Tumors of lung and pleura

Daniel Benharroch*

Department of Pathology, Soroka University Medical Center, Ben Gurion University of the Negev, Beer Sheva, Israel.

*Corresponding author
Daniel Benharroch, Department of Pathology, Soroka University Medical Center, Ben Gurion University of the Negev, Beer Sheva, Israel.

Submitted: 28 Aug 2022; Accepted: 30 Aug 2022; Published: 01 Sep 2022

Citation: Daniel Benharroch (2022) Tumors of lung and pleura. Medical & Clinical Research 7(9):01.
TUMORS OF LUNG AND PLEURA
Primary Tumors of Lung

• Carcinoma (90%-95%)
• Bronchial carcinoid (5%)
• Mesenchymal and other miscellaneous tumors (2%-5%)
LUNG CANCER

- Near 1/3 mortality from cancer
- 84% will die within 5 years
- Most will be diagnosed after age 40 (98%)
- Cigarette smoking – main risk factor (87%)
- 75% are centrally located
CARCINOMA

Frequent invasion to neighboring organs - • Pleura, mediastinum.
Involvement of regional lymph nodes – • 50%.
Distant spread – lymphatic or hematogenic. • Metastases as presenting symptoms – • frequent.
Bronchogenic carcinoma

Frequent location of metastases: •
Adrenals – more than 50% •
Liver – 30-50% •
Brain – 20% •
Bone – 20% •
Clinical vs histological classification

- Squamous cell carcinoma (M32%-F25%)
- Adenocarcinoma (M37%-F47%)
- Large cell carcinoma (M18%-F10%)
- Small cell carcinoma (M14%-F18%)

10% - combined carcinoma

Non small cell carcinoma

Non squamous non small cell carcinoma (EGFR)

Small cell carcinoma
Precursor lesions

- Squamous dysplasia and carcinoma in situ
- Atypical adenomatous hyperplasia
- Diffuse idiopathic pulmonary neuroendocrine cell hyperplasia

A precursor condition does not always imply a cancer. Its transformation is rarely preconceived.
DEVELOPMENT OF BRONCHIAL CARCINOMA

• Area of cytological atypia
• Thickening of bronchial mucosa
• Warty excrescence and erosion
  a. Fungating into bronchial lumen
  b. Infiltration along peribronchial wall
  c. Producing intraparenchymal mass
Respiratory epithelium

Squamous metaplasia

Respiratory epithelium

Development of squamous cell carcinoma
Cytological atypia / dysplasia
Bronchogenic carcinoma
Peribronchial infiltration
Squamous cell carcinoma

90% central

Frequent P53 mutations

overexpression 80% EGFR - mutations are rare

Cigarette smoking

90% central

IHC supporting

P63

CK 5-6
Squamous cell carcinoma

Histopathological characteristics:
Keratin formation.
Marked intercellular bridges (desmosomes).
well differentiated squamous cell carcinoma
Poorly differentiated squamous cell carcinoma
Desmosomes
Adenocarcinoma

- Usual Adenocarcinoma

- Bronchioloalveolar carcinoma
  
  *No link with smoking*  
  *Good prognosis*
Adenocarcinoma (Usual)

- Mostly in women and non-smokers
- Next to scar

Mutations
- K-RAS
- EGFR

Markers
- TTF1
- NAPSIN A
- Supporting IHC

Localization
- Peripheral 75%
Usual Adenocarcinoma

ACINAR –
PAPILLARY –
SOLID –

Glandular differentiation or mucus formation. –
Mucous staining - (Mucicarmine)

80% Positive
Bronchioloalveolar carcinoma

1-9% of lung cancers –
Nodular formation –
Or pneumonia-like consolidation. –
HISTOPATHOLOGY: –
Spreads along preserved alveoli (Lepidic) –
Composed of cuboidal or columnar cells. –
Bronchioloalveolar carcinoma

- **Non mucinous** (adenocarcinoma in situ)
  - Columnar, peg shaped, cuboidal
  - Peripheral lung nodule

- **Mucinous**
  - Tall columnar with cytoplasmatic and intra alveolar mucin
  - Aerogenously spread forming satellite tumors
  - May resemble lobar pneumonia
Non-Small Cell Lung Cancer (NSCLC)

NSCLC differs from Small Cell Lung Cancer by a variety of histomorphological features, by a diverse biological activity, and therefore, by a changing response to chemotherapy, to biological and to radiotherapy.

A standard NSCLC case, displaying metastases, a positive expression for PD-L1, and no abnormal EGFR or ALK expression, may respond best to biological therapy with nivolumab, and with ipilimumab.
SMALL CELL LUNG CANCER (SCLC)

Small cell lung cancer is highly sensitive to radiotherapy. However, this mode of treatment is insufficient, due to the very high stage of this malignancy at diagnosis. Therefore, it is highly advised to append treatment with EGFR tyrosine kinase inhibitor, as well as with an antiangiogenic mode of therapy.
Small cell carcinoma

75% hormone producing or paraneoplastic syndromes

99% - Link with smoking
Small cell carcinoma
(POORLY DIFFERENTIATED NEUROENDOCRINE CARCINOMA)

Microscopic features:
Small epithelial cells, scant cytoplasm, fine granular nuclear chromatin
High mitotic activity
Extensive necrosis

Electron microscopic studies:
Dense-core neurosecretory granules in some of tumor cells

Molecular studies:
Mutant expression: 80-100% RB, 50-80% p53
High levels of BCL-2 (anti apoptotic) - 90%
Reduction of BAX (proapoptotic gene) expression
Small cell carcinoma

Azzopardi effect
Large cell carcinoma

Composed of large, undifferentiated, malignant cells. A neuroendocrine variant is described.
Bronchial Carcinoid

No relation with smoking; good prognosis; mostly below age 40.
May present as a button in the bronchial wall.

Classification:
Typical carcinoid (well differentiated neuroendocrine carcinoma)

Atypical carcinoid (moderately differentiated neuroendocrine carcinoma)
Bronchial Carcinoid

MICROSCOPIC FEATURES:
Organoid (growing organ-like).
Surrounded by delicate connective tissue.
Nests or cords, with uniform cells.
Positive for neuroendocrine markers.
<table>
<thead>
<tr>
<th>Neuroendocrine carcinoma</th>
<th>5y survival (%)</th>
<th>10y survival (%)</th>
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<tbody>
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<td>Typical Carcinoid</td>
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<td>Atypical carcinoid</td>
<td>56</td>
<td>35</td>
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<td>Large cell neuroendocrine carcinoma</td>
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<td>9</td>
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<td>Small cell carcinoma</td>
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<td>5</td>
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</tbody>
</table>
Pulmonary Hamartoma
Pulmonary Hamartoma
Pleural Tumors
MALIGNANT MESOTHELIOMA

50% die within one year
MALIGNANT MESOTHELIOMA

Microscopic types:
• Mesenchymal (20%) (sarcomatoid) – spindle cells
• Epithelioid (60%) – forming tubular and papillary structures
• Mixed (20%)

E.M examination:
• Long microvilli (gold standard)
MALIGNANT MESOThELIOMA