Empiric Flap Coverage for the Pneumonectomy Stump: How Protective Is It? A Single Institution Cohort Study

Objective: To evaluate the role of empiric bronchial stump coverage and the impact on the rate of bronchopleural fistula (BPF) development after pneumonectomy.

Methods: Patients who underwent pneumonectomy between January 2001 and December 2019 were included. Primary endpoint was development of BPF. Secondary endpoints included time to BPF development, need for additional procedures, and perioperative mortality. Descriptive analyses were performed using Fisher's exact test and Wilcoxon rank-sum test.

Results: During the study period, 383 pneumonectomies were performed; 93 were extrapleural pneumonectomy (EPP). Prophylactic tissue flaps utilized included intercostal muscle (n=133), latissimus dorsi (n=14), serratus anterior (n=6), omentum (n=50), pectoralis major (n=1), pericardial fat/thymus (n=120) and pleura (n=5). Most pneumonectomy cases (87%; 332/383) had empiric flap coverage, with an observed higher rate performed for right-sided operations (R: 96%, 153/159; L: 80%, 179/224).

BPF occurred in 10% (40/383) of all patients; 90% (36/40) of these occurred on the right side (p<0.001). Within the BPF cohort, 28% (11/40) occurred within 30 days of operation. Median time to develop BPF was 58 days (IQR 181). Claggett window was performed in 35 patients; 18 of whom required subsequent flap closure. Perioperative mortality at 30 and 90 days for the entire cohort was 2.4% and 7.9%, respectively. Mortality after BPF diagnosis, however, was 10% and 29% at 30 and 90 days.

The impact of flap choice on BPF rate was investigated in right-sided pneumonectomies and excluded EPP patients (Table 1). Within this cohort, 45 patients had induction chemoradiation and 1 patient received radiation alone; most commonly used flaps were intercostal (n=23), pericardial fat/thymic (n=12), and latissimus dorsi (n=5). Interestingly, many surgeons chose intercostal and pericardial fat/thymus flaps for coverage, even in radiation cases. Intercostal muscle flaps were associated with a low rate of BPF within this high-risk group.

Conclusion: Despite improvements in surgical technique, post-pneumonectomy BPF remains a persistent problem for thoracic surgeons. The ideal flap choice for empiric bronchial stump coverage remains unknown; thus, flap selection is typically driven by surgeon preference and experience. We demonstrate that intercostal muscle flaps are not inferior to larger muscles traditionally used to fill post-pneumonectomy space, even in right-sided operations.

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Additional Resources
- https://files.aievolution.com/prd/aat2101/abstracts/abs_4119/Table1.docx