

When Microbes Work Together: The Importance of Clinical Microbiology in Diagnostic Stewardship and the Challenges of Polymicrobial Infections in Descending Necrotizing Mediastinitis

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Introduction

Descending Necrotizing Mediastinitis (DNM) is a rare but life-threatening infection that typically originates from oropharyngeal or cervical infections and rapidly spreads to the mediastinum through fascial planes. The condition is frequently caused by polymicrobial infections, often involving anaerobes and members of the *Streptococcus anginosus* group (SAG). Early recognition and appropriate intervention are crucial, but missteps in diagnostic processes can delay life-saving care. The integration of clinical microbiology into diagnostic stewardship plays a central role in ensuring accurate pathogen identification and guiding antimicrobial therapy.

Case Presentation

A 28-year-old, male who presented with fever, odynophagia, and progressive dyspnea. Neck X-ray showed soft tissue thickening with multiple air lucencies in the retropharynx, submandibular, right and left necks with suspected of mediastinal expansion. Chest X-ray showed heterogeneous opacities in both lungs, bilateral pleural effusion and Soft tissue edema with multiple air lucencies in the subcutaneous area.

Empirical broad-spectrum antibiotics and surgical drainage were initiated. However, due to the lack of early microbiological result, the etiologic agents remained unknown during the initial management. The patient's condition deteriorated rapidly, and he succumbed to sepsis on day three of hospitalization. Cultures revealed a polymicrobial infection dominated by *Streptococcus anginosus* and *Acinetobacter baumannii* on culture.

Discussion

This case highlights the critical role of clinical microbiology in the diagnostic pathway of DNM. Polymicrobial synergy in DNM can potentiate tissue invasion and complicate treatment. Involving microbiology specialists early in the diagnostic process can significantly improve antimicrobial targeting, reduce empiric broad-spectrum usage, and potentially lower mortality.

Conclusion

Polymicrobial DNM underscores the urgent need for coordinated diagnostic and therapeutic strategies. Clinical microbiology must be also embedded into frontline diagnostic decision-making as a core element of diagnostic stewardship. Implementing it will improve the accuracy of infectious disease management and support the broader goals of antimicrobial stewardship.

Reference

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