

Birdal YORGANCIGİL¹
Erdoğan SEVÜK²
Muzaffer AYDEMİR¹
Mustafa DEMİRCİ¹
Mehmet DOĞANAY³

Anthrax Meningitis

¹Department of Microbiology, Faculty of
Medicine, Süleyman Demirel University,
Isparta-Turkey

²Section of Infectious Diseases, Isparta State
Hospital, Isparta-Turkey

³Department of Infectious Diseases, Faculty of
Medicine, Erciyes University, Kayseri-Turkey

Received: May 13, 1997

Anthrax occurs in three clinical forms in humans: cutaneous, gastrointestinal and pulmonary. Meningitis is rarely seen and may develop as primary infection or a result of lymphohaematogenous spread from the primary lesions. It is noted that about 100 cases with anthrax meningitis have been reported in the world literature (1-4).

We report here a case of haemorrhagic meningitis due to *Bacillus anthracis*. This paper is to our knowledge the second about anthrax meningitis in Turkey. The first case was reported twelve years ago (5).

A 64-year-old man was admitted to hospital with high fever, shortness of breath and unconsciousness. His complaints has begun 3 days before his admission with malaise, headache and abdominal pain. On examination, the patient was comatose and pupils were dilated. The temperature was 40°C, pulse rate 160/min and respiratory rate 40/min. His blood pressure was 100/60mmHg. Neurological examination revealed indefinite meningeal signs without neck rigidity, negative Kernig's and Brudzinski's signs and Babinski reflex. Corneal and deep tendon reflexes were either negative and the patient did not respond to painful stimuli. His right retroauricular region and neck was slightly swollen and hiperemic. There were no cutaneous lesions.

Radiological examination of the chest revealed enlargement of mediastinal lymph nodes, linear atelectasis, bronchiectasis and minimal bilateral pleural effusion (Figure 1). Subarachnoid haemorrhage was found in cerebral computerized tomography (Figure 2).

WBC count was 18500/mm³ and ESR was 21mm/h. In lumbar puncture, cerebrospinal fluid (CSF) was

projectile and haemorrhagic. There were 200 white blood cells/mm³ with 90% polymorphonuclear leukocytes, 240mg protein and 5mg/dl glucose in CSF. Smear of CSF revealed encapsulated gram positive bacilli. *B. anthracis* was isolated from cultures of CSF, blood and the specimen aspirated from parotis. The isolate was susceptible to penicillin, chloramphenicol, tetracycline, erythromycin and ciprofloxacin. It was also sensitive to specific gamma phage. The isolate was inoculated into fresh blood and incubated at 37°C for 6 hours and encapsulation was observed.

The patient who was medicated empirically with penicillin, chloramphenicol, mannitol and corticosteroids did not respond to treatment and died 20 hours after admission. Autopsy was not performed. An epidemiological investigation revealed that the case was a wool and hide trader. All his family members were well after nine months, and no other death due to anthrax occurred in the village where he lived.

Anthrax is an endemic disease in Turkey. A total of 1779 human anthrax cases were recorded between 1990 and 1994. Annual incidence of human anthrax cases is about 350. The majority of cases recorded were from the northeastern, eastern and central part of Turkey. Most patients were agricultural workers. The notified human anthrax cases were cutaneous. In our knowledge, few cases of gastrointestinal anthrax have been reported but inhalation anthrax has not been reported in Turkey yet (6). A case with anthrax meningitis complicating from a cutaneous lesion was reported in 1985 (5). Our case is the second report of anthrax meningitis in Turkey. Anthrax is a sporadic disease in Isparta which is located in southwestern part of Turkey. Only 13 cases have been

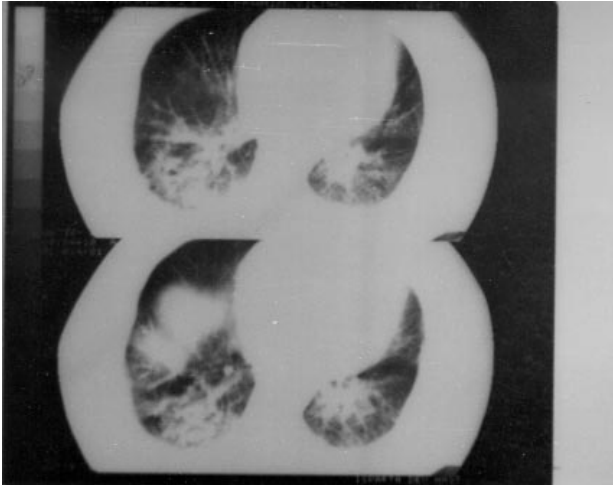


Figure 1. Computerized tomography of the chest revealing enlargement of the mediastinal lymph nodes, linear atelectasis, bronchiectasis and minimal bilateral pleural effusion.

reported in this region since 1985. All cases were cutaneous anthrax with agricultural origin. Being a wool and hide trader, this case is also a typical exemplification of occupational exposure to the microorganism.

Clinical and radiological findings together with the history have suggested that this case was an inhalation anthrax complicated with meningitis. Autopsy could not be performed because of refusal of the family. The diagnosis was confirmed by isolation of *B. anthracis* from CSF, blood and parotid aspirate cultures.

Anthrax meningitis is an extremely rare entity. The commonest portal of entry is skin (52.8%) and lungs (22.9%). About 11.5% of the cases are reported to be primary anthrax meningitis (7). In our patient there were no external signs of injury or lesions and onset of the disease as if a "cold" with cough and fever, might point a respiratory entry. Sepsis was proved in our patient by isolation of the organism from blood.

Pulmonary anthrax shows a biphasic clinical pattern with a benign initial phase followed by an acute, severe second phase that is almost fatal (8). The initial phase begins as a nonspecific illness or may resemble a mild upper respiratory tract infection as in our case. However, there is a sudden onset of respiratory distress and deterioration of patient's general status. Radiological changes are of great significance in establishing the diagnosis of inhalation anthrax. There is usually pleural effusion associated with marked widening of the mediastinal shadow due to haemorrhagic lymphadenitis (2). In chest X-ray of our case, enlargement of mediastinum, linear atelectasia and pleural effusion were

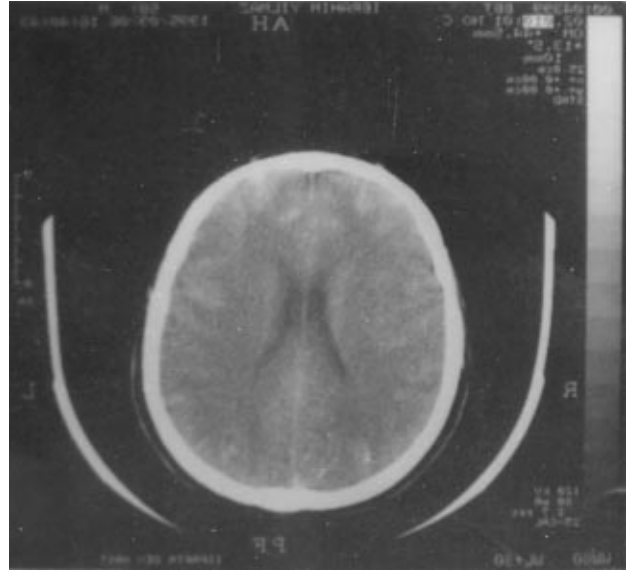


Figure 2. Subarachnoid haemorrhage seen in cerebral computerized tomography.

present. The average duration of the acute stage is reported to be less than 24 hours, almost always ending in death (8).

Meningeal anthrax is described as a haemorrhagic meningitis in which intracranial arteritis is a prominent feature (9). Other findings as exemplified by this case, include subarachnoid haemorrhage and intracerebral haemorrhage. The number of patients who have survived anthrax meningitis are few, despite use of antibiotics to which the organism is sensitive *in vitro* (2). Our case did not respond to antibiotic and supportive therapy and died in a short period.

The drug of choice in the treatment of anthrax is still penicillin although isolates of penicillin resistant *B. anthracis* have been reported. No penicillin resistant *B. anthracis* infection was observed in Turkey (10). The ideal therapy in meningitis and inhalation anthrax should also include a specific antitoxic serum.

Control of the disease in humans depends on control of the disease in animals. Effective animal vaccines are available. A human anthrax vaccine is also available. Industrial and agricultural methods for protecting humans from contact with infectious material should be the primary concern.

Correspondence: Birdal YORGANCIGIL

P.K.:90

32000 Isparta-Turkey

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