THE MUHC PLEURAL CARE PROGRAM
TURNING CHALLENGES INTO OPPORTUNITIES

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DISCLOSURE OF CONFLICTS OF INTEREST

• No conflicts of interest to declare
EDUCATIONAL OBJECTIVES

• After this presentation, attendees will be able to:
  
  • Recognize some of the challenges faced by patients suffering from pleural diseases at the MUHC
  
  • Identify and apply strategies to alleviate those challenges
  
  • Describe some of the MUHC pleural care program initiatives
BURNING QUESTIONS

• What are the barriers to palliation faced by patients suffering from a malignant effusion at the MUHC?

• How can the outcome of patients with pleural infection be improved at the MUHC?
WHAT IS THE MUHC PLEURAL CARE PROGRAM?

An interdisciplinary and patient-centered plan for improving the quality of care provided to patients with pleural diseases.
THE MUHC PLEURAL CARE PROGRAM

- Patient
  - Basic procedures service
  - Advanced procedures service
  - Care pathway protocols
  - Rapid access referral clinic
  - Personnel education
  - Patient & procedures registry
  - Community f/u for PleurX patients
  - Clinical nurse specialist
  - Patient education
  - Quality improvement
  - Research
  - Costs reduction
  - Teaching
  - Nursing care protocols
  - Streamlined investigations
  - Patient education
  - Costs reduction
MS D, 60F WITH PRIOR BREAST CANCER

- Presents to ER with new & progressive dyspnea on exertion over two weeks
  - Afebrile, no WBC elevation
  - Not hypoxemic
  - A chest drain is inserted
UNFORTUNATE SCENARIO

60F with prior breast Ca, presents to ER with MRC 4 SOB

- **D1**: ER in pm
- **D2**: Pigtail inserted
- **D5**: Drainage stops; drain removed
- **D6**: Cytology report shows adenocarcinoma
- **D7**: Resp consulted for Indwelling pleural catheter (IPC): not enough fluid
- **D10**: IPC inserted in a loculated effusion
- **D11**: Discharge home

3 mo later

IPC not draining for 1 month
IPC removed in day hospital
OBJECTIVES OF THE MUHC PLEURAL CARE PROGRAM

• To improve the access to & quality of care provided to patients with pleural diseases
  • Better align the procedures with the needs of the patients
  • Optimize patient care pathways

• To improve the knowledge and competencies of health care workers regarding pleural care

• To promote research initiatives
THE PLEURAL CARE WORKGROUP

- An interdisciplinary team assembled to tackle the organizational and educational challenges
THE PLEURAL CARE WORKGROUP

Samia Saouaf, nursing educator, thoracics/ general surgery
Ludovic Aubin, thoracic surgery nurse coordinator
Pierre Chassé, nursing educator, ER-Glen
Pauline Machon, Chest day hospital nurse
Megan McQuirter, nursing educator, cardiology
Denis Gaumond, nursing practice consultant, nursing department
Julie Dallaire, clinical nurse specialist, respirology
Céline Dupont, assistant chief pharmacist
David Valenti, interventional radiologist
Jonathan Spicer, thoracic surgeon
PATIENTS SUFFERING FROM MALIGNANT EFFUSIONS
MALIGNANT PLEURAL EFFUSIONS

- Malignant pleural effusions (MPE) are a common and debilitating problem.

  - Present in up to 15.9% of new cases of lung cancer.
    - Morgensztern D et al. JTO 2012
  
  - Present at some point in the course of metastatic lung cancer in up to 50% of cases.

  - Seen in 7-11% of patients with breast cancer.
    - ATS statement on MPE 2000
MPE: A POOR PROGNOSTIC FACTOR

<table>
<thead>
<tr>
<th>Cell type</th>
<th>Median survival in days (95% CI)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesothelioma</td>
<td>339 (267 to 422)</td>
<td>170</td>
</tr>
<tr>
<td>Haematological malignancy</td>
<td>218 (160 to 484)</td>
<td>35</td>
</tr>
<tr>
<td>Gynaecological malignancy</td>
<td>203 (97 to 279)</td>
<td>59</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>192 (133 to 271)</td>
<td>140</td>
</tr>
<tr>
<td>Renal cell carcinoma</td>
<td>114 (33 to 334)</td>
<td>22</td>
</tr>
<tr>
<td>Adenocarcinoma of unknown primary</td>
<td>87 (13 to 286)</td>
<td>11</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>74 (60 to 92)</td>
<td>215</td>
</tr>
<tr>
<td>Other</td>
<td>71 (46 to 102)</td>
<td>33</td>
</tr>
<tr>
<td>Gastrointestinal cancer</td>
<td>61 (44 to 73)</td>
<td>61</td>
</tr>
<tr>
<td>Sarcoma</td>
<td>44 (19 to 76)</td>
<td>12</td>
</tr>
<tr>
<td>Melanoma</td>
<td>43 (23 to 72)</td>
<td>23</td>
</tr>
<tr>
<td>Urological cancer (bladder, prostate, testis, penile)</td>
<td>33 (22 to 168)</td>
<td>8</td>
</tr>
<tr>
<td>Overall</td>
<td>136 (119 to 167)</td>
<td>789</td>
</tr>
</tbody>
</table>

Type of cancer is a strong prognostic factor

Clive AO et al. Chest 2014
TAKE-HOME MESSAGE

Goal of care

= Palliation of Symptoms
& Quality of life optimization
AVAILABLE PALLIATIVE OPTIONS

• Talc pleurodesis
  • Through a chest drain
  • By medical thoracoscopy
  • By VATS surgery

• Indwelling pleural catheter (IPC) insertion
MUHC DATA

• Retrospective review of patients who underwent either thoracoscopic talc pleurodesis or indwelling pleural catheter insertion (IPC) at the MUHC

• Study period: Jan 1st 2014 to Dec 31st 2015

• Patients identified through the Chest’s visits database

• Patients with a malignant pleural effusion (MPE) confirmed by cyto/pathology (or obvious from the clinical picture) who underwent either thoracoscopic pleurodesis or IPC insertion

• Exclusion:
  • Patients not followed at the MUHC
  • Procedures performed for non-malignant conditions
OBJECTIVES

- Determine the number and type of pleural procedures performed prior to definitive palliation
- Determine the number of ER visits and hospital admissions for MPE in patients needing palliation
- Measure the time from first presentation to definitive intervention for MPE
DEFINITION OF “IDEAL MANAGEMENT”

- ≤ 2 thoracenteses
- No chest tube insertions
- ≤ 1 ER visits
- No hospital admissions

- Not meeting 1 or more of these criteria was considered “Non-Ideal Management”
STUDY FLOW

167 IPC / thoracoscopy cases
- 61 no definitive intervention
- 26 no procedure done
- 35 diagnostic thoracoscopy only

106 interventions for MPE
- 23 patients not followed at MUHC
- 4 non-MPE
- 7 inadequate charts

72 cases included
- 69 patients, 3 with bilateral procedures done
## RESULTS

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>69 patients / 72 MPE cases</th>
</tr>
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<tbody>
<tr>
<td>Age (mean in years, SD)</td>
<td>70.3 ± 13.6</td>
</tr>
<tr>
<td>Women (%)</td>
<td>59</td>
</tr>
<tr>
<td>Type of malignancy (%)</td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td>42</td>
</tr>
<tr>
<td>Breast</td>
<td>19</td>
</tr>
<tr>
<td>GI/GU</td>
<td>16</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>6</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>4</td>
</tr>
<tr>
<td>Unknown primary</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
</tr>
<tr>
<td>MPE proven pathologically (%)</td>
<td>75</td>
</tr>
<tr>
<td>Side of effusion (%)</td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>47</td>
</tr>
<tr>
<td>Right</td>
<td>53</td>
</tr>
<tr>
<td>Intervention performed (%)</td>
<td></td>
</tr>
<tr>
<td>Indwelling pleural catheter</td>
<td>94</td>
</tr>
<tr>
<td>Talc insufflation</td>
<td>6</td>
</tr>
</tbody>
</table>
## THE PATH TO DEFINITIVE MPE PALLIATION

<table>
<thead>
<tr>
<th>Procedure type</th>
<th>N=72 MPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>All procedures (mean/MPE)</td>
<td>138 (1.9)</td>
</tr>
<tr>
<td>Simple thoracentesis (mean/MPE)</td>
<td>78 (1.1)</td>
</tr>
<tr>
<td>Pigtail thoracentesis (mean/MPE)</td>
<td>16 (0.2)</td>
</tr>
<tr>
<td>Chest tube* (mean/MPE)</td>
<td>36 (0.5)</td>
</tr>
<tr>
<td>Attempted pleurodesis (mean/MPE)</td>
<td>3 (0.02)</td>
</tr>
<tr>
<td>Diagnostic thoracoscopy (mean/MPE)</td>
<td>5 (0.04)</td>
</tr>
<tr>
<td>ER visits due to effusion (mean/MPE)</td>
<td>49 (0.7)</td>
</tr>
<tr>
<td>Admissions to hospital† for effusion (mean/MPE)</td>
<td>37 (0.5)</td>
</tr>
</tbody>
</table>

*Average number of days spent with chest tube: 3.7 d (SD 3.0)

†Average duration of hospitalization: 17.1 d/admission (SD 19.3)
36/72 patients experienced non-ideal management

<table>
<thead>
<tr>
<th></th>
<th>Ideal N=36</th>
<th>Non-Ideal N=36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>ER visits</td>
<td>9</td>
<td>40</td>
</tr>
<tr>
<td>Total procedures</td>
<td>48 1.3/pt</td>
<td>90 2.5/pt</td>
</tr>
<tr>
<td>Patients with chest drain</td>
<td>0</td>
<td>27/36 (range 1-5)</td>
</tr>
<tr>
<td>Chest drain duration</td>
<td>0</td>
<td>3.7d</td>
</tr>
<tr>
<td>Days in hospital</td>
<td>0</td>
<td>17.1/pt SD 19.3</td>
</tr>
</tbody>
</table>
TIME FROM INITIAL MPE PRESENTATION TO DEFINITIVE PALLIATIVE INTERVENTION

Outliers beyond ½ year not shown (10 cases)
BOTTOM LINE

• 50% of patients with a malignant effusion who require a definitive palliative procedure undergo potentially harmful and avoidable procedures

• There is a high rate of ER visits and hospitalization among patients with a MPE requiring a palliative procedure

• Significant delays between initial presentation and palliation exists and could possibly be improved
MPE: PLEURAL CARE PROGRAM’S
SPECIFIC GOALS

• Avoid ER visits and hospitalizations

• Reduce the use of pigtails for malignant effusions

• Improve the access to definitive palliative procedures

• Improve the community follow-up of patients with an IPC
MPE: PLEURAL CARE INITIATIVES

- Corridor of referral for urgent thoracenteses between oncology and Chest day hospital

- "Walk-in" services for patients with malignant effusions through the Chest day hospital

- Corridor of referral for stable patients with pleural effusions between ER and Chest day hospital

- Corridor of referral from the community through the CRDS
MPE: PLEURAL CARE INITIATIVES

• Indwelling pleural catheter (IPC) nursing care protocol development

• Patient education booklet for IPC care

• Creation of an IPC patient registry

• Proactive community follow up of IPC patients
PIGTAILS!?

• They should be avoided in non-infected effusions
  • They cause hospitalization
  • They can prolong hospital stay
  • They cause discomfort and patient immobilization
  • They create adhesions and ultimately cause loculations
  • They are associated with infections & other complications
  • They complicate or even render impossible further diagnostic or therapeutic interventions
  • They cost more than simple pleural aspiration and they require complex nursing care

They add little to no therapeutic value in most cases
MUHC CHEST DRAIN OPTIMIZATION POLICY

Patient with a pleural effusion

Resp involvement suggested

Chest drain criteria present?

No

Diagnostic +/- therapeutic tap

Yes

Chest drain insertion
Pre-defined size as per indication
Primary spontaneous pneumothorax that failed aspiration

Secondary / iatrogenic/ traumatic pneumothorax

Confirmed or highly suspected para-pneumonic effusion or empyema

Massive effusion (> 2/3 of hemithorax) of any etiology with severe dyspnea / hypoxemia unlikely to resolve with thoracentesis

Confirmed hemothorax

Effusions in ventilated patients in ICU & CCU & ER

Other effusion deemed to require a chest drain by a thoracic surgeon or a respirologist
PATIENTS SUFFERING FROM PLEURAL INFECTION
WHY IS PLEURAL INFECTION IMPORTANT?

- A parapneumonic effusion (PPE) is present in 20-57% of pneumonias
  Bhatnagar R. Clin Chest Med 2013

- Rates of pleural infection are increasing in several developed countries
  Finley C et al. CRJ 2008

- PPE and empyema are associated with great morbidity, mortality, & health care costs

- It killed William Osler
PLEURAL INFECTION MANAGEMENT PRINCIPLES

• Pleural effusion drainage
• Antibiotic therapy
• Nutritional support, early mobilisation
• Interdisciplinary care
PLEURAL INFECTION: INTRAPLEURAL THERAPY

• Single-agent intrapleural fibrinolytic therapy does not improve outcomes  
  MIST-1 trial. NEJM 2005

• Combination of tissue plasminogen activator (tPa) and dornase alpha (DNAse) can improve fluid drainage, reduce hospital stay, and reduce referral for surgery  
  MIST-2 trial. Rahman NM et al. NEJM 2011

• Regular pleural drain flushing is recommended by the British Thoracic Society guidelines  
  Davies HE et al. Thorax 2010
MR B, 76M WITH COPD

- Presents to ER with cough, yellow sputum, L-sided pleuritic chest pain

- Afebrile, WBC 16
UNFORTUNATE SCENARIO

D1: ER
   Antibiotics started

D2: Pleural aspiration
   pH=7,10

D3: 8Fr catheter
    inserted
    Minimal drainage

D6: 14Fr catheter
    inserted
    Good drainage

D10: Drain removed

D12: Discharge home

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Intrapleural fibrinolytics given without success

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Intrapleural fibrinolytics given with success
• Retrospective review of all the cases of pleural infection treated with intrapleural fibrinolytics

• Study period: April 2013-April 2016

• Patients identified through the pharmacy database

• Included patients:
  • Were prescribed the combination of intrapleural tissue plasminogen activator (tPa) and dornase-alpha (DNAse) for complicated parapneumonic effusions / empyema or pleural infections of other origin

• Exclusions
  • tPa/DNAse used for non-infectious indications
OBJECTIVES

• To review the outcomes of patients treated with intrapleural therapy for pleural infection at the MUHC since its introduction into practice
  • Compare them with outcomes reported in the literature.

• To identify potential factors predictive of success or failure in patients receiving intrapleural therapy, as a basis for quality improvement initiatives
RESULTS

145 patients had tPa/DNASE prescribed from 2013 to 2016

36 excluded

- tPa/DNASE given for hemothorax / loculated effusion / blocked catheters

109 patients included
## RESULTS: BASELINE CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th>Patients treated with tPa/DNAse N=109</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, yrs (mean)</td>
<td>61</td>
</tr>
<tr>
<td>Female, %</td>
<td>38 (34%)</td>
</tr>
<tr>
<td>Site</td>
<td></td>
</tr>
<tr>
<td>MGH</td>
<td>66%</td>
</tr>
<tr>
<td>RVH/Glen</td>
<td>28%</td>
</tr>
<tr>
<td>Old Chest / MNI</td>
<td>6%</td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
</tr>
<tr>
<td>Thoracics</td>
<td>31%</td>
</tr>
<tr>
<td>Medicine/Resp</td>
<td>42%</td>
</tr>
<tr>
<td>ICU</td>
<td>18%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
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</table>
### MUHC VS PUBLISHED DATA

<table>
<thead>
<tr>
<th></th>
<th>MUHC tPa/DNAse N=109</th>
<th>MIST-2 tPa/DNAse N= 48</th>
<th>MIST-2 Placebos N= 51</th>
<th>Real-life series tPa/DNAse N=107</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration of hospital stay in days mean (SD)</strong></td>
<td>30 (29)</td>
<td>11.8 (9.4)</td>
<td>17,0 (n/a)</td>
<td>10 (IQR 6-17)</td>
</tr>
<tr>
<td><strong>Mortality, n (%)</strong></td>
<td>12 (11%)</td>
<td>4 (8%)</td>
<td>2 (4%)</td>
<td>9 (8,5%)</td>
</tr>
<tr>
<td><strong>Need for surgery</strong></td>
<td>15 (13,7%)</td>
<td>2 (4%)</td>
<td>6 (12%)</td>
<td>8 (7,5%)</td>
</tr>
<tr>
<td><strong>Survival to discharge without surgery</strong></td>
<td>85 (78%)</td>
<td>n/a</td>
<td>n/a</td>
<td>96 (89,7%)</td>
</tr>
<tr>
<td><strong>Pleural bleed requiring intervention</strong></td>
<td>8 (7,3%)</td>
<td>2 (4,2%)</td>
<td>0</td>
<td>2 (1,8%)</td>
</tr>
</tbody>
</table>
HYPOTHESES: NON-MODIFIABLE FACTORS

- Higher proportion of nosocomial cases
  - 36% vs 9-13% in other series

- Referral bias due to our tertiary role & concentration of thoracic surgery activities at the MUHC

- Sample of sicker patients?

- Delays in access to the OR
  - Average wait time from decision to OR of 6 days

- Discharge planning challenges
HYPOTHESES: MODIFIABLE FACTORS

• Delays in clinical pathway
  • 2.5 d between effusion identification and drain insertion
  • 5 d between drain insertion and intrapleural fibrinolytics
  • Significant delays in radiologic follow up

• Suboptimal intrapleural pharmacotherapy
  • 41% of the patients did not complete the therapy
  • Administration of doses was erratic
HYPOTHESES: MODIFIABLE FACTORS

- Use of inadequate drains
  - 42 drains were of size 8-10Fr (39%)

- Lack of regular flushing of pigtails

- Delayed recognition of blocked drains

- Very high rate of re-intervention
  - 67/109 patients required a second drain
  - 33/109 patients required a third drain insertion
• Patients suffering from a pleural infection at the MUHC may have poorer outcomes than in centers of excellence

• Delays in recognition and intervention for infected effusions are encountered

• A large proportion of patients must undergo repeat procedures

• The use of intrapleural tPa/DNAse therapy is often incomplete and given erratically
PLEURAL CARE PROGRAM INITIATIVES

- Development / update of protocols for chest drain care
- Implementation of pigtail flushing by nurses
- Creation of a pre-printed order / protocol for intrapleural pharmacotherapy
- Creation of local guidelines to optimize the care pathway of patients with possible pleural infection
Patient with a pleural effusion

Resp involvement suggested

Chest drain criteria present?

No

Diagnostic +/- therapeutic tap

Yes

Chest drain insertion
Pre-defined size as per indication
OTHER PLEURAL CARE PROGRAM ACTIVITIES
OTHER PLEURAL CARE PROGRAM ACTIVITIES

- Strategies for benign non-infected effusions and pneumothorax
- Costs analyses and costs reduction strategies
- Extension of the pleural care initiatives to other institutions
- EQUAL CARE Malignant Pleural Mesothelioma project
NURSING PRACTICE INITIATIVES

JULIE DALLAIRE INF. MSc
PLEURAL CARE WORKGROUP: WHAT HAS BEEN DONE SO FAR?

- Update of existing nursing practice protocols
  - Pleural and mediastinal tubes: Care of the Adult patient

- Development of new nursing practice protocols
  - Pleural pigtail
  - Indwelling Pleural Catheter (IPC)
  - Intrapleural Alteplase and Dornase + associated pre-printed order

- Baseline competency & knowledge assessment
SURVEY OF COMPETENCY/KNOWLEDGE

• What
  • Online survey about bedside trouble-shooting for IPC and chest drains targeting key safety items

• When
  • From Oct 25 to Dec 20 2016

• Where:
  • Glen, MGH, Lachine
  • Units targeted: Critical care units (ICU/CCU, ED), Medicine/onco, surgery units

• Responses:
  • Chest drain: 239 questionnaires completed
  • IPC: 174 questionnaires completed
CHEST TUBE SURVEY: EXAMPLE OF QUESTIONS

• Which of the following is (are) acceptable drainage device to connect to either a chest tube or a pigtail? Choose all that apply.
  • A Foley bag.
  • Any drainage bag, as long as it is graded and contains an outlet device. X A Pleur-Evac unit.
  • A glass vacuum bottle.

• A patient with a chest tube is confused and makes the Pleur-Evac system tumble over. The patient is stable and the tube is still connected to the drainage system. You must ensure that the water-seal of the Pleur-Evac system is still present. Indicate which of the following proves that the water-seal is preserved.
  • Fluctuations of fluid are seen in the drainage line and through the chest tube.
  • There is no bubbling. X In the water-seal chamber, the water level reaches the dotted 2cm line.
  • The chest tube is still draining well.
CHEST TUBE SURVEY RESULTS: OVERVIEW

• Average proportion of right answers
  • 61% (range 43-90%)

• Number of questions for which the correct answer rate was ≥ 80%
  • 2 (1 in medicine respondents)

• Nurses’ comfort in dealing with chest drains
  • Only 32% indicated they were comfortable
IPC SURVEY: EXAMPLE OF QUESTIONS

• Which of the following can be used to access the valve of an IPC to drain it? Choose all that apply.
  • A 14-18g Cathlon catheter.
  • A 16-20g needle.
  • Any luer lock syringe.
  X The “PleurX”© drainage line.

• You perform the drainage of an IPC and you notice that the access valve of the catheter is leaking, even after the cap is put on. Before notifying the physician, what should be done?
  • Cover the catheter and the insertion site with an occlusive dressing.
  X Clamp the catheter as close to the skin as possible.
  • Connect the catheter to a Pleur-Evac unit.
  • Cover the access valve with pink occlusive tape.
IPC SURVEY RESULT OVERVIEW

• Average proportion of right answers
  • 36.8% (range 15-61%)

• Number of questions for which the correct answer rate was ≥ 80%
  • 0

• Nurses’ comfort in dealing with chest drains
  • Only 7% indicated they were comfortable

*Results largely influenced by the fact that a majority of surgical RNs were the survey respondents*
PLEURAL CARE WORKGROUP’S EDUCATIONAL INITIATIVE

• Goals
  • Harmonize the care of chest tubes in adults across the MUHC
  • Support nurses in their practice with chest drain/pigtail/IPC
  • Ensure that proper monitoring and care is being provided to patients with chest tubes across all MUHC adult sites to decrease risks of complications or adverse events.

• Plan (based on new protocols + survey results):
  • Accredited E-learning: in development
  • Central Nursing Orientation (day4): in discussion
At this point, attendees should be able to:

- Recognize the challenges faced by patients suffering from pleural diseases at the MUHC
- Identify and apply strategies to alleviate those challenges
- Describe some of the MUHC pleural care program initiatives
BURNING QUESTIONS

• What are the barriers to palliation faced by patients suffering from a malignant effusion at the MUHC?

• How can the outcome of patients with pleural infection be improved at the MUHC?
BURNING QUESTIONS

• What are the barriers to palliation faced by patients suffering from a malignant effusion at the MUHC?
  • Use & misuse of chest drains
  • ER visits & hospitalization
  • Suboptimal community follow up

• How can the outcome of patients with pleural infection be improved at the MUHC?
  • By better aligning the procedures performed with the needs of the patient
  • By reducing delays in recognizing and intervening for pleural infection
  • By developing streamlined clinical care pathways to facilitate intrapleural fibrinolytic therapy
CONCLUSION

Although several challenges characterize the care of patients with pleural diseases at the MUHC, interdisciplinary initiatives to improve the situation are underway.
THE PLEURAL CARE WORKGROUP

Samia Saouaf, nursing educator, thoracics/ general surgery
Ludovic Aubin, thoracic surgery nurse coordinator
Pierre Chassé, nursing educator, ER-Glen
Pauline Machon, Chest day hospital nurse
Megan McQuirter, nursing educator, cardiology
Denis Gaumond, nursing practice consultant, nursing department
Julie Dallaire, clinical nurse specialist / educator, respirology
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