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Perspective

Advancements in Tuberculosis Surgery by Addressing Drug Resistance and Complications

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DESCRIPTION

Tuberculosis (TB), caused by the bacterium *Mycobacterium tuberculosis*, has been a persistent global health challenge, affecting millions of individuals each year. While pharmacological interventions such as antibiotics remain the primary mode of TB treatment, surgical strategies play a important role in certain cases, particularly those involving complications, drug resistance, or anatomical considerations and the evolving landscape of TB surgery. While drug therapy has been highly effective in treating uncomplicated cases of tuberculosis, surgery becomes necessary in specific situations where medical treatment alone may not suffice. The emergence of drug-resistant strains of *Mycobacterium tuberculosis*, such as Multi Drug-Resistant TB (MDR-TB) and Extensively Drug-Resistant TB (XDR-TB), poses a significant challenge. Surgical procedures may be considered to remove localized disease, enhance drug penetration, and improve treatment outcomes. Tuberculosis can lead to various complications, including the formation of abscesses, bronchial stenosis, and the development of fibrotic masses. Surgical intervention may be required to address these complications and prevent long-term sequelae. The location of TB lesions can sometimes pose challenges to effective drug delivery. Surgical resection or drainage may be undertaken to access and treat lesions in anatomically challenging areas, such as the brain, spine, or joints.

Tuberculous pleuritis can lead to the accumulation of fluid in the pleural space, resulting in empyema or pleural effusion. Surgical procedures, such as thoracotomy and decortication, may be performed to drain the pleural space and improve respiratory function. Pulmonary resection involves the surgical removal of diseased lung tissue. This procedure is commonly employed in cases of localized tuberculosis lesions, particularly when drug-resistant strains are present. Lobectomy or segmentectomy may be performed to excise the affected portion of the lung while preserving functional lung tissue. Video-Assisted Thoracoscopic Surgery (VATS) is a minimally invasive surgical approach that utilizes a thoracoscope and small incisions to visualize and access the thoracic cavity. VATS is increasingly used for procedures such as lung biopsy, pleural biopsy, and drainage of pleural effusions in TB cases. It offers advantages such as reduced postoperative pain and shorter recovery times compared to traditional open surgery. Thoracotomy is an open surgical procedure involving a larger incision in the chest wall. This approach allows for comprehensive exploration of the thoracic cavity and is employed in cases where more extensive interventions, such as pulmonary resection or decortication, are needed. Decortication is a surgical procedure aimed at removing fibrous tissue (pleural peel) that may form in response to tuberculous pleuritis. This fibrous tissue can encase the lung (pleural peel), restricting its expansion. Decortication helps restore normal lung function and improve respiratory symptoms.

Accurate diagnosis is critical for determining the need for surgical intervention. However, diagnosing TB can be challenging, and delays in diagnosis may impact the timing of surgical procedures. Drug-resistant TB strains pose a significant challenge, and surgical strategies are often employed as part of a comprehensive approach to managing these cases. However, surgical outcomes may be influenced by the extent of drug resistance and the overall health of the patient. Access to surgical facilities and expertise can be limited in certain regions, particularly in areas with a high burden of TB. Addressing resource limitations is crucial to ensuring that individuals who require surgical intervention can receive timely and appropriate care. Postoperative care is essential for optimizing outcomes, especially in complex cases. Ensuring access to appropriate follow-up care, rehabilitation, and ongoing medical management is crucial for the success of surgical interventions.

The increasing use of minimally invasive approaches, such as VATS, reflects a trend toward reducing the invasiveness of surgical interventions in TB management. These approaches offer benefits such as shorter recovery times and reduced postoperative complications. Integrating surgical strategies with pharmacological therapies, including new and repurposed drugs, can enhance treatment outcomes. Coordinated efforts between surgeons and infectious disease specialists are essential for

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optimizing the overall care of TB patients. The complexity of TB cases often requires a multidisciplinary approach, involving collaboration between surgeons, pulmonologists, infectious disease specialists, radiologists, and other healthcare professionals. This approach ensures comprehensive care and addresses the diverse aspects of TB management.

Surgical strategies play a vital role in the comprehensive management of tuberculosis, particularly in cases involving drug-resistant strains, complications, and anatomical challenges. The field of TB surgery continues to evolve, with a focus on minimizing invasiveness, integrating with pharmacological therapies, and adopting a multidisciplinary approach. As advancements in research and clinical practice unfold, the goal is to optimize outcomes, reduce the burden of disease, and contribute to global efforts to control and eliminate tuberculosis. By cutting through the Mycobacterium with surgical precision, healthcare professionals to enhance the quality of care for individuals affected by this persistent infectious disease.