collecting grass on the field 3 days ago; then he felt burn and itching in the bite area, and after these, an acne-like lesion developed on same area; he also added that he picked up the scar tissue with his hand. Apart from this, the patient said that he had cut a lamb and touched its raw meat ten days before the biting incident. On examination, the patient was conscious, well oriented and cooperative. There were blue-black hemorrhagic bullas (and a necrosis area in the middle of bulla) sized 2x3 cm in three separate sites in the right anterior cruciate area, and there was an increase in temperature, redness, and edema on the right upper extremity from the fingers to the level of the shoulder. In addition, there was a lymphadenopathy at the right axillary region which had a size of 5 cm in diameter. The patient's skin lesion was shown in Figure 1.

On admission, the patient's fever was 39°C, blood pressure was 110/60 mmHg, and pulse was 124 beats/minute. Laboratory values were measured as white blood cells: 13400/microliter (mL), neutrophil ratio: 84%, platelet count: 202.000/mL, mean platelet volume: 7.7 femtolitre (fL), sedimentation rate: 20 mm/s, C-reactive protein: 3 mg/dL. The patient was hospitalized with a diagnosis of complicated cutaneous anthrax. Swab samples from the skin lesion and blood cultures were sent to the microbiology laboratory. The patient was started to be treated with ampicillin-sulbactam 4x1.5 grams (gr) per day intravenously. Daily extremity elevation was provided and extremity dressed with saline. On the second day of treatment, the patient's fever was 41°C, and because of the rapid progression of the patient's lesions on the neck, chest and, back (Figure 2); so the patient was thought to have been into sepsis, and ampicillin-sulbactam was discontinued. Piperacillin-tazobactam 3x4.5 gr/day intravenous and clindamycin 3x900 miligrams (mg)/day intravenous treatment was started.

Blood cultures of the patient were placed on an automated blood culture device, BACTEC (BD, USA), positive signal was obtained following 48 hours of incubation, and Gram-positive bacils were seen in Gram stain (Figure 3); inoculation to 5% sheep blood agar, EMB agar, and chocolate agar medium had been done. Specimens taken from the wound did not show any specific feature in Gram-stain; also no growth was detected in wound cultures. After 24 hours of incubation, in blood cultures, gray colored, small, mat colonies were observed, which did not hemolyze in sheep blood agar. In order to verify and advanced typing, isolated strains were sent to the National Reference Laboratory of Turkey General Directorate of Public Health for high risk pathogens. MLVA method with 25 loci was used for genotyping, and it was determined that the genotype in our case is GK43 that is located in the major cluster A and subset 3. In addition, in our laboratory, the sensitivity test for penicillin was performed with 10 units of penicillin disk (BD, USA) and was found to be sensitive (Figure 4).

On the second day of treatment, respiratory distress developed; and 40 mg methylprednisolone treatment had given for three days. During the hospitalization, the patient continued to have a temperature of 38°C and over. On the eighth day of hospitalization, the general condition was bad; fever was 39oC and blood pressure was 100/60 mmHg. There was widespread bullous lesions in the right arm of the patient and rapid progression in necrotic areas. In the complete blood count, white blood cell, , neutrophil ratio, platelet count and mean platelet volume were 20300/mL, 81.3%, 214.000/mL and 7.9 fL, respectively. On the tenth day of hospitalization, compartment syndrome had been occurred. Escharotomy had been established for the treatment of compartment syndrome. After three weeks of antibiotherapy, the patient has been discharged from the hospital with good health.

A written consent was taken from the patient

Figure 1. The patient's skin lesion.

Discussion

Although anthrax had been eradicated in developed countries, it is still a major public health problem in developing countries. As a result of the animal vaccination campaigns, education of the people in the risk group and prevention of uncontrolled animal slaughter, the number of cases in our country has decreased considerably. According to the data of the Ministry of Health, the number of human anthrax cases, which was 396 in 2000, dropped to 148 in 2009 and to 93 in 2010. Between the years of 1995-2005, the prevalence of anthrax in provinces of Turkey was given respectively: Kars (477 cases), Ardahan (364 cases), Erzurum (355 cases) and Van (351 cases) [3].

Figure 2. Patient's lesions on the second day of the treatment.

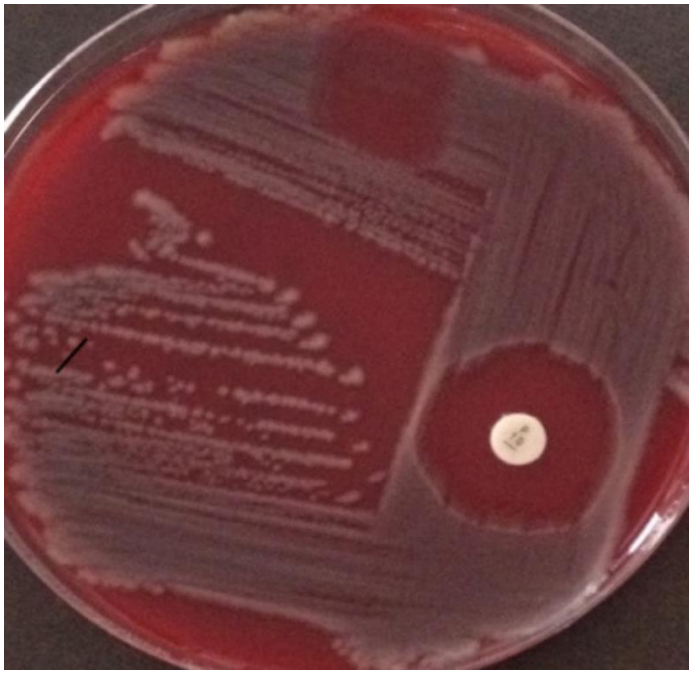

Figure 3. Penicillin sensitivity of obtained Anthrax isolate.

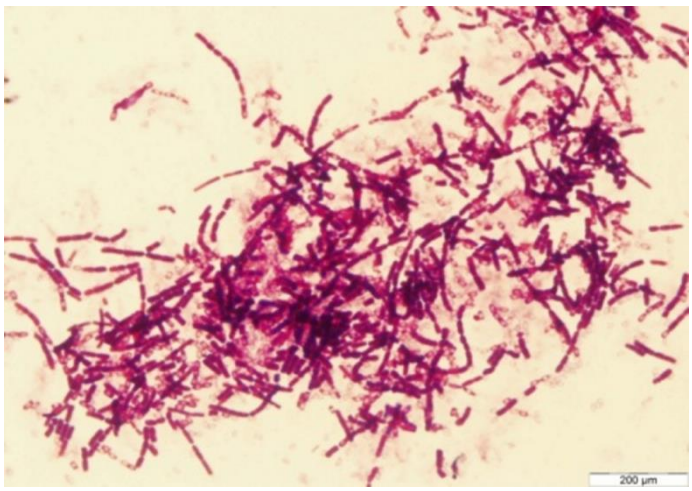

Figure 4. Gram stain from blood culture.

The skin anthrax is the most common (95%) clinical form of the disease. Often the anthrax is picked up from a body region where the integrity of the skin is corrupted by direct contact during the cutting or skinning of the sick animals or chopping the meat. There is a study claiming that anthrax can also be transmitted through the bite of a mosquito. Anthrax lesions are most commonly seen in open areas of the body such as the hand, arm, neck, nape, and face [5-8]. Similarly, in our case, the anthrax lesion developed in an open area of the patients' arm which was bitten by a mosquito and was contacted to raw meat of a lamb ten days ago. Our patient stated that he could not make an anthrax vaccination on some of his animals, and he also added that veterinary control was missing. This has shown that the controls made during animal production can sometimes be neglected; and that in addition to controls, animal husbandry people should be well aware of the disease to be able to prevent anthrax disease in our region completely.

Although the development of sepsis in the cutaneous anthrax is very rare; it is the most important complication in this clinical form [5-7]. In the study of Doganay et al. [5], 22 skin cancer cases followed up for seven years: Septic shock and bacteriemia were seen in two patients, while 10 of 22 cases showed serious infection signs. In a study of 58 cases of skin eczema in our country, only one case was developed as clinical and laboratory sepsis [6]. No sepsis-like complication has been reported in the anthrax case series in Eastern Anatolia and the Marmara region [9, 10].

Skin anthrax can usually heal spontaneously and 3-7 days of treatment is considered to be sufficient for uncomplicated cases [1, 2]. As in our case, 10-14 days of treatment is recommended for complicated cases with sepsis [1]. 10-20% of untreated cases develop sepsis and mostly result in death. However, close follow-up and appropriate treatment have reduced mortality to about 3% [1, 2]. Demirdağ et al. [7] reported a mortality rate of 8% due to sepsis in skin anthrax cases. Kaya et al. [11] In a study evaluating 132 patients in the Eastern Anatolia region, the death rate was 1.5% due to malignant edema and meningitis. High mortality rates in systemic anthrax infection are associated with lung anthrax and anthrax meningitis [1, 2, 12].

Although the lesion is easily characterized by its typical appearance, the lesion is confirmed by the appearance of gram-positive capsular bacilli in the gram stained preparation made

from clinical specimens and by growth of the agent [1, 2]. Encapsulated gram-positive bacilli were observed in the gram staining of our case's bullous lesions, and the anthrax was isolated from wound and blood cultures. The antimicrobial susceptibility of the isolates which confirmed by conventional and molecular methods was investigated by epsilometer-test. The strains were found sensitive to ampicillin, tetracycline, tigecycline, ciprofloxacin, levofloxacin, gentamycin, chloramphenicol, erythromycin, clarithromycin, vancomycin, linezolid, daptomycin, and rifampicin. These results are consistent with the results of sensitivity studies abroad and in our country [13-16]. This data shows that there is no resistance problem in naturally occurring anthrax disease and that penicillin, quinolone, and doxycycline are still the first antibiotics to be preferred in treatment.

Comparing the first and last complete blood counts from the patient, leukocytosis seems to be exacerbated with time; this increase is normalized in cases where the general situation is gradually deteriorating, and the infection cannot be controlled. Again, the patient's last mean platelet volume value is higher than the first one. This increase in mean platelet volume is consistent with publications that indicate that it is increasing in infective conditions [17].

Molecular typing methods are needed to be determined the epidemiological relationship between the cases. Molecular typing can establish epidemiological relationships between different patients and environment and / or animal isolates; genotypes predominant in a geographical area can be identified; obtain information about the origin of the species in the country and the continuity of the dominant clones [4, 18-20]. In this study, MLVA method with 25 loci was used, and it was determined that the genotype in our case is located in the major cluster A which is widespread throughout the world. According to MLVA results with eight loci, B.anthracis genotypes are divided into two strains (A and B) containing six (A1-4, B1-2) branches. While cluster A has spread throughout the world, cluster B has a more limited geographical area (B1 is dominant in South Africa, and B2 is in Europe). The subset A1 in cluster A is distributed worldwide but is more dominant in the western part of North America. While the A3 cluster contains dominant genotypes observed in many parts of the world, the A4 subset includes genotypes scattered in Asia, Europe and America [19]. A3a (which is a subset of A3 subset) is observed in the Georgia, Turkey and Iran, and southern and eastern Bulgaria [4, 18-20]. When genotyping results of B.anthracis strains in our country are examined; the most common genotypes are GK 35, GK 43 and GK 44 in the subgroup A3.a [4,18]. Our isolate was also typed as GK 43 and was found to be similar to other strains isolated from Konya, Ankara, Kayseri, Eskişehir, and Erzurum. When the data obtained with MLVA-25 are examined, the presence of strains isolated in Kars, Erzurum, Kayseri, Ankara, Konya and Eskişehir in the same cluster between 2004 and 2012 indicates that the infection did not occur within a specific province or a limited period. This data demonstrates that the cross contamination rate between human and animal anthrax cases in our country is quite high.

Anthrax disease is seen as sporadic in our country and surrounding countries. The development of sepsis in the patient with the diagnosis of skin anthrax and the isolation of anthrax bacillus in the blood culture will stimulate the physicians who may encounter similar cases. In conclusion, we believe that patients with contact with livestock and who thought to have skin anthrax may have been treated with early and appropriate treatment in terms of sepsis development and systemic complications.

References

1. Doganay M. Anthrax. In: Cohen J, Powderly WG, Opal S (eds), Infectious Diseases. 2010, 3rd ed. Mosby-Elsevier, 2010:1257-61.
2. Lucey D. Bacillus anhtracis (Anthrax). In: Mandell GL, Bennett JE, Dolin R (eds), Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases. 6th ed. Churchill Livingstone, 2005:2485-93.
3. Ertek M. Şarbonun ülkemizdeki durumu. ANKEM Derg. 2011;25:88-91.
4. Durmaz R, Doganay M, Sahin M, Percin D, Karahocagil MK, Kayabas U, et al. Molecular epidemiology of the Bacillus anthracis isolates collected throughout Turkey from 1983 to 2011. Eur J Clin Microbiol Infect Dis. 2012;31:2783-90.
5. Doganay M, Metan G, Alp E. A review of cutaneous anthrax and its outcome. J Infect Public Health. 2010;3:98-105.
6. Baykam N, Ergonul O, Ulu A, Eren S, Celikbas A, Eroglu M, et al. Characteristics of cutaneous anthrax in Turkey. J Infect Dev Ctries. 2009;3:599-603.
7. Demirdag K, Ozden M, Saral Y, Kalkan A, Kilic SS, Özdarendeli A. Cutaneous anthrax in adults: a review of 25 cases in the eastern Anatolian region of Turkey. Infection. 2003;31:327-30.
8. Mechanical transmission of Bacillus anthracis by stable flies (Stomoxys calcitrans) and mosquitoes (Aedes aegypti and Aedes taeniorhynchus). M J Turell, G B Knudson. Infect Immun. 1987; 55:1859–61.
9. Özden K, Özkurt Z, Erol S, Uyanık MH, Parlak M. Cutaneous anthrax patients in Eastern Anatolia, Turkey a review of 44 adults cases. Turk J Med Sci. 2012;42:39-45.
10. Meriç M, Willke A. Gebze'de şarbon. İnfeksiyon Derg. 2008;22:1-9.
11. Kaya A, Tasyaran MA, Erol S, Ozkurt Z, Ozkan B. Anthrax in adults and children: a review of 132 cases in Turkey. Eur J Clin Microbiol Infect Dis. 2002;21:258-61.
12. Centers for Disease Control and Prevention. Human anthrax associated with an epizootic among livestock-North Dakota, 2000. MMWR Morb Mortal Wkly Rep. 2001;50:677-80.
13. Bartlett JG, Inglesby TV, Borio L. Management of anthrax. Clin Infect Dis. 2002;35:851-8.
14. Bryskier A. Bacillus anthracis and antibacterial agents. Clin Microbiol Infect. 2002;8:467-78.
15. Bakici MZ, Elaldi N, Bakir M, Dökmetaş I, Erandaç M, Turan M. Antimicrobial susceptibility of Bacillus anthracis in an endemic area. Scand J Infect Dis. 2002;34:564-6.
16. Perçin D. Şarbon basillerinde antibiyotik direnci. ANKEM Derg. 2011;25:97-9.
17. Erdem MG, Cil EO, Tukek T, Helvaci SA. Evaluation of platelet and mean platelet volume levels in patients with liver cirrhosis. Arch Clin Exp Med. 2018;3:18-21.
18. Ortatatli M, Karagoz A, Percin D, Kenar L, Kilic S, Durmaz R. Antimicrobial susceptibility and molecular subtyping of 55 Turkish Bacillus anthracis strains using 25-loci multiple-locus VNTR analysis. Comp Immunol Microbiol Infect Dis. 2012;35:355-61.
19. Keim P, Price LB, Klevytska AM et al. Multiple-locus variable-number tandem repeat analysis reveals genetic relationships within Bacillus anthracis. J Bacteriol. 2000;182:2928-36.
20. Keim P, Van Ert MN, Pearson T, Vogler AJ, Huynh LY, Wagner DM. Anthrax molecular epidemiology and forensics: using the appropriate marker for different evolutionary scales. Infect Genet Evol. 2004;4:205-13.