Lung cancer and pulmonary metastases
(presentation for English medical students)

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I. case
Anamnestic datas, physical examination

- 53 years old male patient
- several times haemoptysis
- hypertension, myocardial infarction
- 1 pack/day cigarette for 15 years
- drinks alcohol occasionally
- No positive findings with physical examination
I. case

• What kind of diseases cause haemoptysis?
A, oropharyngeal origin/ distinguish hematemesis
B, pulmonary origin
C, cardiovascular origin (high blood pressure, mitral stenosis)
D, haemostatic disorder
Pulmonary origins of haemoptysis

• Chronic inflammation (brochiectasis, TBC, lung abcess, pneumonia with necrosis)
• Malignant and benign tumours
• Malformations (AV malformations, bronchial telangiectasia)
• Systemic diseases pulmonary manifestation (vasculitis, haemostatic disorder)
• Others (pulmonary embolism, foreign body aspiration, iatrogenic, trauma)
Lung cancer symptoms

1. Incidentally diagnosed without any kind of symptoms (5-15%)

2. Symptoms:
   - cough (40-70%)
     - dyspnea (50-70%)
     - weight loss (30-60%)
     - hemoptysis (20-40%)
     - chest pain (30-40%)
   - atelectasis, pneumonia (20%)
Lung cancer syndromes

Paraneoplastic syndromes:

- Hematological: Trousseau syndrome (deep venous thrombosis+thrombophlebitis migrans), anaemia
- Endocrinological: Cushing-syndrome, SIADH, hypercalcaemia
- Neurological: peripheral neuropathy, myasthenia gravis (Lambert-Eaton syndrome)
- Musculoskeletal: hypertropic osteoarthropathia, clubbing of the digits
- Other: fewer, acanthosis nigricans, retinopathy
Lung cancer symptoms

Other symptoms:

- hoarseness (n. recurrens involved)
- diaphragma paralysis (n. phrenicus involved)
- dysphagy (oesophagus involved)
- pleural effusion (carcinosis pleurae)
- pericardial effusion (pericardium involved)
- v. cava superior syndrome (v. cava superior involved)
- Pancoast tumor: Horner triad, chronic shoulder pain
I. case

• **What kind of test would you choose?**
• *plain chest X-rays*
• *(otolaryngological consultation)*
• *(gastroenterological consultation)*
• *(cardiological consultation)*
I. case

Chest X-rays
I. case
Chest X-rays
II. case

• *What kind of other tests would you choose an why?*

• Chest CT (morphology, localization, operability, lymph node involvement)

• Bronchoscopy (morphology, localization, operability, lymph node involvement, biopsy)
I. case
Chest CT
I. case
Chest CT
I. eset
Bronchoscopy

- Left upper lobe bronchus is full of blood, no direct tumor sign, brushing cytology from left upper lobe: malignancy

1. picture: normal bronchus

2. picture: bronchus with blood
Hystology
Benign tumors

• Epithelial tumours: adenoma, papilloma

• Dysontogenetic tumours: hamartoma, teratoma

• Neurogenic tumours: neurinoma, neurofibroma

• Mesodermal tumours: fibroma, lipoma, chondroma
Hystology
Malignant

Non small cell lung cancer (NSCLC)

- Adenocarcinoma (~40%)
- Squamousus cell carcinoma (~25%)
- Large cell carcinoma (~10%)
- Carcinoid tumours(~10%)
- Others: sarcomatoid, salivary gland tumours, not specified (~<1%)

Small cell lung cancer (SCLC) (~15%)
### TNM staging (NSCLC)

<table>
<thead>
<tr>
<th></th>
<th>Diam</th>
<th>Scopy</th>
<th>Atelectasis</th>
<th>Invasion</th>
<th>Nodules</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>T1a &lt; 2cm</td>
<td>No invasion</td>
<td>No invasion</td>
<td>No invasion</td>
<td>No invasion</td>
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<tr>
<td></td>
<td>T1b: 2-3cm</td>
<td>lobar bronchus</td>
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<tr>
<td>T2</td>
<td>T2a: 3-5cm</td>
<td>&gt; 2cm to carina</td>
<td>Lobar atelectasis or obstructive pneumonia to hilus</td>
<td>Chest wall diafragm mediast pleura pericard</td>
<td>Nodules in same lobe</td>
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<tr>
<td></td>
<td>T2b: 5-7cm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>&gt; 7cm</td>
<td>&lt; 2cm to carina</td>
<td>Whole lung</td>
<td>Heart great vessels trachea esophagus spine</td>
<td>Nodules in other ipsilateral lobes</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>T4</td>
<td>Tumor in carina</td>
<td></td>
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# TNM staging (NSCLC)

<table>
<thead>
<tr>
<th>Regional lymph nodes (N)</th>
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<tbody>
<tr>
<td><strong>N1</strong></td>
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<tr>
<td><strong>N2</strong></td>
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<tr>
<td><strong>N3</strong></td>
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# TNM staging (NSCLC)

<table>
<thead>
<tr>
<th>M</th>
<th>Metastasis (M)</th>
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<tbody>
<tr>
<td></td>
<td>Contralateral nodules</td>
</tr>
<tr>
<td></td>
<td>pleural dissemination</td>
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<tr>
<td></td>
<td>Distant metastases</td>
</tr>
<tr>
<td></td>
<td>→ M1a</td>
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<tr>
<td></td>
<td>→ M1b</td>
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## Stages (NSCLC)

<table>
<thead>
<tr>
<th>T1a</th>
<th>T1b</th>
<th>T2a</th>
<th>T2b</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0</td>
<td>IA</td>
<td>IB</td>
<td>IIA</td>
<td>IIB</td>
<td>IIIA</td>
</tr>
<tr>
<td>N1</td>
<td>IIA</td>
<td>IIA</td>
<td>IIB</td>
<td>IIIA</td>
<td>IIIA</td>
</tr>
<tr>
<td>N2</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIA</td>
<td>IIIB</td>
<td>IIIB</td>
</tr>
<tr>
<td>N3</td>
<td>IIIB</td>
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</tbody>
</table>
Staging (SCLC)

- **TNM** system is used!

  But:

  - **Limited disease:** Disease restricted to one hemithorax with/without metastases in ipsi- or contralateral regional lymph node; or ipsilateral pleural effusion

  - **Extensive disease:** distant metastasis occurs outside the hemithorax
Treatment
Benigns tumours

• surgical resection (atypical surgical resection: wedge or enucleation) is sufficient
• sometimes anatomical resection needs
• why operate?: because of the tumour can cause symptoms in the future and for the appropriate hystology
Treatment
Benign lesions - wedge resection
Treatment

NSCLC:

- **I-II/B stages** operation (anatomical resection = lobectomy, bilobectomy, pulmonectomy + lymphadenectomy) then if it’s needed chemoradiotherapy
- **III/A stage**: neoadjuvant chemotherapy. Then restaging and if there is regression in the lymph nodes, operation (anatomical resection + lymphadenectomy ) then chemotherapy
- **III/B stage**: Chemoradiotherapy
- **IV stage**: Chemoradiotherapy. Rarely if there is isolated adrenal gland-, or intracranial- or liver metastases and there is a chance for the curative resection of the lung cancer it’s possible to remove the metastases and the lung cancer as well.
Treatment

SCLC:

• Treatment is generally chemoradiotherapy!
• Rarely surgical procedure, only in case of „very limited disease” (T1N0, T2N0)
• Before the operation, patients with negative N2 region in the chest CT should undergo diagnostic mediastinoscopy (exclude N2 cancer involvement)
Treatment
Malignant tumours-anatomical resection

• Why anatomical resection? : decreasing local tumour recurrence

Segmentectomy  Lobectomy  Pulmonectomy
Treatment
Open surgical procedures (thoracotomy)

- Posteolateralis or anterolateralis thoracotomy

1. picture: posteolateral thoracotomy
2. picture anterolateral thoracotomy
Treatment
Video assistated thoracoscopy (VATS)

• Atypical or anatomical resection as well!
Treatment

Video assisted thoracoscopy (VATS)
Obligated tests before lung resection

- Laboratory tests (blood count, coagulogram, liver and kidney function, CRP, blood type and antibody)
- **Chest CT (or PET-CT)**
- **Bronchoscopy**
- **Lung function test**
- **Arterial astrup test**
- **In case of pulmonectomy lungscintigraphy**
- **Head CT**
- **Abdominal ultrasound**
- Consultations (most frequently with cardiologist)
Lung metastases

• **Lung metastases are not equal with palliative chemoradiotherapy!!!!**

• If the primary tumour is under control and there is no metastases in other organs, or the other organs metastases are controlled by surgery, and if there is a chance for complete resection, they could surgically removed

• No limit of number

• Mainly colorectal, renal, non seminomatosus germ cell tumours, and sarcomas
Lung metastases

- Always atypical „lung saving” resections
  - wedge resection
  - laeser metastasectomy
Lung metastases
laeser metastasectomy
Lung metastases
laeser metastasectomy
Lung metastases
laeser metastasectomy
Lung metastases
laser metastasectomy
Thank you for your attention!