Malignant Pleural and Pericardial Effusions

Elizabeth A David, MD FACS
USAF Cardiothoracic Surgeon
David Grant Medical Center, Travis AFB, CA

Assistant Professor
Associate Program Director Cardiothoracic Surgery Residency Programs
Associate Director General Thoracic Surgery Robotics Program
Section of General Thoracic Surgery
UC Davis Medical Center, Sacramento, CA

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Disclosures

• None
Objectives

• Define Malignant Pericardial Effusion
• Define Malignant Pleural Effusion
• Discuss the clinical significance of ME
• Define treatment options for ME
• Discuss the importance of palliation for ME
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Malignant Pericardial Effusion

• Accumulation of fluid in the pericardial sac associated with malignant cells in:
  – Effusive fluid
  – Pericardium
  – Epicardium

• >50ml of fluid

• 50% of pericardial effusions in cancer patients are benign
Malignant Pericardial Effusion

- Clinical Manifestations
  - Asymptomatic
  - Dyspnea, cough, orthopnea, chest pain
  - Hemodynamic collapse
  - Cardiac tamponade 35-50%
  - Easily confused with other cancer-related symptoms
  - Diagnosis usually made late
Malignant Pericardial Effusion
Malignant Pericardial Effusion

• Prevalence 3-20%

• Pathophysiology:
  – Lymphatic obstruction by malignant cells
    • Pericardium
    • Mediastinal nodes
  – Tumor cells provoking increased effusive response

• Most common malignant etiologies:
  – Lung
  – Breast
  – Lymphoma
  – Mesothelioma
  – Unknown primary
Malignant Pericardial Effusion

- **Diagnosis**
  - CT or Echo

- **Echo most useful**
  - Size
  - Location
  - Cardiac function

*Xiong and Shi, 2011*
Malignant Pericardial Effusion

Xiong and Shi, 2011
Malignant Pericardial Effusion

Xiong and Shi, 2011
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Malignant Pleural Effusion

• Accumulation of pleural fluid associated with malignant cells
• Neoplastic cells in pleural fluid or biopsy
  – Cytology is positive in only 64% (60-80%)
  – Exudative effusion

Porcel et al. 2014, Thomas et al 2013
Malignant Pleural Effusion

• “Paramalignant effusions”
  – Associated with malignancy but do not result from pleural invasion by tumor
  – Direct local effect
  – Systemic manifestations of the tumor
  – Consequence of therapy

Porcel et al. 2014, Thomas et al 2013
Malignant Pleural Effusion

• Most common histologies:
  – Lung
  – Breast
  – Lymphoma
  – Ovarian
  – Gastric
  – Unknown primary

Porcel et al. 2014, Thomas et al 2013
Malignant Pleural Effusion

• Pathophysiology
  – Impaired lymphatic drainage
    • Pleural surface or lymph nodes
  – Inflammatory response to pleural tumor
    • Increased microvascular permeability
  – VEGF
    • Induces vascular leakage
Malignant Pleural Effusion

• Clinical Manifestations
  – Dyspnea
  – Chest pain *
  – Weight loss, fatigue

• Diagnosis :
  – CXR or CT, PET/CT
Malignant Pleural Effusion
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Clinical Significance of ME

- Diagnosis of Advanced Stage Cancer
- Psychologically devastating
- Physically debilitating
  - Cough
  - Dyspnea
  - Failure to Thrive
  - Poor performance status

Arber et al. 2013
Clinical Significance of ME

Figure 3 Survival for patients with malignant and benign tamponade.

Celik et al, 2012
Clinical Significance of ME

Figure 3. Survival with respect to underlying disease process.
Low serum albumin, and High neutrophil/lymphocyte ratio were associated with increased risk of mortality.

Gastrointestinal malignancy was also associated with increased risk of death, but N=5.
Clinical Significance of ME

Proved malignant pleural effusion

Discussion of goals of care, prognosis

Asymptomatic

Symptomatic

Evaluate approximate survival

Less than a month

Thoracentesis

One month to three months

Tube thoracostomy

More than 3 months

Plan for pleurodesis if there are no contraindications

Muduly et al, 2011
Clinical Significance of ME

• Dyspnea
  – “Distressing awareness of the process of breathing”
  – Frightening
  – Very common for patients with ME
Clinical Significance of ME

• Management is entirely palliative
• Palliation does not mean hospice
  – Set realistic expectations
• Incorporate patient-centered goals into care plan
  – Timing / choice of intervention
  – After intervention care
Clinical Significance of ME

• Noninvasive management
  – Acknowledge symptoms
  – Treat anxiety/fear
  – Positioning – keep upright
  – Keep room cool, moving air
  – Dietary management, balance salt/protein intake
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Treatment of Pericardial Effusion

• Goals:
  – Relieve symptoms
  – Make diagnosis
  – Minimize chance of recurrence
Treatment of Pericardial Effusion

- Procedures
  - Pericardiocentesis
  - Balloon pericardiostomy
  - Subxyphoid window
  - VATS pericardial window
Management Algorithm

Suspected Malignant Pericardial Effusion

Tissue Diagnosis needed?
Presence of Tamponade?

Yes → Assess Code Status

No → Plan Intervention/Palliation

Pericardiocentesis w/ drain
Balloon Pericardiotomy
Subxyphoid window
VATS pericardial window
Pericardiocentesis

• Indications:
  – Diagnosis
  – Therapeutic evacuation, drain placement
  – Anterior effusions

• Contraindications:
  – Loculated, posterior effusions
  – Coagulopathy
Pericardiocentesis

• **Benefits:**
  - Can be done under Echo or Fluoro guidance
  - Local anesthesia

• **Adverse Reactions:**
  - Injury to other structures
  - Air embolism, dysrhythmia
  - No pericardial biopsy
  - High recurrence rates
Balloon Pericardiotomy
Balloon Pericardiotomy

• Indications
  – Recurrent pericardial effusion after pericardiocentesis in poor performance status patients

• Similar recurrence and morbidity rates (7, 14%)

• Adverse reactions:
  – Bleeding
  – Inability to biopsy pericardium
Subxyphoid Pericardial Window

• Indications:
  – Diagnosis
  – Therapeutic evacuation, drain placement
  – Any effusion accessible
  – Allows for pericardial biopsy
Subxyphoid Pericardial Window

- Can be done under local or GETA
- Pain
- Surgical recovery
- Low recurrence
- Can also be Left Anterior Thoracotomy
VATS Pericardial Window

• Indications:
  – Diagnosis
  – Therapeutic evacuation, drain placement
  – Any effusion accessible *
  – Allows for pericardial biopsy
  – Co-management of pleural effusion
VATS Pericardial Window

- Requires GETA – single lung ventilation
- Pain
- Surgical recovery
- Low Recurrence
Recurrence rate was significantly higher in patients treated with pericardiocentesis than pericardiotomy (31% vs 5.3%, p=0.046).

Diagnostic yield of the procedures was similar (92.9% vs 86.7%, p=0.6).

Complications and median overall survival were similar.

Conclusion: Pericardiotomy had a higher success rate in preventing recurrence.
Multidisciplinary Case

- 68 yo F metastatic ovarian cancer
- PET/CT revealed pericardial effusion/B lung mets
- Renal failure, significant dyspnea, chronic pain
- Pericardiocentesis
- Surgical window
Treatment of Malignant Pleural Effusion

• Tunneled Indwelling Catheter
• Surgical Pleurodesis
• Pleuroperitoneal Shunt
• Pleurectomy/decortication
Tunneled Indwelling Catheters

• **Indications**
  – Recurrent pleural effusions
  – Trapped lung
  – Poor performance status
    • Inability to tolerate GETA
    • Malnutrition

• **Benefits**
  – Chemical pleurodesis possible
  – Easy to drain outside of hospital setting
  – **Local anesthesia**
  – Outpatient procedure
Tunneled Indwelling Catheters
Tunneled Indwelling Catheters
Surgical Pleurodesis

• Indications
  – Recurrent pleural effusions
  – Pleural apposition possible
  – Must be able to tolerate GETA, single lung ventilation*

• Other considerations
  – Chemical and mechanical pleurodesis possible
  – Requires hospital stay
  – Surgical risks
  – May complicate future biopsies
## Sclerotic Agents

### Table 1. Sclerosing agents for pleurodesis/success rate.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Standard dose</th>
<th>Success rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talc</td>
<td>2.5-10 mg</td>
<td>70-100 (22-25)</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>20 mg/kg</td>
<td>50-92 (26-30)</td>
</tr>
<tr>
<td>Bleomycin</td>
<td>60 U in 100 mL, NaCl 0.9%</td>
<td>58-85 (25,26,31-35)</td>
</tr>
<tr>
<td>Mitoxantrone</td>
<td>0.4 mg/kg or 25-60 mg</td>
<td>73-88 (36-38)</td>
</tr>
<tr>
<td>Cisplatin</td>
<td>100 mg/m²</td>
<td>65-83 (39-42)</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>500 mg in 30 mL, NaCl 0.9%</td>
<td>60-89 (39,43-45)</td>
</tr>
<tr>
<td>Taxol</td>
<td>120 mg/m²</td>
<td>85-93 (46,47)</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>1 g in 30 mL, 5% glucose</td>
<td>85-88 (48-50)</td>
</tr>
<tr>
<td>Corynebacterium parvum</td>
<td>4-14 mg</td>
<td>65-92 (51)</td>
</tr>
<tr>
<td>Interferon alpha-2b</td>
<td>$3 \times 10^6$ IU</td>
<td>62-100 (26)</td>
</tr>
<tr>
<td>Iodopovidone</td>
<td>20 mL of 10% iodopovidone</td>
<td>64-96 (52)</td>
</tr>
</tbody>
</table>

Zarogoulidis et al. 2013
Management Algorithm

Diagnosis of MPE

- Recurrent Effusion
  - Rapid accumulation of fluid
  - Pleural apposition
    - No
    - Yes: Tunneled Indwelling catheter
  - Observation

- Loculated effusion
  - Pleurodesis
  - Observation

Response to Systemic Therapy

Adapted from Zarogoulidis et al. 2013
Surgical Pleurodesis
Surgical Pleurodesis
Optimal Treatment?

- Systematic review, 161 papers (14)
- Surgical chemical pleurodesis
  - 86% success, 2% mortality
  - LOS 2.3 days, 23 month median survival

Zahid 2011
Optimal Treatment?

- Tunneled Indwelling catheter
  - 94% symptomatic improvement
  - 126 day median survival

- Surgical Chemical Pleurodesis optimizes symptom control and survival, but there is likely a selection bias

Zahid 2011
Surgical Pearls

• Use Minimally-invasive approach
  – Pain control

• Maximize efficiency for the patient
Surgical Pearls

• Patient counseling/selection
  – Set expectations (pain, hospital stay)
  – Pneumonitis
  – Recurrence

• Postoperative pathway to improve quality
  – Standardize care
  – 3 days suction
  – Avoid anti-inflammatory agents
Multidisciplinary Case

- 45 yo F
  - Dyspnea
  - Stage 4 NSCLC
  - Tunneled Indwelling Catheter placed
  - Progression @ 8 months
  - Re-expansion of lung
  - Need for new biopsy
  - Pleural biopsy, pleurodesis and catheter removal
  - Clinical trial enrollment
Objectives

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Palliation

- Balance symptom control, recurrence, risk
- Try to alleviate without curing
- Weigh:
  - LOS
  - Recovery time
  - Periprocedural morbidity
  - Predicted survival
  - Anticipated disposition
Palliation

Recurrence rate and morbidity was lower with surgical approaches rather than non-surgical approaches to pericardial effusion drainage.

Lack of randomized trials to address selection bias

No studies address quality of life

Jama et al 2014
Quality of Life Assessment

The Impact of Tunneled Pleural Catheters on the Quality of Life of Patients with Malignant Pleural Effusions

Natasha F. Sabur\textsuperscript{a}  Alex Chee\textsuperscript{a}  David R. Stather\textsuperscript{a}  Paul MacEachern\textsuperscript{a}
Kayvan Amjadi\textsuperscript{b}  Christopher A. Hergott\textsuperscript{c}  Elaine Dumoulin\textsuperscript{d}  Anne V. Gonzalez\textsuperscript{e}
Alain Tremblay\textsuperscript{a}

- 82 patients
- 45\% died during the 14 week study period
- Significant improvement in Global Health status, Dyspnea, and QOL within 2 weeks

Sabur 2012
Quality of Life Assessment

Quality-of-Life assessment in malignant pleural effusion treated with indwelling pleural catheter: A prospective study

María-José Lorenzo¹, Manuel Modesto², Javier Pérez³, Elena Bollo⁴, Rosa Cordovilla⁵, Manuel Muñoz², José A Pérez-Fidalgo⁶ and Enrique Cases¹

Significant improvement in symptom scales @ 30 days

Dyspnea significantly improved @ 30 days

Background: Malignant pleural effusion is a clinical problem that impairs Quality of Life in patients with advanced malignancies. An indwelling pleural catheter is an alternative treatment to palliate some of the symptoms.

Aim: To evaluate the Quality of Life of outpatients with malignant pleural effusion who were treated with an indwelling pleural catheter. Questionnaire compliance, catheter patency time, and survival were analyzed.

Participants: Patients with recurrent malignant pleural effusion treated with an indwelling pleural catheter.

Results: A total of 51 outpatients completed the baseline QLQ-C30 questionnaire. Of these, 28 completed the questionnaire at 30 days. Of these 28 patients, 13 completed the questionnaire at 60 days. Scores showed a significant improvement in symptoms scales at 30 days (p = 0.03). Global health status and functional scales showed a non-significant trend to improvement at 30 and 60 days. A total of 27 lung cancer patients completed the QLQ-LC13 questionnaire. Items assessing dyspnea showed a significant improvement following catheter placement (p = 0.002).

Conclusion: Indwelling pleural catheter is useful for palliative management of recurrent malignant pleural effusion in that it benefits Quality of Life in outpatients with advanced malignancies. In lung cancer patients, scores indicated that indwelling pleural catheter also provides significant relief of dyspnea.

Lorenzo et al 2014
Future Studies

ClinicalTrials.gov
A service of the U.S. National Institutes of Health

Find Studies > Search Results > Study Record Detail

Trial record 23 of 133 for malignant effusion

Out Patient Talc Slurry Via Indwelling Pleural Catheter for Malignant Pleural Effusion Vs Usual Inpatient Management (OPTIMUM)

This study is currently recruiting participants. 

Verified June 2015 by Guy's and St Thomas' NHS Foundation Trust

Sponsor:
Guy's and St Thomas' NHS Foundation Trust

Collaborator:
CareFusion

Information provided by (Responsible Party):
Guy's and St Thomas' NHS Foundation Trust

Purpose

This is a multicentre randomised controlled trial evaluating global health related quality of life outcomes in patients with malignant pleural effusions. Patients will be randomised to receive either chest drain and talc pleurodesis or indwelling pleural catheter and talc pleurodesis. Patients will be followed up for 3 months post intervention.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleural Effusion, Malignant</td>
<td>Device: Chest Drain Insertion and Talc Pleurodesis</td>
</tr>
<tr>
<td></td>
<td>Device: Indwelling Pleural Catheter Insertion and Talc Pleurodesis</td>
</tr>
</tbody>
</table>

ClinicalTrials.gov Identifier:
NCT02517749

First received: August 5, 2015
Last updated: August 7, 2015
Last verified: June 2015
History of Changes

www.clinicaltrials.gov
A Quality of Life Study re Management of Malignant Pleural Effusions

This study has been completed.
Sponsor: University Health Network, Toronto
Information provided by (Responsible Party): University Health Network, Toronto

ClinicalTrials.gov Identifier: NCT00188474
First received: September 12, 2005
Last updated: October 7, 2014
Last verified: September 2014
History of Changes

Purpose
There is much data in the literature regarding optimal treatment approaches for malignant pleural effusions as assessed by patient outcomes. However, data on quality of life and satisfaction with treatment from the patient's perspective is not available.

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<td>Malignant Pleural Effusions</td>
<td>Behavioral: LCADLS, FACIT-PAL, FACIT-TS questionnaires</td>
</tr>
</tbody>
</table>

Study Type: Observational
Study Design: Observational Model: Case-Only
Time Perspective: Prospective

Official Title: A Prospective Study of Patient Centered Outcomes in the Management of Malignant Pleural Effusions

Further study details as provided by University Health Network, Toronto:

Primary Outcome Measures:
- the successful palliation of symptomatic pleural effusions as assessed by the London Chest Activity of Daily Living Scale (LCADLS) [ Time Frame: discharge, 2 wks and 6 wks ] [ Designated as safety issue: No ]
Conclusions

• Maximize diagnostic and therapeutic efficiency for patients with ME
• Malignant pericardial effusions should undergo pericardiotomy
• Malignant pleural effusions can be managed with TPC or surgical pleurodesis
Conclusions

- Set appropriate patient expectations
- Palliation is the goal
- Help patients feel better
- Be innovative about ways we can provide better care for these patients
References
