The Imaging Journey of Patients with Malignant Pleural Mesothelioma: Experience of a Tertiary Mesothelioma MDT

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Exhibit Category: Thoracic Neoplasms
Disclosures

- None
Learning Objectives

• Imaging features of malignant pleural mesothelioma (MPM), from presentation to palliation
• Optimum CT imaging technique
• Means of obtaining histological diagnosis
• Role of CT in determining radical versus non-radical surgery
• Normal and abnormal post-intervention appearances
• Multi-disciplinary based approaches to managing end-stage MPM
Presentation

- Unexplained unilateral pleural effusion and/or thickening
CT Technique

- Pleural protocol
  - Entire pleural and diaphragmatic surfaces required from apices to pubic symphysis
  - 60 second delay
  - 150 mls at 2.5 mls/second
  - 1.5 collimation
Common features of MPM

- Circumferential irregular pleural thickening
- Interlobar fissural involvement
- Mediastinal irregular pleural thickening
Uncommon features of MPM

- Discrete pleural nodule
- Mediastinal invasion
- Extension beyond the diaphragm
- Chest wall invasion and bony destruction
- Metastases at presentation
Role of MRI in MPM

• Not routinely used to evaluate MPM

• Mainly used as a problem solving tool for detecting invasion of vessels, cardiac structures, endothoracic fascia, and diaphragm

• Modality of choice for those in whom iodinated contrast is contraindicated
PET-CT

- Adjunct in diagnosis and staging

- F-18 FDG uptake is higher in MPM than benign conditions \(^1\)

- Potential use of PET-CT guided biopsies

- PET-CT can give false positives with infection, inflammation, or after talc pleurodesis
PET-CT Images
Benign or malignant pleural disease

- Yilmaz et al.\textsuperscript{2}:
  - Favour a malignant process when:
    - Nodular pleural thickening
    - Mediastinal pleural thickening
    - Parietal pleural thickening > 1 cm
    - Circumferential pleural thickening
  
  - Specificity: 97\%, 85\%, 85\%, 97\%
  - Sensitivity: 37\%, 31\%, 35\%, 22\%
Mesothelioma Mimics

Talc in chest wall leading to a giant cell reaction

Lung cancer with pleural effusion

Mucinous cystic tumour
Diagnosis

• Thoracoscopy\textsuperscript{3, 4}
  – Investigation of choice
  – Also allows placement of drains or pleurodesis
  – Diagnostic sensitivity of 94 % for malignancy

• Percutaneous biopsy

• The increased sensitivity of thoracoscopy has led to a decreased use of aspiration and percutaneous pleural biopsy
Staging

• The 8th edition of the TNM classification for malignant pleural mesothelioma is due to be released by IASLC

• Important for stratification of patients
  – Treatment options
  – Clinical Trials

• However, there is relatively poor correlation between CT and final surgical staging
Volumetric assessment

• Volumetry may be useful for pre-operative assessment \(^5,\,6\)

• Currently, quite labour intensive

• Computer assisted methods are being investigated
Treatment options

- All treatment should be thought of as palliative
  - Active supportive care
  - Drain
  - Chemotherapy
  - Cordotomy
  - Surgery
Lung Sparing Pleurectomy Decortication *aka* Radical P/D aka Extended Pleurectomy/Decortication

- P/D that removes ALL macroscopic disease
- Full parietal pleurectomy
- Visceral decortication extending into fissures
- Removal of pericardium and diaphragm and reconstruction with synthetic patches
Pleuropneumonectomy, *aka* Extra Pleural Pneumonectomy (EPP)

- En bloc removal of pleura, lung pericardium and diaphragm.
- Reconstruction of pericardium and diaphragm with synthetic patches.
Contraindications to radical surgery

- Metastatic disease at presentation
- Invasion of subclavian vessels
- Involvement of pericardial space and mediastinum
- Involvement of subclavian vessels
- Vertebral body destruction
- Neuroforaminal involvement
Follow up – normal patch appearances
Complications post surgery

Chylous collection
Talc pleurodesis in chest wall leading to granuloma formation
Pneumothorax and subcutaneous emphysema
Diaphragmatic patch rupture post EPD
Percutaneous pleural biopsy
Recurrence - Needle tract seeding
## Recurrence - Needle tract seeding

<table>
<thead>
<tr>
<th>Procedure</th>
<th>n</th>
<th>Incidence of Needle Tract Seedlings</th>
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</thead>
<tbody>
<tr>
<td>Aspiration</td>
<td>55</td>
<td>2 (4%)</td>
</tr>
<tr>
<td>CT Core-Needle Bx</td>
<td>22</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Chest Drain</td>
<td>55</td>
<td>5 (9%)</td>
</tr>
<tr>
<td>Thoracoscopy</td>
<td>51</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>Thoracotomcy</td>
<td>21</td>
<td>5 (24%)</td>
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Progression – role of serial CT
Palliative measures - Pleural Drains

• Removal of fluid may relieve pain and difficulty in breathing

Therapeutic drain for malignant mesothelioma spread into the peritoneum
Take Home Messages

• Radiology is key to management
• Pleural phase CT is vital
• CT helps discriminate between radical or non-radical surgery
References


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