Successful outcome of descending necrotizing mediastinitis due to neck trauma

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Summary

Descending necrotizing mediastinitis (DNM) is an uncommon form of mediastinitis that can rapidly progress to septicemia. The optimal surgical approach still remains controversial. In this paper we would like to present a case of descending necrotizing mediastinitis that was treated successfully by means of thoracic drainage through trans-thoracic approach. In our case DNM occurred as a complication of oropharyngeal abscesses and a complication of cervical spine trauma.

Key words: mediastinal infection • esophageal injury/perforation • surgery • emergency

PDF file: http://www.polradiol.com/fulltxt.php?ICID=881956

Background

DNM is a highly fatal disease originating from odontogenic, pharyngeal, or cervical infections that descend along fascial planes into the mediastinum [1]. Only a few cases of DNM have been reported in recent literature, with mortality rates between 25% and 40% [2,3]. Drainage and debridement of infected fluid collections and necrotic tissue excision are the surgical gold standard procedures. However, the best surgical approach still remains controversial [4]. We wish to report a DNM case treated successfully in our institution and caused by neck trauma.

Case Report

We report on a case of a 45-year-old male who was brought to the emergency department after cervical spine trauma, complaining of neck pain. Clinical examination (including establishing neurological status) was normal and CT-scan of cervical spine revealed a vertebral C5 body fracture that was stable (Figure 1). The patient was then admitted to the orthopedics department and sent home 24 hours later with non-surgical treatment. Six hours later the patient consulted a general physician complaining of intense pharyngeal pain and dysphagia. The patient was then diagnosed with acute pharyngitis and anti-inflammatory treatment was given. Three days later, the patient showed up again in the emergency department because of worsening of the symptoms and temperature of 39°C. At that point, enhanced CT-scan was done which showed the presence of signs of mediastinal infection involving the anterior and posterior mediastinum bilateral pleural effusion and signs of right lower lobe pneumonia (Figure 2).

Initially, the patient underwent surgical drainage of the left pleural cavity by means of a thoracic 32 F drain and was transferred to the Intensive Care Unit; empirical broad-spectrum intravenous antibiotics were administered as soon as the diagnosis was confirmed. As the patient’s status did not improve in the following 24 hours, aggressive surgical drainage and mediastinal debridement via right posterolateral thoracotomy was decided to be done. The thoracic procedure included radical surgical debridement of the mediastinum with complete excision of infected and necrotic tissue, decortication and mediastinal and pleural drainage with adequate placement of chest tubes.

The total duration of mediastinal drainage was 10 days. In the meantime, the patient developed pericardial effusion that was drained and cultures taken that proved negative. Upper gastrointestinal endoscopy was also performed and showed no pathological findings.

Bacteriological results of samples obtained from the pleura and blood revealed polymicrobial infection.
The outcome was favorable. Control thoracic CT-scan performed before discharge from Intensive Care Unit showed normal aspect with return to water density of the mediastinum; so the patient was transferred to the General Surgery Department. During this period the patient required re-drainage of loculated residual empyema of the left pleural cavity, but remained non-symptomatic and with no fever in the following 4 days.

**Discussion**

Mediastinitis is an acute infection involving the mediastinum and a surgical emergency with a high mortality rate. It may primarily begin from the mediastinal structures, or occurs as a result of an infection extending downward from the oropharynx, called as descending necrotizing mediastinitis (DNM).

The criteria for the diagnosis of DNM were established by Estrera in 1983 [5] and include the following:

- Clinical evidence of severe oropharyngeal infection,
- Characteristic roentgenographic features of mediastinitis,
- Documentation of necrotizing mediastinal infection during operation or at postmortem,
- Establishment of the relationship between the descending necrotizing mediastinitis and the oropharyngeal infection.

Based on experience several authors [6], *pathophysiology* of the mediastinal infections is typically polymicrobial in nature, resulting from a disruption of normal mucosal and tissue barriers. Infection may result from a rupture of the esophagus or trachea or from surgical intervention. When infection extends from the head and neck downward into the mediastinum, the condition is described as descending necrotizing mediastinitis because the infection uses the fascial planes in the neck to gain access to the mediastinum. It is necrotizing, as the infection is often polymicrobial in etiology with gas-producing organisms.

The potential spaces that can allow infections from the head or neck to enter the mediastinum include the following: carotid space, prevertebral space, and danger space. Danger space lies between the alar and prevertebral fasciae. It is patent from the skull base to the diaphragm. Its upper part is the retropharyngeal space, which lies between the prevertebral fascia and the buccopharyngeal fascia on the outer surface of the pharynx. Lymph nodes are present in this space.

Pathological walling-off of infection usually occurs in the retropharyngeal space, but no anatomical barrier exists to the spread of infection downward into the mediastinum. The lower part of this potential space extends behind the esophagus, through the superior mediastinum, and into the posterior mediastinum.

That was primary suspected etiology in our case. DNM probably occurs as a complication of oropharyngeal abscesses due to complication of cervical trauma. Severe cervical infection spreads along the fascial planes into the mediastinum with abscess and empyema formation and sepsis. Diagnosis was confirmed by computed tomography of the neck and chest.

**Conclusions**

More than 90% of cases of acute mediastinitis are caused by esophageal rupture. This may be due to trauma, neoplasm, surgery, or endoscopy. In the case presented the spiral vertebral body fracture due to neck trauma may have caused oropharyngeal rupture and contamination of the “danger space”. Time of incubation was 7 days which is comparable to the time presented by other authors [7]. We claim that the most important factors in the favorable outcome in these cases are the time of evolution and the correct application of aggressive surgical treatment.
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