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Multidisciplinary Management of Multi-Compartmental Infections in an Immunocompromised Patient: A Case of Retropharyngeal Abscess, Empyema, and Chest Wall Abscesses

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Abstract: ***This case study presents a 43-year-old male with poorly controlled diabetes and recent hepatitis B diagnosis who developed extensive infections involving the retropharyngeal space, left pleural cavity, and right chest wall. His condition was further complicated by chronic granulomatous lymphadenitis. The patient's initial refusal of surgery led to prolonged morbidity, requiring coordinated medical intervention across departments. Imaging, drainage, and targeted antibiotics yielded substantial improvement over six months. The case underscores the complexities of managing polymicrobial infections in immunocompromised hosts and highlights the value of integrated, patient-centered treatment strategies when surgical approaches are limited.***

Keywords: retropharyngeal abscess, empyema, diabetes mellitus, polymicrobial infection, multidisciplinary management

1.Introduction

Infections involving multiple anatomical compartments, particularly in immunocompromised individuals, present significant diagnostic and therapeutic challenges. Retropharyngeal abscesses are deep neck space infections that can lead to life-threatening complications such as airway obstruction, mediastinitis, or aspiration pneumonia. Empyema, the accumulation of pus in the pleural space, often arises as a complication of pneumonia but can also result from contiguous spread of infection. Concomitant subcutaneous and intramuscular collections further complicate the clinical picture, potentially indicating widespread infection. Diabetes Mellitus, a prevalent metabolic disorder, impairs immune function, predisposing patients to more severe, atypical, and complicated infections. This case report describes a unique presentation of a diabetic patient who developed a complex interplay of retropharyngeal abscess, left-sided empyema, and extensive chest wall collections, compounded by the presence of HbsAg positivity and chronic granulomatous lymphadenitis.

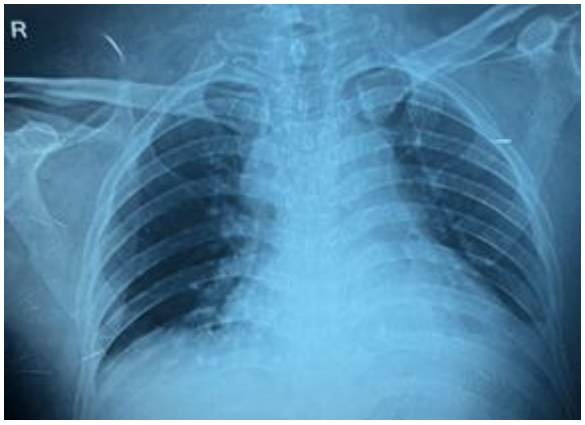
2.Case Presentation

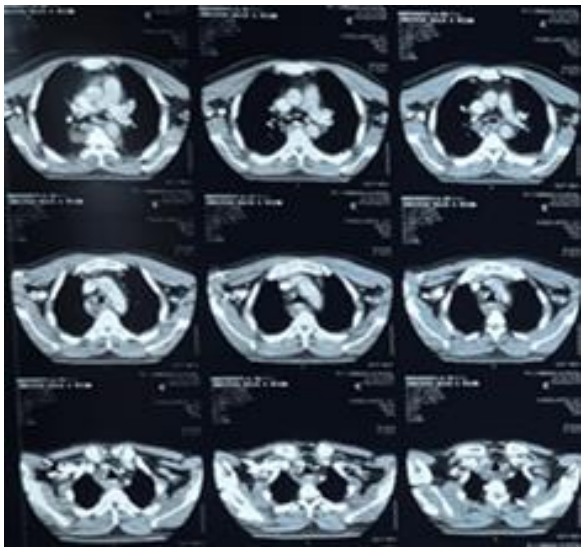
A 43-year-old male, a driver by occupation and presented with chief complaints of right-sided neck and right-sided chest wall swelling, and fever, all persisting for 10-15 days. The swelling was insidious in onset and gradually progressed from the right neck to the right chest wall, extending to the lower back. The fever was intermittent, mild to moderate grade, without chills or rigors. He also reported dysphagia, dyspnea on exertion, and right shoulder pain. There was no history of difficulty in opening the mouth, cough, abdominal pain, ear pain, or throat pain.

His past medical history included Type 2 Diabetes Mellitus for 4 years, managed with oral hypoglycemic agents. He was also a known case of HbsAg positive, diagnosed recently (10-12 days prior to admission). He had a history of blunt force trauma to the right shoulder 5-6 months prior. He was a tobacco chewer for 20 years but was a non-smoker and non-alcoholic. His sleep was disturbed for one month, and he experienced loss of appetite due to difficulty in swallowing.

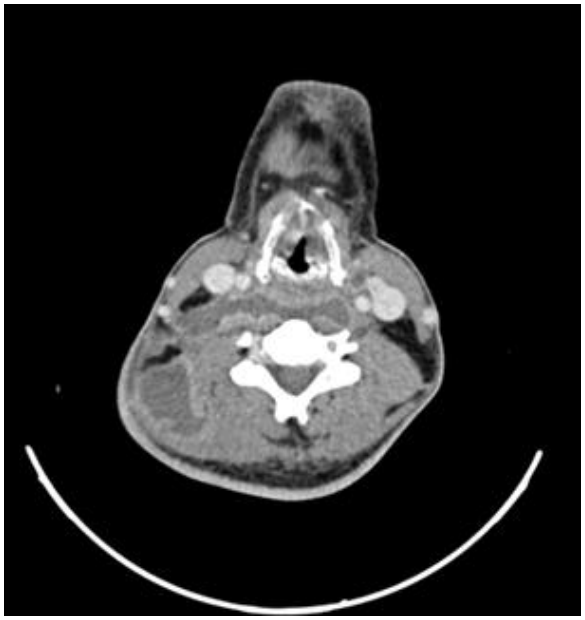
Initially, he was admitted to Hospital 1 where a CECT neck with thorax revealed a retropharyngeal abscess. An X-ray of the right shoulder joint and chest X-ray were reported as normal. Surgery for the retropharyngeal abscess was advised due to high risk, but the patient refused and sought a second opinion at Hospital 2. At Hospital 2, conservative medical management was attempted but proved unsuccessful.

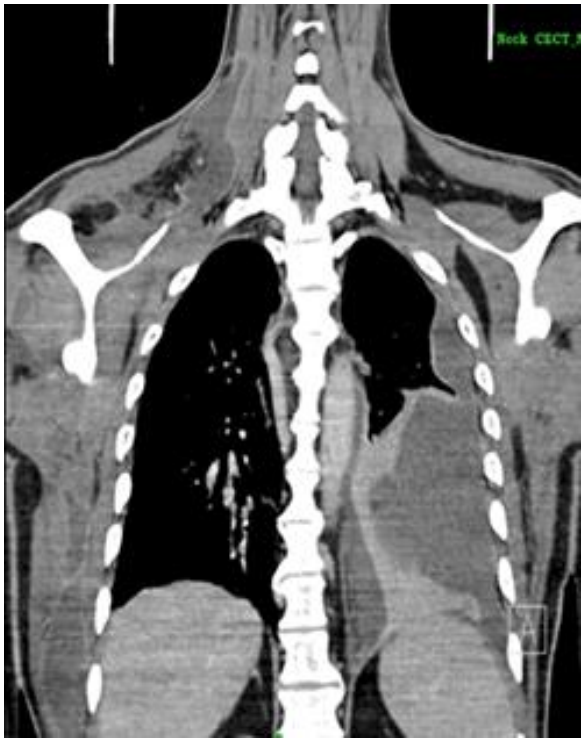
Repeat imaging showed minimal left-sided pleural effusion, right-sided soft tissue edema, and persistent retropharyngeal abscess with right-sided chest wall subcutaneous collection. He was detected HbsAg positive at this hospital, and surgery was again planned but later withheld in favor of medical management. After temporary symptomatic improvement, his complaints aggravated, leading to his admission to our institute on June 17, 2024.





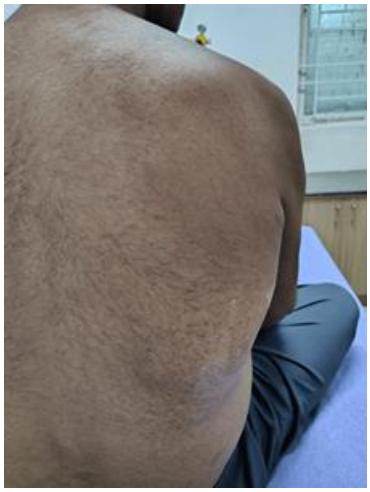
On admission to Sapthagiri Hospital, blood investigations revealed Hb 12.2 gm%, Plt 3.81 lakh/cmm, Tc 13180 cells/cmm (N-81%, L-8%), ESR 21 mm/hr. Renal and liver function tests were within normal limits, except for total protein 5.5 g% and serum albumin 2.5 g%. HbsAg was positive, and HbA1c was significantly elevated at 11%. A repeat CECT neck with thorax was performed.

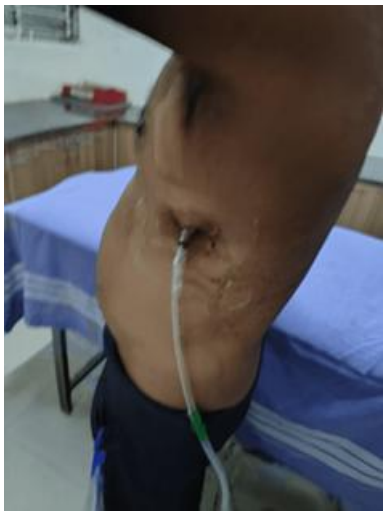




The patient was transferred to the Pulmonary Medicine department due to difficulty in breathing and left-sided effusion. On examination, his pulse was 102 bpm, BP 110/70 mmHg, and SpO2 96% on room air. There was no pallor, icterus, clubbing, cyanosis, or generalized lymphadenopathy. A diffuse, tender, and erythematous swelling was noted on the right side of the neck, extending to the right chest wall until the lower back. Respiratory system examination revealed a centrally placed trachea, reduced thoracic expansion on the right side, and local rise of temperature, tenderness, and erythema over the right chest wall. Percussion was dull throughout the right chest and also on the left side from the 4th to 8th intercostal spaces along the mid-axillary line, extending to the 10th intercostal space posteriorly. Reduced tactile vocal fremitus/vocal resonance was noted bilaterally (left side > right side), and breath sounds were reduced bilaterally in the infra-axillary and infra-scapular areas (left side > right side).

Given the findings, the probable diagnoses included retropharyngeal abscess, left-sided pleural effusion (empyema), right-sided subcutaneous fluid collection, Type 2 Diabetes Mellitus, HbsAg positive, and collection of fluid in multiple planes of the chest wall.



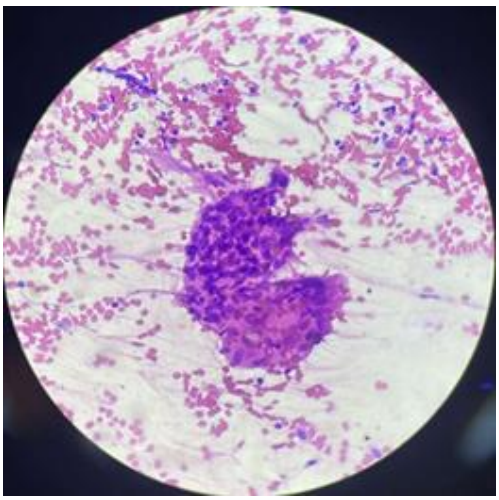


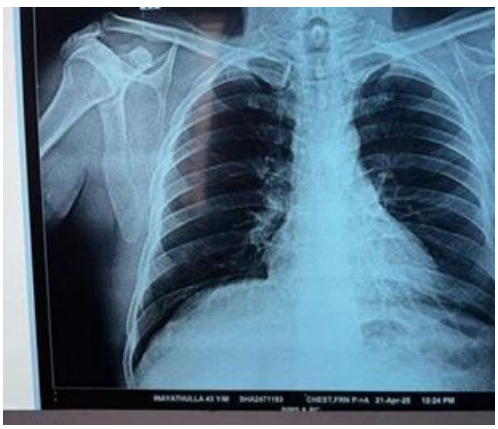
An intercostal drain (ICD) was inserted into the left 5th intercostal space along the mid-axillary line, draining approximately 1200 ml of frank pus upon insertion, which was sent for analysis. Antibiotics were escalated, and supportive treatment continued. Pleural fluid analysis showed sugar 196 mg/dl, protein 3.7 g%, ADA 231 U/L, LDH >1000 U/L. KOH/AFB smears were negative. Gram stain revealed plenty of pus cells and occasional Gram-negative coccobacilli. Pleural fluid cytology showed grayish, turbid fluid with a cell count of >1 lakh/cmm, primarily neutrophils (95%), with no evidence of malignant or atypical cells, suggestive of an acute inflammatory process consistent with empyema. Pleural fluid culture and blood culture showed no growth, and pleural fluid AFB + CBNAAT was negative.

General Surgery and CTVS (Cardiothoracic and Vascular Surgery) opinions were sought regarding the subcutaneous swelling of the right chest wall. Insertion of a chest tube on the right side was advised but was withheld. Serial ICD drainage from the left side showed decreasing output from 1200 ml on Day 1 to less than 50 ml by Day 10, leading to ICD removal on Day 12.

After ICD removal, the patient's symptoms improved significantly; fever and pain in the right shoulder movement resolved, and tenderness over the right neck and chest wall reduced. However, neck swelling persisted. A repeat USG chest showed fluid collection in the intramuscular plane and minimal left-sided effusion. Repeat CECT neck with thorax was performed. Interventional radiology guided aspiration from the right-sided intramuscular collection yielded turbid reddish fluid, which on analysis showed high neutrophil count and high protein.

ENT consultation was again obtained for the persistent neck swelling, with drainage of the retropharyngeal abscess advised under high risk, but the patient was unwilling. The patient was discharged on antibiotics for 7 days with advice for follow-up. On follow-up, the patient was symptomatically and clinically better with no fresh complaints, and the swelling was minimally reduced. A repeat USG neck showed minimal collection in the intramuscular plane and lymphadenopathy. USG-guided FNAC of the right level 5 cervical lymph node was performed. The aspirate was hemorrhagic, and microscopy revealed moderately cellular smears with lymphocytes, granulomas composed of epithelioid cells, and multinucleated giant cells in a hemorrhagic background. No atypical cells were seen, with an impression of chronic granulomatous lymphadenitis. CBNAAT for tuberculosis from this sample was negative. The final diagnoses were left-sided empyema, collection of pus in multiple planes of the chest wall and neck, Diabetes Mellitus, HbsAg positive, and cervical lymphadenopathy, with a suspicion of tuberculosis.





A repeat chest X-ray in April 2025, six months after the initial admission, showed a completely normal chest X-ray, and the patient was doing well with no complaints.

3.Discussion

This case illustrates the complex presentation and management of multi-compartmental infections in a patient with significant comorbidities. The diffuse nature of the swelling extending from the neck to the chest wall and lower back, coupled with the presence of both retropharyngeal abscess and empyema, suggests a widespread inflammatory process.

The early refusal of surgical intervention for the retropharyngeal abscess likely contributed to the progression and spread of the infection to adjacent spaces.

The patient's uncontrolled Type 2 Diabetes Mellitus (HbA1c 11%) played a crucial role in the severity and complicated course of the infection, as diabetes is a known risk factor for delayed wound healing, impaired immune response, and susceptibility to aggressive infections. The HbsAg positivity, while noted, did not appear to directly impact the acute infectious process in this scenario.

The initial pleural fluid analysis confirmed empyema with high protein, high LDH, and predominantly neutrophilic cells, indicative of a severe inflammatory exudate. Despite the lack of growth on pleural fluid culture and blood culture, and negative KOH/AFB and CBNAAT, the presence of Gram-negative coccobacilli on Gram stain suggested a bacterial etiology. The subsequent finding of chronic granulomatous lymphadenitis on FNAC of the cervical lymph node raised the suspicion of tuberculosis. However, repeated CBNAAT tests for tuberculosis were negative, making it less likely to be active mycobacterial disease. Granulomatous lymphadenitis can be caused by various factors, including atypical mycobacteria, fungal infections, or sarcoidosis, and further investigation might be warranted if symptoms recur.

The management involved a multi-disciplinary approach. Aggressive antibiotic therapy combined with efficient drainage of the empyema via ICD was critical for resolution of the left-sided pleural infection. The image-guided aspiration of the right-sided intramuscular collection also helped in managing the localized pus. The patient's initial reluctance for surgical drainage of the retropharyngeal abscess presented a challenge, emphasizing the importance of patient counseling and shared decision-making. The significant improvement and complete resolution of chest findings after six months, as evidenced by a normal chest X-ray, underscore the effectiveness of prolonged medical management and diligent follow-up in complex cases, even when surgical options are declined.

4.Conclusion

This case report highlights a complex presentation of multi-compartmental infections in a diabetic patient, including retropharyngeal abscess, empyema, and extensive chest wall collections, further complicated by granulomatous lymphadenitis. The case underscores the challenges in managing such extensive infections in immunocompromised individuals and emphasizes the importance of a comprehensive, multidisciplinary approach, including aggressive medical therapy, effective drainage of collections, and prolonged follow-up, even in the absence of surgical intervention for certain identified infection sites.

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