

A Case of Descending Mediastinitis with Caseification Necrosis

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Abstract

We report a case of rapidly progressive mediastinitis following a cervical infection in a previously healthy elderly female patient. The patient was treated surgically by mediastinal debridement, but the infection persisted postoperatively. Although the cultures remained sterile, antibiotics directed against opportunistic microorganisms were administered. A novel technique of “modified

sternal closure” is also described. The patient was discharged in a completely healthy state.

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Introduction

Descending necrotizing mediastinitis (DNM) is the most serious mediastinitis type. It is highly mortal as the infection uses facial planes in the neck to gain access to the mediastinum. Mortality is still around 30-40% (1-3).

Both aerobic and anaerobic microorganisms in the oropharyngeal flora can cause DNM (1). In the past, *Streptococci*, *Bacteroides* and *Fusobacteria* spp were the most frequent reported microorganisms. Nowadays, *Pseudomonas aeruginosa* has become the most commonly encountered agent (1-2).

The case presented here was treated by mediastinal debridement. Though the results of the cultures were negative, anti-microbial therapy was also included in the treatment upon clinical suspicion. The patient showed a complete recovery.

Case

A 62-year-old female patient was hospitalized by the otorhinolaryngology department, with a one-week history of shortness of breath and neck pain. The patient was diagnosed as widespread neck infection and superficial drainage through 4 different incisions was performed. One week later, as the clinical state of the patient had worsened, she was referred to our clinic. On physical

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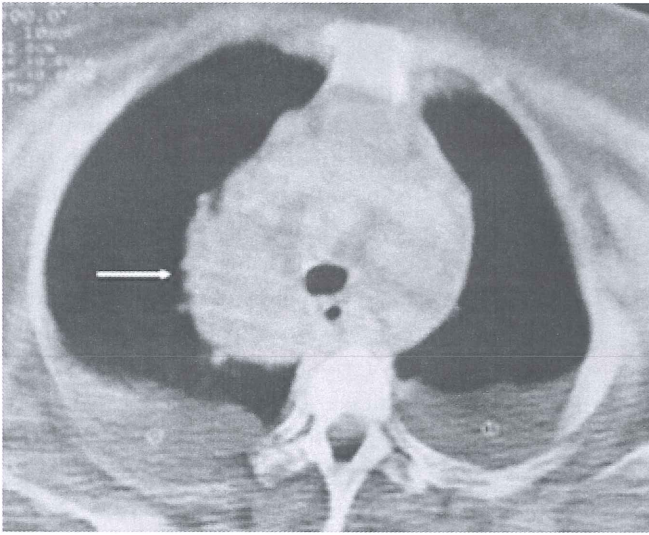


Figure 1. Thorax CT revealed a heterogeneous round mass which contained necrotic areas. The widest (arrow) diameter of the conglomerated mass was 15 cm. Note the mild to moderate pleural effusion in both hemithoraces.

examination the patient had dyspnea, and there was hyperemia and edema over the neck and upper chest. Yellowish and purulent material was draining through the skin incisions. The infection was spreading to the subcutaneous fat layer of the frontal chest wall. Blood pressure was 110/60 mmHg, pulse rate was 116/min and body temperature was 39.2°C. Laboratory examination results were as follows; white blood cell count: 14 100/mm³, Hb: 9.9 g/dL, Htc: 30.8%, sedimentation rate: 76 mm/hour, arterial blood gases in hypoxemic levels. No microorganisms were identified by gram staining and the cultures remained sterile. This was also true for acid fast bacilli. Two chest radiographs, taken one week apart demonstrated a widened upper right mediastinum. Thoracic CT scan showed abscesses, the largest being near the vena

cava superior. Minimal pleural effusion was detected in both hemithoraces (Figure 1).

Considering these findings, the patient was diagnosed as acute DNM and a median sternotomy was performed. Localized abscess focuses were drained. Decayed and infected pleuro-pericardial tissues were debrided. No bacteriological growth was observed in cultures of the tissue and of the purulent material taken during surgery. The pathological examination revealed a “caseified granulomatous” lesion. Based on this finding, antituberculosis therapy, consisting of a combination of isoniazid, rifampicin, ethambutol and pyrazinamide was started. On the 13th day of the operation, the chest X-ray revealed that the sternum was fragile due to infection. Moreover, fractured bone segments were present bilaterally. The installed sternal steel wires, especially the one in the manubrium and the one in the corpus had destroyed the sternum at the suture sites. So we applied a modified technique for sternal closure. Ipsilateral longitudinal pericostal sutures, which pass internally through the manubrium and lower corpus, were knitted on each other at midline. Then, transverse costochondral wires were passed internally in four consecutive costal cartilages (2-5th ribs). Transverse wires were placed laterally on both of the longitudinal sutures for enhancing the strength of the sternal closure (Figure 2a-b).

Unfortunately, after all these interventions, the body temperature was still very high, and no clinical improvement was observed, so we had to reconsider the diagnosis. After reconsultation with Pathology, Chest, and Clinical Microbiology Departments, the antituberculosis therapy was stopped and therapy with trimethoprim-sulfamethoxazole was started against assumed *nocardia* infection. Body temperature began to decrease starting from the third day of treatment and the general clinical state improved. The pa-

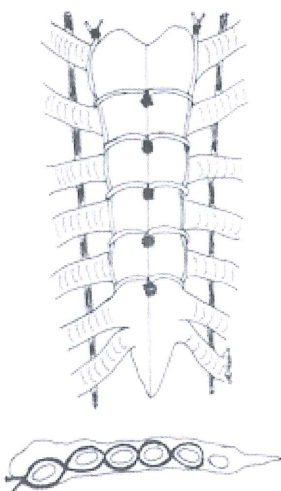


Figure 2a. Diagrammatic presentation of the sternal closure technique described by Robicsek.

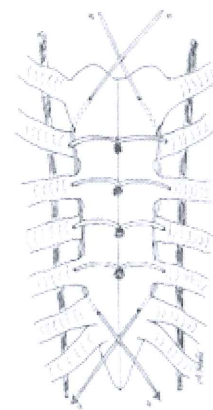


Figure 2b. Schematic illustration of our technique for pericostal wire closure (a and b; longitudinal pericostal sutures).

tient was supported by mechanical ventilation for eighteen days. Although the perioperative condition of the patient was problematic, she was discharged on the 40th day of operation in a healthy condition.

Discussion

Infection gains access to the mediastinum through three deep cervical fascia (pretracheal, perivascular, prevertebral) depending on gravity and intrathoracic negative pressure (1-4). DNM is more frequently observed in people in poor health caused by conditions such as malnutrition, alcoholism, diabetes, drug addiction, and immune system defects (5,6). In our case, the patient had no remarkable history, except obesity and total knee replacement.

Delay in diagnosis increases the mortality (7). Cervical and thoracic CT scan is the most reliable technique for diagnosis (2-4). Our case, who was healthy previously, had a cervical infection in her history. Moreover, the physical findings suggested deep cervical and mediastinal infection. Finally the CT scan revealed that the infection had spread to mediastinum in a week (Figure 1).

It is reported that 70-94% of DNM cases are due to anaerobic and 52-69% to mixed bacterial agents (1-3). Though *Streptococci* are the most commonly encountered bacteria, recent reports have also demonstrated growths of *Bacteroides fragilis* and *Pseudomonas aeruginosa* (2). In our case we could not detect any microorganism. Pathologic examination revealed a chronic caseified granulomatous lesion. Though clinical and intraoperative findings were not consistent with tuberculosis, considering the high incidence of tuberculosis in Turkey, we started antituberculosis therapy. However, there was no response to the treatment. Reexamination of the pathological specimen revealed the presence of Langerhans cells and caseification necrosis. As this morphology is not pathognomonic for tuberculosis and can also be seen in fungal infections (8), the patient was reevaluated. The patient had a history of deep cervical soft tissue infection and we detected multiple microabscesses in the mediastinum. This finding was not consistent with tuberculosis. Although no organisms grew in the cultures, nevertheless we considered the possibility of opportunistic bacteria such as *nocardia* as the cause of this infection and decided to start treatment against these microorganisms. TMP/SMX is active against a variety of Gram positive and Gram negative bacteria. On the third day of treatment, body temperature began to decrease and fluid

drainage from the open incisions on the neck ceased. The patient's clinical state improved, shortness of breath decreased and blood gases returned to normal levels.

There are reports suggesting median sternotomy and clamshell incision in such patients, but these methods have some disadvantages like high postoperative sternal fracture risk and possibility of insufficient prevertebral drainage (4,9). Partial sternal resection and muscle flap closure are also recommended (10). As a matter of fact, postoperative sternal fracture also occurred in our patient. The sternum was found to be osteoporotic and multiple fractures were present. We used a modified version of Robiscek's closure technique to correct these fractures (Figures 2A-B) (11). To our knowledge, this is a novel approach and has not been described previously.

Due to its porous and loose structure, the mediastinum is vulnerable to the spread of infections. Successful treatment in DNM patients can be achieved by a combination of early and aggressive drainage and debridement, and adequate antibiotic therapy.

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