Minimally Invasive Surgery for Descending Necrotizing Mediastinitis

Desendan Nekrotizan Mediastinit Tedavisinde Minimal İnvaziv Cerrahi

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ABSTRACT

Descending necrotizing mediastinitis (DNM) is a lethal disease with a high mortality rate, and occurs as a complication of odontogenical or cervical infections. The choice of treatment is still controversial and ranges from a cervical approach alone to cervical approach with clamshell incision. Until now, there have been only a few cases operated on via thoracoscopy in the literature. In this study, we present a 21 year-old man who was referred with high fever and neck swelling after the removal of an infected right lower second molar tooth, and diagnosed as DNM, and succesfully treated with cervical and unilateral videothoracoscopic approach.

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Key words: Descending necrotizing mediastinitis, drainage, videothoracoscopy

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ÖZET

Desendan nekrotizan mediastinit (DNM), mortalite oranı yüksek, öldürücü bir hastalıktır ve odontojenik ve servikal enfeksiyonların bir komplikasyonu olarak ortaya çıkar. Tedavisinde seçilecek yöntem henüz tartışmalıdır ve sadece servikal bir insizyon yapılmasından, servikal insizyona "clam shell" insizyonunun eklenmesine kadar geniş bir aralığı kapsar. Literatürde bugüne kadar torakoskopi ile opere edilen çok az sayıda hasta yer almaktadır. Bu olgu sunusunda, sağ alt molar diş çekimi sonrası yüksek ateş ve boyunda şişlik yakınmasıyla hastaneye başvuran ve DNM tanısı alıp servikal yaklaşım ve tek taraflı videotorakoskopik yaklaşımla başarılı şekilde tedavi edilen 21 yaşında erkek hastayı sunuyoruz.

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Anahtar sözcükler: Desendan nekrotizan mediastinit, drenaj, videotorakoskopi

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INTRODUCTION

Acute mediastinitis is a serious infection involving the connective mediastinal tissue and mediastinal organs. One of the most lethal forms of this disease is descending necrotizing mediastinitis (DNM). It occurs as a complication of odontogenic or cervical infections or cervical trauma as it spreads along the fascial planes into the mediastinum. The diagnostic criteria for DNM were first defined by Estrera [1] as follows: (1) clinical manifestations of severe infection; (2) demonstration of characteristic roentgenographic features; (3) documentation of the necrotizing mediastinal infection at operation or postmortem examination, or both; (4) establishment of the relationship of oropharyngeal or cervical infection, with the developement of the necrotizing mediastinal process.

The main cause of death is the delay of diagnosis and inappropriate drainage of the mediastinum. Altough no large series have been reported, the mortality rates in the literature ranges from 14% to 40% [1, 2]. In this article, we report a young male patient who was successfully treated with cervical and videothoracoscopic mediastinal drainage.

CASE

A 21 year-old man presented with neck swelling and high fever two days after the removal of an infected right second lower molar tooth. He had been treated with parentheral antibiotics for seven days. As fever and neck swelling progressed and the patient detoriated, a posteroanterior (PA) chest X-ray (Figure 1a) and a cervicothoracic computed tomography (CT) (Figure 1b, 1c) were performed which showed a necrotizing infection that extended from the neck to the level of the vena azygos along the right paratracheal region and a right sided pleural effusion. He was referred to our department with the diagnosis of DNM and admitted to intensive care unit. His body temperature was 39.5°C. He was

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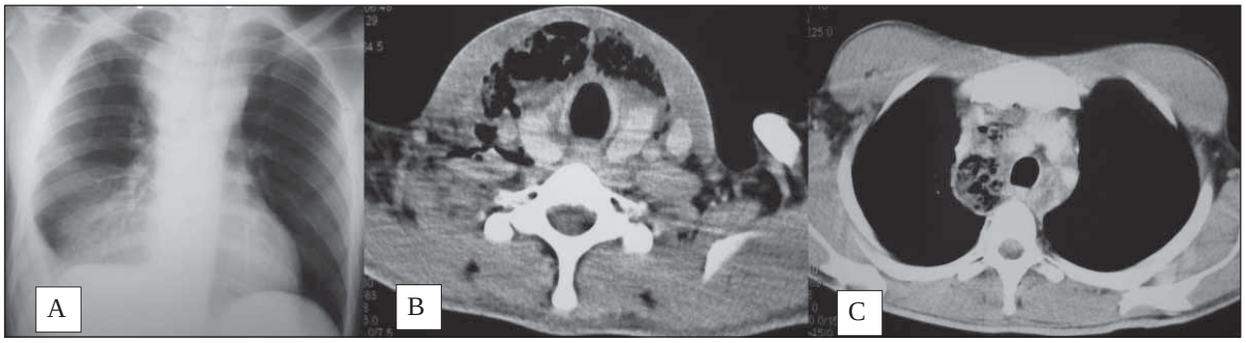

Figure 1. Preoperative Chest X-Ray and CT images showing the pleural effusion and the necrotizing infection on the neck and mediastinum

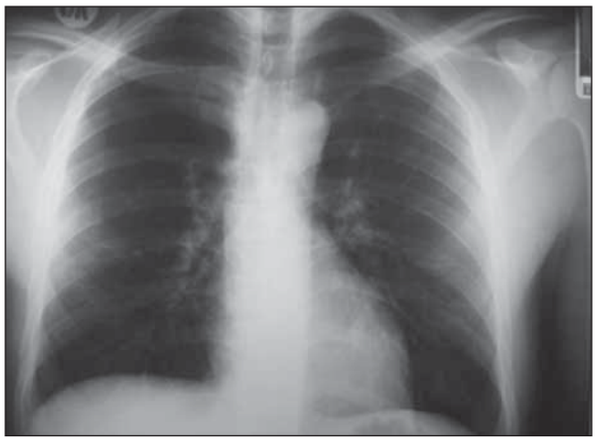

Figure 2. Chest x-ray one month after discharge

dyspneaic, his face and neck were hyperemic, swollen and painful on palpation. His breath sounds were decreased at the posterior lower base of the right hemithorax on oscultation. His white blood cell count was 15100/mm^3. He was taken to the operating room on the day of admission. A collar incision was made initially to drain the cervical abscess and remove the necrotized tissues, then the patient was positioned for right sided video-assisted thoracoscopic surgery (VATS). Thoracoscopic exploration through the seventh intercostal space in the mid-axillary line revealed a purulent right pleural effusion and several pleural adhesions. Two more additional ports were placed on the fifth intercostal space in the anterior and the posterior axillary lines. The samples of the pleural fluid were taken for microbiological examination and 1200ml of pleural fluid were drained. The adhesions were removed and the debridement of the pleural cavity was peformed. The distended mediastinal pleura was opened over the azygos vein up to the thoracic inlet and the purulent material was drained and the necrotized tissues were completely removed. The thoracic cavity was irrigated with antiseptic solutions and one apical and one basal drains were placed. Cultures of the pleural fluid samples revealed streptococcus viridans and the appropriate parentheral antibiotherapy were given. The thoracic cavity was irrigated with antiseptic solutions after the operation through the drains and the patient was discharged on the 15th postoperative day. The PA chest X-ray (Figure 2) one month after discharge revealed only a minimal pleural thickening.

DISCUSSION

Until the 1980s, mediastinal drainage by the cervical approach was the main treatment of choice for DNM. Despite the induction of antibiotics, the mortality rate was still almost as high as 40% [1].

The mortality rates reduced significantly after the use of CT in early diagnosis and the appropriate drainage and the debridement of the mediastinum via the transthoracic approach [3-4]. Wheatley et al. [3] revealed that transcervical drainage is not enough for the appropriate drainage of the mediastinum. Marty-Ane et al. [4]. Corsten et al. [5] found a statistically significant difference in survival between patients undergoing transcervical mediastinal drainage (53%) versus those receiving transthoracic mediastinal drainage (81%), in a subsequent meta-analysis.

Endo et al. [6] classified DNM into three types according to the extansion of DNM as diagnosed by CT, and proposed differenital surgical management according to this classification. They insisted on a transcervical approach for type I (localized in the upper mediastinum above the tracheal bifurcation), on irrigaton through subxiphoidal and cervical incisions with additional percutaneous thoracic drainage for type IIA (extending to the anterior lower mediastinum), and on complete irrigation and debridement of the entire mediastinum through a standard thoracotomy for type IIB (extending to the anterior and posterior lower mediastinum). However, DNM often progresses so rapidly that in most of the cases even if it is type I, the cervical approach alone may not be satisfactory. Our case is classified as “type I” according to the CT findings. A combined cervical and videothoracoscopic approach was successful without any additional morbidity of an “open” surgical approach.

The videothoracoscopic approach for mediastinal drainage in DNM was first reported by Roberts et al. [7]. He concluded that thoracoscopic exposure of the posterior mediastinum allows complete drainage of substantial mediastinal contamination and is less painful than thotacotomy incisions. Recently Min et al. [8] published their results with a cervical and VATS approach for mediastinal drainage and debridement in DNM. In our case, alongside the mediastinal drainage and the debridement, we were also able to drain the purulent pleural fluid and debride the pleural surfaces. This approach also allowed us to apply irrigation of the affected hemithorax and the mediastinum postoperatively, which means that VATS is as effective as thoracotomy in such cases.

In conclusion, VATS is a safe, effective and less invasive surgical option for the management of DNM. It gives an opportunity to access the mediastinum and each hemithorax when applied bilaterally. It should be performed as soon as possible once the diagnosis is achieved, because of the increased mortality rate of a delayed and/or inappropriate drainage.

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