

Cutaneous anthrax in patient with type 2 diabetes mellitus

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Abstract

Anthrax is a zoonotic disease caused by *Bacillus anthracis*, which is transmitted to humans from infected animals. Transmission occurs when there is a contact with animals or products from animals infected with anthrax. Anthrax infection is an important public health problem in developing countries. Indonesia is one of the countries where zoonotic anthrax forms can still be found. The most common entrance route for anthrax spores is the skin. Although skin anthrax usually resolves on its own, complications can arise in untreated cases. Underlying systemic disorders such as diabetes mellitus can disrupt the clinical picture and cause atypical presentation.

A 50-year-old woman who works as a farmer with a history of diabetes mellitus, is treated at a local hospital with complaints of fever and inflamed lesions in the lower right leg. An anthrax outbreak has been reported in the area where she lives. At clinical examination regional swelling was found and the appearance of blackish lesions accompanied by pus around the wound. Laboratory tests documented by ELISA an increased titer of anthrax antibodies. The patient was given antibiotic therapy with a combination of penicillin G and ciprofloxacin intravenously and experienced healing from skin lesions.

We can conclude that comorbid diseases such as diabetes mellitus can obscure clinical manifestations of skin anthrax and causes systemic symptoms. With appropriate management, skin anthrax lesions in patients with comorbid diabetes mellitus can heal with good results.

Introduction

Anthrax has become a world threat in the face of bioterrorism.¹⁻³ This can be found in any country (although it is not uncommon in developed countries), and doctors must be familiar with its clinical presentation.⁴ We report extensive skin involvement of naturally acquired skin anthrax in a patient

with type II diabetes mellitus non-insulin-dependent (T2DM).

Case Report

A 51-year-old female farmer experienced ulceration, swelling, and pain involving the right lower leg. reported washing and cooking meat from a cow 5 days before, after which she saw a painless black blotch on the calf of his lower right leg. The lesion progressed with edema and pain. An outbreak of anthrax was reported in the area where she lives during the previous week.

Dermatological examination revealed lesions with an unclear border and exudation with erythema and edema on the right lower limb (Figures 1 and 2). A diagnosis of skin anthrax was made, and the patient was hospitalized. At ELISA test, an antibody titer against anthrax increased by almost 3-fold was found. The patient was suffering from diabetes mellitus treated by Glimepiride 2 mg daily. Skin anthrax was treated with an intravenous combination protocol (penicillin G 5×10⁶ IU/days and ciprofloxacin 400 mg /12 hours) for 14 days, then the patient was discharged from the hospital with improvement in skin ulceration.

Discussion

Bacillus anthracis is a Gram-positive, non-motile, spore-forming aerobic *Bacillus*.²⁻⁷ Central or subterminal endospores, found throughout the world as an integral part of soil, are resistant to extreme environmental conditions and can remain inactive for decades.²⁻⁵ Anthrax is primarily a domestic herbivorous zoonotic disease (sheep, goats, cows), which get infection from spore-contaminated soil.^{2,3,6,8} Human diseases are usually associated with animal outbreaks. Direct contact with infected sick or dead animals or indirect contact with animal products (hair, wool, skin, skin, fur) allows infection.^{2,3,6,8} Typical exposure farming scenarios involve handling, skinning, cutting, or eating the flesh of infected animals.^{4,6,8} Our patient had a characteristic history, which raised suspicion of skin anthrax.

The clinical form of anthrax infection is determined by the portal of entry of spores: skin, inhalation and gastrointestinal.^{1,4-6,8} Nearly 95% of cases are skin, in which the spores enter the skin through a wound or abrasion.^{2-5,8} After the incubation period 2-7 days, a pruritic papule develops at the site of entry of the spores.^{2,7-9} Papules turn into bull vesicles and then form black ulcers 1-3 cm.⁷⁻⁹ Then, characteristic black necrotic eschar

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includes ulcers.^{2,4,5} Erythema is prominent and muscular edema surrounds the eschar.^{2,7,8} Despite its worrisome clinical appearance, this lesion is painless.^{7,8} Within 1-2 weeks, the lesion dries up and leaves a permanent scar.^{2,4} Most cases are present as a solitary lesion on the hand, arm, face or neck.^{2,6-8} In our case, the primary focus of spore entry is the right index finger.

Although skin anthrax usually resolves on its own, the spread of lymphohematogenic microorganisms from the primary focus occurs in 5-20% of untreated cases, resulting in painful lymphangitis, painful lymphadenopathy, and septicemia.^{1-5,7,8,10} Our patient had painful edema, lymphangitis and lymphadenitis, even though the primary lesion was painless.

Unusual local extension of the lesion and serous fluid discharge may be related to advanced age or underlying diabetes. Skin infections in patients with uncontrolled diabetes usually have a long and severe course, and may be resistant to treatment. Early intervention for infection and metabolic control of diabetes can prevent life-threatening complications. In our patients, systemic complications have not

been observed, possibly due to early diagnosis and therapy.

The diagnosis of cutaneous anthrax can be confirmed by Gram smears or culture.^{2,6,8,9} In sheep blood agar, grayish white, resilient, non-hemolytic, and filamentous colonies (Medusa's head) were observed.⁴ In vitro, *B. anthracis* has a capsule and grows as a long chain.^{4,6} Sophisticated techniques for diagnosis including serology and PCR.^{2,5-8}

After being diagnosed, anthrax must be reported to the public health authority.²

Conclusions

Mortality rates for non-treated and treated skin anthrax are 10-20% and <1%, respectively.^{2,3,8} Naturally obtained skin anthrax can be treated with intravenous penicillin G for 7–14 days. The main second-line antibiotics in cases of penicillin allergy include tetracycline (doxycycline) and quinolones (ciprofloxacin).^{3,7} The combination of two antibiotics can provide additional benefits.^{2,7,8} With the presence of comorbidities like diabetes mellitus, a combination of intravenous penicillin G and ciprofloxacin provides healing from skin lesions within 14 days.

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Figure 1. Clinical photograph of the skin lesion in the patient's right lower limb 10 days after processing and consuming anthrax-affected beef. Skin lesions had indistinct borders and were accompanied by oedema.



Figure 2. Clinical features of skin lesions at hospital discharge after antibiotic therapy. The wound was dry and not raised with yellowish crusts.