Flap Sandwich: Use of a De-Epithelialized TRAM Flap, Partial Latissimus Dorsi Flap and Dermal Patch to Reconstruct Coccidioidomycosis-Induced Bronchopleural Fistula

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Abstract

**Problem:** A healthy 38 year old gentleman developed cough and cachexia, later found to be Coccidioides pneumonia. He successively developed a recurring pneumothorax and chronic empyema recalcitrant to antimicrobial therapy, with eventual progression into a chronic bronchopleural fistula. After multiple failed surgeries including pleural stripping and over a year of chest tube dependence and progressive shortness of breath, he considered either an Eloesser flap for controlled permanent drainage, or even a pneumonectomy. His unique surgical problems also included limitations of workhorse flaps needed to reach his defects. He was left with a shortened latissimus muscle flap and no serratus flap (both from prior thoracotomy and scarring). With his significant respiratory compromise and deep wounds beyond the reach of rectus abdominus or pectoral flaps, we were left with limited access to these deep structures beyond the reach of standard chest flaps. With modifications in access, materials, and techniques, we were able to adapt to obtain success.

**Solution:** An aggressive multi-disciplinary approach utilized infectious disease, pulmonology, nutrition, and combined surgical approaches from cardiothoracic surgery, plastic surgery, and interventional pulmonology. Our definitive procedure included using an extended de-epithelialized TRAM flap and extending the access of the latissimus dorsi flap remnant. We designed efficient keyhole-type incisions for direct tunneling between selected ribs to best reach deep pleural defects for improved arcs of rotation. By prefabricating longer flaps, we effectively "sandwiched" the injured lung parenchyma between well-perfused flaps, while respecting the patient's desires to avoid free flaps if possible. Adding a de-epithelialized dermal patch in conjunction with these overlying flaps further layered the effective tissue seal over the visualized leak sites. Our pulmonary interventionalist placed an endobronchial valve to divert barotrauma from the healing flaps and grafts to support reliable healing.

![Image](image_url)

**Figure 1.** Intra-operative view of bronchopleural fistula prior to inset of TRAM and latissimus dorsi flaps.

**Conclusion:** Flaps bring perfusion, optimized antimicrobial delivery, sealing, and tissue filling of infected fistula sites. This unique presentation in a healthy young man required a variety of surgical adaptations of classic thoracic flaps. Adding autografts and endobronchial valves also helped to support the reconstruction with the lung defect "sandwiched" between flaps approaching from both sides through access windows provided by our cardiothoracic team. Pulmonary venting devices as well as optimized basic wound care and nutrition principles helped us achieve durable success from an otherwise debilitating, rare, and life-threatening wound.
Figure 2. Post-operative view of well-healed flap coverage of bronchopleural fistula, one year later.

**Reference Citations:**


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