

Sputum Cytology as a Diagnostic Alternative for Pulmonary Adenocarcinoma in a Frail Elderly Patient Unsuitable for Transthoracic Lung Biopsy: A Case Report and Brief Literature Review

Suriany^{1,2}, Aryani Alexandra Angeliwu³

¹Faculty of Medicine, Institut Kesehatan Medistra, Lubuk Pakam, Indonesia

²Department of Anatomical Pathology, Sembiring General Hospital, Deli Serdang, North Sumatera, Indonesia

adenocarcinomas, which commonly arise in the peripheral lung parenchyma, are associated with substantially lower sensitivity because malignant cells exfoliate less readily into the airways.⁵⁻⁸

Despite these limitations, sputum cytology continues to have important clinical value in carefully selected patients. Positive cytological findings may establish malignancy even when bronchoscopic biopsy is negative or when invasive tissue sampling cannot be safely performed. Furthermore, recent advances in liquid-based cytology, molecular biomarkers, microRNA profiling, and genomic analysis have expanded the diagnostic potential of sputum specimens, suggesting that sputum cytology may continue to play a complementary role in modern lung cancer diagnosis rather than becoming an obsolete technique.⁹⁻¹²

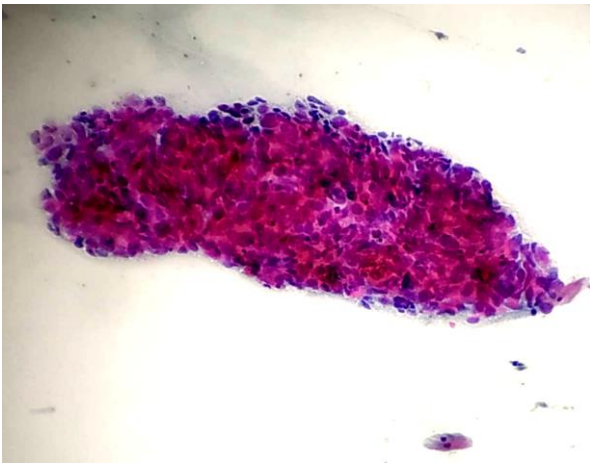


Figure 2. Sputum cytology showing cohesive clusters of malignant epithelial cells with prominent nuclear crowding and overlapping, displaying focal

cytology, particularly in tertiary centers where advanced bronchoscopic and image-guided procedures are readily available.

The diagnostic performance of sputum cytology is further influenced by tumor location and histological subtype. Squamous cell carcinoma, which typically arises in the central bronchi and readily exfoliates malignant cells into the sputum, consistently demonstrates higher detection rates than pulmonary adenocarcinoma. In contrast, adenocarcinoma frequently originates in the peripheral lung parenchyma, resulting in fewer exfoliated tumor cells reaching the central airways and consequently lower cytological sensitivity. Reported sensitivities for sputum cytology in adenocarcinoma are substantially lower than those observed in squamous cell carcinoma, emphasizing the diagnostic challenge posed by peripheral gland

demonstrates that serial sputum cytology, when interpreted in conjunction with clinicoradiological findings, can provide sufficient diagnostic confidence to establish pulmonary adenocarcinoma in carefully selected patients. Furthermore, the successful use of sputum-derived cell block for PD-L1 immunocytochemical assessment and the utilization of the cytological specimen for EGFR mutation analysis underscore the evolving role of sputum cytology beyond conventional morphological diagnosis. Although histopathological examination remains the diagnostic gold standard, maximizing the diagnostic and predictive potential of minimally invasive cytological specimens may offer a practical and patient-centered alternative when tissue acquisition is not feasible. This case highlights the continuing relevance of sputum cytology as an integral component of multidisciplinary lung cancer