THORACIC MALIGNANCIES
Lung Cancer

Non-Small Cell Lung Cancer

Diagnostic Evaluation for Non-Small Lung Cancer

1. History and Physical examination.
2. CBCDE, screening profile, LDH.
4. CT scan of chest and upper abdomen (i.e., inferior part includes liver and adrenal gland).
5. Bronchoscopy: for central tumors or if FNA is negative for peripheral tumors.
6. FNA for peripheral tumors.
7. Mediastinoscopy: only to be done if CT chest showed 1 cm or >1 cm lymph node in shortest diameter. The test only to be done on operable cases.
8. Bone scan and CT brain: only for symptomatic cases.

Treatment of Non-Small Cell Lung Cancer

A) Early Localized resectable Non-Small Cell Lung Cancer

1. **Occult non-small cell lung cancer T\(x\)N\(o\)M\(o\):**
   Patient should have close follow-up every 6-8 months CT chest until tumor is evident and tumor discovered. After discovery of the tumor it should be treated as 1\(^{st}\) stage.

2. **Stage O NSCLC: TIS small N\(o\)M\(o\):**
   In-situ carcinoma of the lung.
   Surgical resection using least extensive technique, eg wedge resection or segmentectomy.
3. **Stage 1 NSCLC: \((D_{1-2}N_0M_0)\):** 
   Treatment is surgery as lobectomy. This to be done if this patient has enough respiratory reserve, i.e. expected post-operative FEV1 should be >0.8 or 40% of the predicted PCO\(_2\) <50 mmHg pre-operative FEV1 should be >60% of the predicted or ≥2 liters.

4. **Stage 2 NSCLC: \((T_{1-2}N_1M_0) (T_3N_0M_0)\):** 
   Surgery as for Stage 1. No adjuvant therapy.

**B) Locally Advanced Resectable NSCLC:**

1. **Stage IIIA: \((T_3N_1M_0), (T_{1-3}N_2M_0)\):**
   - \(T_3N_1\) tumors: Will be treated with neoadjuvant chemotherapy consisting of two cycles of cisplatin/etoposide chemotherapy followed by surgical resection. No adjuvant therapy chemotherapy. Adjuvant radiation in case of positive margins.
   - \(N_2\) disease: patient’s with good performance status, no contra-indication to surgery are to be treated with neoadjuvant chemotherapy (cisplatin + VP 16) for 2 cycles followed by surgery. If patient’s have low performance status or contra-indication to surgery, but have adequate pulmonary function tests then definitive radiotherapy or chemo-radiotherapy can be done, otherwise palliative radiotherapy.

**C) Locally Advanced Unresectable and Small Cell Lung Cancer**

These include \(T_4\) and \(N_3\) disease:

- Patients good performance status 0-2 and good pulmonary function tests should have combined modality therapy. Combined modality therapy will be delivered according to recent intergroup trial. The patients will receive concurrent chemoradiotherapy (both starting on day 1). Chemotherapy will consist of cisplatin (q 4 weeks for two cycles) and vinblastine (weekly for 5 weeks).
- Patients poor performance status 3-4 and/or poor pulmonary function test should receive palliative radiotherapy.
- \(T_4\) – **malignant pleural effusion:** are not appropriate candidates for definitive radiotherapy. Their treatment to be followed as for metastatic disease patients (see below)

**D) Metastatic Non-small Cell Lung Cancer**
• Patient who has good performance status 0-2 and favorable prognostics, to be treated with combination chemotherapy. Either one of the following combinations is acceptable:
  1. Cisplatin 100mg/m² every 4 weeks combined with weekly Navelbine 25mg/m² OR
  2. Cisplatin 100mg/m² on day one every three weeks combined with Etoposide 100mg/m² days 1-3 (3 consecutive days) every 3 weeks.

• Patient who has low performance status 3-4 or unfavorable prognostics can be treated with best supportive care ± palliative radiotherapy locally for metastatic sites.
• Other acceptable option includes single agent Navelbine at the dose of 25 mg/m² given weekly. This is now considered standard of care based on several randomized trials from Europe and USA.

E) Recurrent Non-small Cell Lung Cancer:

• Recurrent metastatic disease with good performance status can be treated as metastatic disease as mentioned earlier.
• Recurrent solitary metastasis in patients with good performance status and no contraindication to surgery combined approach with resection radiotherapy is to be done for specific sites like brain metastases. This is to achieve better palliation and longer median survival.
• Recurrent non-small cell lung cancer with prior chemotherapy as neoadjuvant or palliatively for advanced disease. Should not received 2nd line chemotherapy.
Small Cell Lung Cancer

Staging:

1. Limited: tumor confined to the hemothorax of origin, the mediastinum and supraclavicular nodes which can be encompassed within radiotherapy field.
   NB: No general agreement for pleural effusion which has been included as limited or extensive by various groups. Same debate has been for contralateral supraclavicular lymph nodes.

2. Extensive: Disease beyond these bounds.

Staging Procedures:

i. History and physical examination and performance status determination.
ii. Chest x-ray, ECG, CBCD, SP.
iii. CT chest, abdomen, brain.
iv. Bone scan.
v. Bone marrow aspiration and biopsy (bilateral is controversial).
vi. Bronchoscopy with interbronchial biopsy or FNA (as discussed before in non-small cell lung cancer section).

NB: Staging should stop when disease is documented to be extensive disease, therefore, patients on physical examination if documented to be ED, then only screening staging to be done, ie studies in Section A and B in staging procedure. Other staging procedure to be done only if indicated clinically.

Treatment of Small Cell Lung Cancer

i. Limited disease:
   • Combination chemotherapy with cisplatinum+ VP16 a total of 6 cycles
     Irradiation (TI), concomitantly with the 2nd cycle. PCI in complete responders post 6 cycles of chemotherapy.
ii. **Extensive disease:**
   - Patient with good performance status to have 6 cycles of cisplatinum VP16. No PCI or TI, even for CR patients.
   - Patient with poor performance status or elderly can have single agent or low dose carboplatin with oral VP 16 as an alternative.

*Follow-up for both limited disease and extensive disease: q3 months for 1st 2 years, then q6 months for another 3 years, then q yearly.*
**Thymoma**

**Treatment by pathologic type and stages:**

i. **Non-invasive thymoma:** surgical resection which is to be done in block resection keeping in tight capsule.

ii. **Invasive thymoma:**
   - Stage 1: surgical resection as described above. Radiation therapy only if incompletely resected or poor surgical risk.
   - Stage II, III, IV:
     - Operable cases: en block resection with post-operative radiotherapy if positive margin
     - Inoperable cases, like Stage III and IV will be treated with three cycles of neoadjuvant chemotherapy including combination of cyclophosphamide+platinum+adriamycin (CAP) followed by radiation therapy and than surgical resection of residual disease if possible.

c. **Recurrent invasive thymoma:**
   - Viable options are:
     - i Repeat surgery followed by radiation
     - ii Radiotherapy alone, if not resectable
     - iii Neoadjuvant or adjuvant chemotherapy can be added to surgery or radiation.

*Follow-up q3 months for 1st 2 years, then q6 months for another 3 years, then 3 yearly.

**Thymic carcinoma:**
No clear guidelines available in the literature. The recommendation is to treat as an advanced, invasive thymoma with multimodality therapy, chemotherapy, surgery + radiation for localized disease. For metastatic disease, combination chemotherapy is option as the numbers are too small to make decisions but can be considered in patients with good performance status and no comorbidities.

v. **CAP Chemotherapy**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
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<tbody>
<tr>
<td>Cisplatin</td>
<td>50 mg/m2</td>
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<tr>
<td>Doxorubicin</td>
<td>50 mg/m2</td>
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<tr>
<td>Cyclophosphamide</td>
<td>500 mg/m2</td>
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Malignant Mesothelioma

Treatment:

i. **Localized: (Stage I):**

Surgical resection of the adequate margins for solitary lesion. Intracavitary lesions can be treated with palliative pleurectomy and decortication or palliative radiation.

ii. **Advanced: (Stage II, III, IV):**

Symptomatic treatment with only pleurodesis or palliative radiotherapy. No chemotherapy to be prescribed for the advanced stages.