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Case Report

Mediastinal abscess secondary to left paratracheal deep neck space abscess: a rare presentation and surgical management

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ABSTRACT

Deep neck space infections (DNSIs) are potentially life-threatening due to their rapid progression along fascial planes into the mediastinum. Descending mediastinitis, though rare, is associated with significant morbidity and mortality if not managed promptly. We report the case of a 21-year-old male who presented with fever, dysphagia, and neck pain of 10 days' duration. Clinical examination revealed diffuse anterior neck swelling with tenderness. Contrast-enhanced CT of the neck and chest demonstrated a left paratracheal abscess extending into the posterior mediastinum, along with pleural effusion. Despite prior treatment with intravenous antibiotics at an outside hospital, the infection progressed. The patient underwent incision and drainage of the paratracheal abscess through a midline cervical approach, followed by hemisternotomy for drainage of the mediastinal abscess. Postoperatively, he was managed with broad-spectrum intravenous antibiotics, supportive care, and daily dressings. Secondary suturing was later performed once healthy granulation tissue developed. The patient showed good clinical recovery and was discharged in a stable condition. This case highlights the importance of early diagnosis and aggressive multidisciplinary management of mediastinal extension of DNSIs. Imaging plays a crucial role in delineating the extent of disease, and combined cervical and thoracic surgical drainage is often required for definitive treatment. Mediastinal abscess as a complication of DNSI is rare but potentially fatal. A high index of suspicion, prompt imaging, broad-spectrum antibiotics, and timely surgical drainage through combined approaches are key to successful outcomes.

Keywords: Deep neck space infection, Mediastinal abscess, Hemisternotomy, Paratracheal abscess, Descending mediastinitis

INTRODUCTION

Deep neck space infections (DNSIs) are serious bacterial infections that arise within the potential spaces and fascial planes of the neck. They often originate from odontogenic infections, tonsillitis, pharyngeal or peritonsillar abscesses, trauma, or foreign body impaction.[1] The anatomical continuity of cervical fascial planes allows these infections to spread rapidly into the thoracic cavity, leading to complications such as descending necrotizing mediastinitis, which is associated with a high mortality rate ranging from 10-40% despite advances in antimicrobial therapy and surgical techniques.[2] Factors that predispose to deeper spread of infection include immunocompromised states, coexisting illnesses such as diabetes, history of trauma, recent surgical or dental procedures, and intravenous drug use.[3]

The paratracheal space, in particular, provides a direct pathway for infection to track into the posterior mediastinum through the visceral space. Such progression can cause severe sepsis, airway compromise, and multisystem involvement if not recognized early.[4] Clinical diagnosis is often challenging because symptoms may be nonspecific, and initial empirical antibiotic therapy may fail to halt disease progression. Imaging, particularly contrast-enhanced CT of the neck and chest, and in some

cases MRI, is crucial for determining the extent of infection and planning appropriate management.[5]

The standard of care for mediastinal abscesses of cervical origin involves aggressive surgical drainage combined with broad-spectrum antibiotics and multidisciplinary collaboration between otolaryngologists, thoracic surgeons, and intensivists.[6] Here, we present a case of a young male with a left paratracheal deep neck abscess extending into the posterior mediastinum, successfully managed with combined cervical and thoracic approaches. This case highlights the importance of early recognition, appropriate imaging, and timely intervention in preventing fatal outcomes.

CASE REPORT

A 21-year-old male, presented to the ENT department with complaints of fever, difficulty in swallowing, and pain in the neck for the past 10 days. He was apparently healthy until 10 days earlier when he developed an oral lesion, followed by progressive swelling on the left side of his neck. In an attempt at home treatment, he applied an herbal plant over the swelling, after which his symptoms worsened. He subsequently developed high-grade fever, worsening neck pain, and dysphagia.

The patient was initially treated at an outside hospital, where he was administered intravenous meropenem for 7 days. However, his symptoms persisted without any clinical improvement, prompting referral to our institution.

On examination, he was conscious, oriented, and febrile, with a pulse rate of 102/min and blood pressure of 130/70 mmHg. Local examination of the neck revealed diffuse swelling over the anterior aspect, with edema extending down to the suprasternal notch. The swelling was tender on palpation, particularly over bilateral level IV and V areas. A hypopigmented horizontal mark was also noted over the left level III region (Figure 1 and 2).



Figure 1: Lateral clinical view.



Figure 2: Anterior clinical view.

Routine blood investigations revealed elevated inflammatory markers. A contrast-enhanced CT of the neck and chest demonstrated a significant collection in the left paratracheal area extending into the posterior mediastinum, along with evidence of pleural effusion (Figure 3).

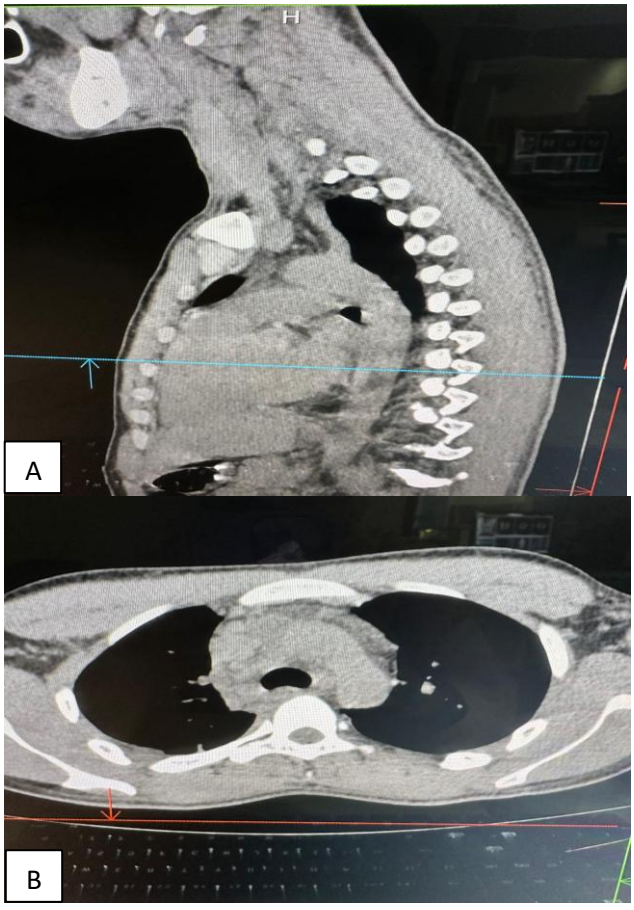


Figure 3 (A and B): CECT images demonstrating a significant collection in the left paratracheal area extending into the posterior mediastinum.

In view of these findings, a multidisciplinary team involving cardiothoracic surgery and pulmonology was consulted. The patient was stabilized with intravenous antibiotics and supportive care before being taken to the operating room. A midline cervical approach was used for incision and drainage of the left paratracheal abscess. The abscess tract was carefully traced into the posterior mediastinum, and further drainage was achieved through a hemisternotomy approach. Pus samples were sent for Gram staining, AFB smear, and culture and sensitivity (Figure 4).



Figure 4: Intra-operative incision and drainage of abscess.

During the hospital stay, the patient was managed conservatively with medical treatment. Daily wound dressings were performed on the cervical wound, leading to satisfactory development of healthy granulation tissue. Once the granulation tissue was well established, secondary suturing was carried out. The patient showed gradual postoperative improvement, with resolution of fever and a marked reduction in dysphagia. He was ultimately discharged in stable condition with oral medications and advised to maintain regular follow-up.

DISCUSSION

DNSIs remain a clinical challenge due to their variable presentation and potential for rapid progression into life-threatening complications. The spread of infection into the mediastinum occurs through the deep cervical fascial planes, particularly the pretracheal, retropharyngeal, and danger spaces.[7] In this case, the left paratracheal abscess extended inferiorly into the posterior mediastinum, resulting in a mediastinal abscess.

The use of broad-spectrum antibiotics, while essential, is often insufficient when an abscess cavity is well established. This explains the lack of response to prolonged intravenous meropenem in our patient prior to surgical intervention. Imaging plays a crucial role in identifying the precise extent of infection, with contrast-enhanced CT being the gold standard for evaluating both cervical and mediastinal involvement.[8]

The primary management of descending necrotizing mediastinitis (DNM) involves a combination of broad-spectrum intravenous antibiotics, airway stabilization, eradication of the primary source of infection (such as pharyngeal or odontogenic focus), and effective drainage of both cervical and mediastinal collections. Transcervical drainage is often considered the preferred approach, as described historically by Dean with an incision placed anterior to the sternocleidomastoid muscle providing good access to the retropharyngeal space.[9] Cervical exploration and drainage, either unilateral or bilateral cervicotomy, remains the most widely practiced initial intervention.[10]

However, the optimal method of mediastinal drainage continues to be debated. Various approaches-including transcervical, subxiphoid, thoracotomy, video-assisted mediastinoscopy, and video-assisted thoracoscopic surgery (VATS) have been proposed, with no universal consensus. In line with the majority of published reports, transcervical drainage is generally sufficient for infections limited to the upper mediastinum (Endo type I). For collections in the lower anterior mediastinum (Endo type IIA), a midline sternotomy or subxiphoid approach is often recommended, while posterolateral thoracotomy is favored for lower posterior mediastinal involvement (Endo type IIB).[11]

Ultimately, surgical management remains the cornerstone of treatment, with the approach tailored to the anatomical extent of disease. In our case, where the abscess extended into the posterior mediastinum, a combined cervical and hemisternotomy approach provided adequate access for drainage and ensured complete resolution of infection.

This case highlights the importance of a multidisciplinary approach. Collaboration between ENT surgeons, cardiothoracic surgeons, and pulmonologists was essential for achieving a favourable outcome. Early diagnosis, prompt surgical drainage, and aggressive supportive care are key to reducing morbidity and mortality in such cases.

CONCLUSION

Mediastinal abscess as a complication of deep neck space infection is uncommon but associated with high mortality if not recognized and managed early. This case illustrates the need for high clinical suspicion, early imaging, and prompt multidisciplinary surgical intervention. Combined cervical and thoracic drainage can be lifesaving in cases with mediastinal extension.

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