Parana Liyanage A.I.K.G.

PATHOLOGICAL DIFFERENCES BETWEEN SMALL CELL VS NON SMALL CELL LUNG CARCINOMA

Tutor: PhD Tishchenko G.V.
Department of Pathological Anatomy
Gomel State Medical University, Gomel

Small cell lung carcinoma (SCLC) and non-small cell lung carcinoma (NSCLC) represent two major histological categories of lung cancer, each characterized by distinct clinical behaviors and therapeutic considerations. Accurate differentiation between these forms is essential for effective diagnosis and treatment, as they display significant pathological and biological divergence. This literature review integrates recent research that delineates the unique genetic and clinical features of SCLC and NSCLC, emphasizing the resulting implications for patient care and clinical outcomes

Comparative examination of the histological features of SCLC and NSCLC demonstrates substantial differences in their underlying genetic profiles. SCLC, defined by its small, round to oval cellular morphology, frequently shows neuroendocrine differentiation, a characteristic linked to its aggressive clinical course and unfavorable prognosis. In contrast, NSCLC comprises multiple subtypes most notably adenocarcinoma and squamous cell carcinoma that present a wider spectrum of histopathological patterns and clinical outcomes.

Comparative genomic hybridization (CGH) analyses have identified recurrent chromosomal abnormalities that distinguish the major forms of lung cancer. Distinct patterns of genomic alteration observed in SCLC and NSCLC point to divergent oncogenic pathways and tumor-evolution processes. These molecular differences carry direct therapeutic implications: SCLC is generally managed with systemic chemotherapy and radiation, whereas NSCLC is more amenable to targeted interventions directed at alterations such as EGFR and ALK mutations. Furthermore, emerging evidence underscores the importance of molecular diagnostics particularly the assessment of circulating tumor DNA (ctDNA) in elucidating resistance mechanisms and tracking disease progression in advanced NSCLC. Such assays can inform treatment selection by identifying actionable mutations, reinforcing the value of comprehensive genomic profiling. Notably, studies examining ctDNA dynamics in patients receiving Osimertinib have shown that fluctuations in EGFR mutation burden correlate meaningfully with clinical outcomes, offering a refined approach to prognostic assessment. Despite these advances, some researchers contend that broad molecular testing in all lung cancer patients, especially those with early-stage disease, may yield limited clinical benefit while imposing substantial financial costs. This debate highlights ongoing questions regarding the most effective and economically sustainable strategies for integrating molecular testing across different stages of lung cancer management

The differentiation between small cell lung carcinoma and non-small cell lung carcinoma remains essential not only for accurate diagnosis but also for guiding therapeutic decision-making and predicting clinical outcomes. Distinct pathological, genetic, and clinical characteristics underscore the necessity of subtype-specific treatment approaches. Even though advances in molecular testing have deepened understanding of tumor biology, its application in early-stage disease requires careful evaluation to balance clinical benefit with resource utilization. As lung cancer management continues to evolve, ongoing research into resistance mechanisms and the development of more precise targeted therapies remains critical.