Metastatic Cancer: Progression, Complications, and CDI Opportunities

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Learning Objectives

• At the completion of this educational activity, the learner will be able to:
  – Review the pathophysiology of cancer spread
  – Identify common metastatic sites
  – Recognize complications of metastatic cancer
  – Discuss common documentation gaps impacting risk adjustment
Disclaimer

- Practical information about clinical documentation
- Seek counsel on individual legal and compliance questions
“Raise Your Hand” Question 1

Cancer is the leading cause of death in the United States.

a. True

b. False
“Raise Your Hand” Question 1

Cancer is the leading cause of death in the United States.

a. True

b. False

In 2016:
• Heart disease caused 635,260 deaths (23%)
• Cancer was second at 598,038 deaths (22%)

https://doi.org/10.3322/caac.21551
Estimated CancerDeaths, 2019

• 606,880 (1,700 deaths/day)
  Lung cancer (25%)
  – Women (285,210)
    ▪ Lung (23%)
    ▪ Breast (15%)
    ▪ Colorectal (8%)
  – Men (321,670)
    ▪ Lung (24%)
    ▪ Prostate (10%)
    ▪ Colorectal (9%)

5-year survival (all stages combined)

▪ Prostate (98%)
▪ Melanoma of the skin (92%)
▪ Female breast cancer (90%)

▪ Lung (19%)
▪ Esophagus (19%)
▪ Liver (18%)
▪ Pancreas (9%)

https://doi.org/10.3322/caac.21551
Pathophysiology of Cancer Spread
Multistep Process of Metastasis

NIH – National Cancer Institute

1. Grows into nearby normal tissue
2. Moves through the walls of nearby lymph nodes or blood vessels
3. Travels through the lymphatic system and bloodstream to other parts of the body
4. Stops in small blood vessels at distant locations

Multistep Process of Metastasis

5. Invades the blood vessel walls at distant sites and moves into surrounding tissue

6. Grows in this tissue until tiny tumor forms

7. Causes new blood vessels to grow, which creates a blood supply that allows the tumor to continue growing

Determination of Distant Site for Metastases

• Route of dissemination
  – Hematogenous
  – Lymphatic
• Seed and soil hypothesis

Common Sites of Metastases
### Primary Cancers and Common Sites of Metastasis

<table>
<thead>
<tr>
<th>Primary</th>
<th>Common Sites of Metastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung</td>
<td>Brain, Bone, Lung, Liver, Adrenal</td>
</tr>
<tr>
<td>Breast</td>
<td>Brain, Bone, Lung, Liver</td>
</tr>
<tr>
<td>Gastric</td>
<td></td>
</tr>
<tr>
<td>Pancreatic</td>
<td>Lung, Liver, Peritoneum</td>
</tr>
<tr>
<td>Colorectal</td>
<td>Lung, Liver</td>
</tr>
<tr>
<td>Ovarian</td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td>Brain, Bone, Lung, Liver, Adrenal</td>
</tr>
<tr>
<td>Bladder</td>
<td>Bone, Lung, Liver</td>
</tr>
<tr>
<td>Prostate</td>
<td>Bone, Lung, Liver</td>
</tr>
<tr>
<td>Melanoma</td>
<td>Brain, Bone, Lung, Liver, Skin/Muscle</td>
</tr>
</tbody>
</table>


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Brain: Signs and Symptoms of Metastasis

- Generalized (increased intracranial pressure)
- Focal (tumor burden)

Common primary
Lung
Breast
Melanoma
Renal cell
Colorectal

Documentation considerations
- Cerebral edema
- Delirium (+/- encephalopathy)
- Seizures
- Coma, brain herniation, brain death
Bone: Signs and Symptoms of Metastasis

- Hypercalcemia
- Elevated alkaline phosphatase
- Fracture
- Pain

Documentation considerations

- Pathologic fractures
- Hypercalcemia
- Spinal cord compression
- Pancytopenia 2/2 to malignancy

Common primary
- Breast
- Lung
- Prostate
- Renal cell
- Colorectal
- Multiple myeloma
Lung: Signs and Symptoms of Metastasis

- Dyspnea, hemoptysis
- Cough
- Wheezes, stridor
- Loss of breath sounds

Documentation considerations

- ✓ Acute hypoxic respiratory failure
- ✓ Pneumonia (+/- aspiration)
- ✓ Malignant pleural effusion
- ✓ Superior vena cava syndrome
- ✓ Tracheoesophageal fistula

Common primary
- Breast
- Colorectal
- Melanoma
- Sarcoma
- Renal cell
Liver: Signs and Symptoms of Metastasis

- Albumen (low)
- Transaminases/LDH/ALP/bili (high)
- Nausea, RUQ pain
- Hepatomegaly, jaundice

Common primary
- Colorectal
- Pancreatic
- Breast
- Lung

Documentation considerations

 ✓ Cirrhosis
 ✓ Hepatic encephalopathy
 ✓ Metabolic encephalopathy
 ✓ Carcinomatosis
 ✓ Malignant ascites
 ✓ Bacterial peritonitis
 ✓ Coagulopathy
 ✓ Hyponatremia
Cancer Morbidity and Mortality
Cancer-Related Admissions

• Urgent/unplanned (nearly 75%)
  – Due to uncontrolled symptoms
    • Dyspnea
    • Pain
    • Neurologic symptoms
    • Fever
    • Digestive tract – vomiting, jaundice, etc.
    • Intestinal obstruction

https://dx.doi.org/10.1371%2Fjournal.pone.0120827
Healthcare Utilization and Outcomes

Unplanned admissions in patients with advanced cancer

- Average length of stay: 6.3 days
- 90-day readmission rate: 43.1%
- 90-day mortality rate: 41.6%

https://doi.org/10.1002/cncr.30912
“Raise Your Hand” Question 2

When compared to other developed countries, the United States has the most cancer deaths occurring in hospitals.

a. True
b. False
"Raise Your Hand" Question 2

When compared to other developed countries, the United States has the most cancer deaths occurring in hospitals.

a. True

b. False – The U.S. actually has the LEAST number of cancer deaths occurring in the hospital.

Healthcare Utilization for Patients Dying With Cancer

Retrospective study of decedents with cancer over age 65
Administrative and registry data from 2010 (US, Canada, Belgium, Norway, England, Germany, Netherlands)

• U.S. deaths occurring in acute care hospitals  ➔ 22% (range 22%–52%)

• U.S. hospitalizations in the 6 months prior to death
  – Admission to acute care hospitals  ➔ 75% (range 70%–89%)
  – Admission to intensive care units  ➔ 40% (range 8%–18% ... 40%)

New Treatments for Metastatic Cancer
Targeted Cancer Therapy

• Specific genes
• Specific proteins
• Tissue environment
• Drugs can ...
  – Block signals that tell cancer cells to grow and divide
  – Keep cells from living longer than normal
  – Destroy the cancer cells

Impact on Healthcare

• More treatment options for advanced cancer
  – Breast
  – Colon
  – Lung
  – Melanoma

• Expensive medications

• Patients with advanced cancer have less reserve
  – Higher risk for ED visits
  – Higher risk for hospitalization

Oncology Care Model (OCM)

- 5-year project (2016–2021)
- Led by the Centers for Medicare and Medicaid Innovation
- Requires practices to reduce the cost of care while improving quality and patient outcomes
- Payment impacted by comorbidities identified by Hierarchical Condition Categories (HCCs)

https://innovation.cms.gov/initiatives/oncology-care/
Oncology Care Model (OCM)

NQS (National Quality Strategy) Core Measure Set

• Practice reported measures
  – Person-and-caregiver experience and outcome
  – Clinical quality of care

• Claims-based measures
  ▶ **Risk-adjusted** all-cause **hospital admissions**
  ▶ **Risk-adjusted** all-cause ED visits or observation stays
  – Deaths in hospice for 3 days or more

Partnering With Oncology to Improve Documentation

Risk adjustment
Hierarchical Condition Categories (HCCs)

Risk adjustment examples: 68 yo F living in the community with Medicare (2018)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>N18.4</td>
<td>Chronic kidney disease, stage IV</td>
<td>0.237</td>
</tr>
<tr>
<td>E66.01</td>
<td>Morbid obesity</td>
<td>0.273</td>
</tr>
<tr>
<td>J96.01</td>
<td>Acute hypoxic respiratory failure</td>
<td>0.302</td>
</tr>
<tr>
<td>I50.31</td>
<td>Acute diastolic heart failure</td>
<td>0.323</td>
</tr>
<tr>
<td>J44.9</td>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>0.328</td>
</tr>
<tr>
<td>I27.82</td>
<td>Chronic pulmonary embolism</td>
<td>0.400</td>
</tr>
<tr>
<td>N17.9</td>
<td>Acute kidney failure</td>
<td>0.422</td>
</tr>
<tr>
<td>E44.1</td>
<td>Mild malnutrition</td>
<td>0.545</td>
</tr>
<tr>
<td>J69.0</td>
<td>Aspiration pneumonia</td>
<td>0.599</td>
</tr>
<tr>
<td>C34.11</td>
<td>Lung cancer</td>
<td>0.970</td>
</tr>
<tr>
<td>C79.31</td>
<td>Brain metastasis</td>
<td>2.625</td>
</tr>
</tbody>
</table>

CC - Complication/comorbidity  MCC - Major complication/comorbidity

http://www.hccuniversity.com/risk-score-calculator/
## Hierarchical Condition Categories (HCCs)

### Risk adjustment examples: 68 yo F living in the community with Medicare (2018)

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</tr>
</thead>
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<tr>
<td>N18.4</td>
<td><strong>Chronic kidney disease, stage IV</strong> (HCC 137) - CC</td>
<td>0.237</td>
</tr>
<tr>
<td>E66.01</td>
<td>Morbid obesity (HCC 22)</td>
<td>0.273</td>
</tr>
<tr>
<td>J96.01</td>
<td><strong>Acute hypoxic respiratory failure</strong> (HCC 84) - MCC</td>
<td>0.302</td>
</tr>
<tr>
<td>I50.31</td>
<td><strong>Acute diastolic heart failure</strong> (HCC 85) - MCC</td>
<td>0.323</td>
</tr>
<tr>
<td>J44.9</td>
<td><strong>Chronic Obstructive Pulmonary Disease</strong> (HCC 111)</td>
<td>0.328</td>
</tr>
<tr>
<td>I27.82</td>
<td><strong>Chronic pulmonary embolism</strong> (HCC 107) - CC</td>
<td>0.400</td>
</tr>
<tr>
<td>N17.9</td>
<td><strong>Acute kidney failure</strong> (HCC 135) - CC</td>
<td>0.422</td>
</tr>
<tr>
<td>E44.1</td>
<td><strong>Mild malnutrition</strong> (HCC 21) - CC</td>
<td>0.545</td>
</tr>
<tr>
<td>J69.0</td>
<td><strong>Aspiration pneumonia</strong> (HCC 114) - MCC</td>
<td>0.599</td>
</tr>
<tr>
<td>C34.11</td>
<td><strong>Lung cancer</strong> (HCC 9) - CC</td>
<td>0.970</td>
</tr>
<tr>
<td>C79.31</td>
<td><strong>Brain metastasis</strong> (HCC 8) - CC</td>
<td>2.625</td>
</tr>
</tbody>
</table>

CC - Complication/comorbidity   MCC - Major complication/comorbidity

http://www.hccuniversity.com/risk-score-calculator/
## Hierarchical Condition Impact: Lung Cancer Patient

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>Risk score</th>
<th>Risk score</th>
</tr>
</thead>
<tbody>
<tr>
<td>C34.11 Malignancy of upper lobe, right bronchus or lung (HCC 9) - CC</td>
<td>0.970</td>
<td></td>
</tr>
<tr>
<td>C79.51 Secondary malignant neoplasm of bone (HCC 8) - CC</td>
<td>2.625</td>
<td>2.625</td>
</tr>
<tr>
<td>C79.31 Secondary malignant neoplasm of brain (HCC 8) - CC</td>
<td>2.625</td>
<td></td>
</tr>
<tr>
<td>G83.21 Monoplegia of upper limb affecting right dominant side (HCC 104)</td>
<td>0.395</td>
<td>0.395</td>
</tr>
<tr>
<td>G93.5 Compression of brain (HCC 80) - MCC</td>
<td>0.584</td>
<td></td>
</tr>
<tr>
<td>D63.8 Anemia in other chronic diseases</td>
<td>no HCC</td>
<td>no HCC</td>
</tr>
<tr>
<td>D70.8 Other neutropenia (HCC 47)</td>
<td>0.625</td>
<td>0.625</td>
</tr>
<tr>
<td>D69.6 Thrombocytopenia, unspecified (HCC 48)</td>
<td>0.221</td>
<td>0.221</td>
</tr>
<tr>
<td>D61.810 Pancytopenia due to chemo (HCC 47) - MCC</td>
<td>0.625</td>
<td></td>
</tr>
<tr>
<td>D61.82 Pancytopenia due to cancer in bone marrow (HCC 46) - CC</td>
<td>1.388</td>
<td></td>
</tr>
<tr>
<td>→ Interaction: Immune Disorders*Cancer Group</td>
<td>0.893</td>
<td>0.893</td>
</tr>
<tr>
<td>→ 2018 Demographic Risk Factor</td>
<td>0.312</td>
<td>0.312</td>
</tr>
<tr>
<td><strong>2018 TOTAL RISK ADJUSTMENT FACTOR (RAF) SCORE</strong></td>
<td>5.071</td>
<td><strong>6.822</strong></td>
</tr>
</tbody>
</table>
Translating Severity and Risk
Advanced Cancer Symptoms

Best predictor of prognosis

PERFORMANCE STATUS

Symptoms with independent predictive value

- Cognitive failure
- Weight loss
  - Anorexia
- Dysphagia
- Dyspnea

(Altered mental status)
  - Delirium
  - Encephalopathy
  - Coma
  - Glasgow Coma Scale

Malnutrition
Cachexia
Aspiration

Acute respiratory distress, acute respiratory failure

\( \text{HCC} \text{(Hierarchical Condition Category)} \)

https://journals.sagepub.com/doi/abs/10.1191/026921600701536192
Translating Severity and Risk

Other Common Symptoms

<table>
<thead>
<tr>
<th>Sign/symptom</th>
<th>Look for ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehydration</td>
<td>Acute kidney injury</td>
</tr>
<tr>
<td>Fever</td>
<td>Due to ... ; is there sepsis</td>
</tr>
<tr>
<td>Anemia</td>
<td>Blood loss – acute or chronic</td>
</tr>
<tr>
<td>Blood clot</td>
<td>Deep venous thrombosis</td>
</tr>
<tr>
<td>Constipation</td>
<td>Opioid dependence</td>
</tr>
</tbody>
</table>

\( \text{=} \) HCC (Hierarchical Condition Category)
Translating Severity and Risk

Other Common Symptoms

<table>
<thead>
<tr>
<th>Sign/symptom</th>
<th>Look for ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low blood pressure</td>
<td>Hypotension, lactic acidosis, shock</td>
</tr>
<tr>
<td>HCAP</td>
<td>Gram-negative/MRSA pneumonia</td>
</tr>
<tr>
<td>Neutropenic fever</td>
<td>“Suspected” bacterial infection</td>
</tr>
<tr>
<td>Bicarb low</td>
<td>Metabolic acidosis</td>
</tr>
<tr>
<td>Low Na</td>
<td>Hyponatremia</td>
</tr>
<tr>
<td>Electrolyte protocols</td>
<td>Hypomagnesemia/hypophosphatemia</td>
</tr>
</tbody>
</table>

\[\text{= HCC (Hierarchical Condition Category)}\]
Chemotherapy for Metastatic Breast Cancer
Impact of documentation on risk adjustment

59 yo F with metastatic breast cancer was admitted for chemotherapy

Weight loss noted in the review of systems
MD documents sacral redness (stage 2)

<table>
<thead>
<tr>
<th>846–848 Encounter for chemotherapy</th>
<th>Breast cancer</th>
<th>+ Bone mets* (2/2)</th>
<th>+ Brain mets* (2/2)</th>
<th>+ Weight loss (1/1)</th>
<th>+ Sacral decubitus stage 2 (3/3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare GLOS</td>
<td>2.8 days</td>
<td>3.5 days</td>
<td></td>
<td>3.5 days</td>
<td>3.5 days</td>
</tr>
<tr>
<td>Severity of illness</td>
<td>1 - Minor</td>
<td>2 - Moderate</td>
<td></td>
<td>2 - Moderate</td>
<td>2 - Moderate</td>
</tr>
<tr>
<td>Risk of mortality</td>
<td>2 - Moderate</td>
<td></td>
<td></td>
<td>2 - Moderate</td>
<td>2 - Moderate</td>
</tr>
<tr>
<td>HCC (score)</td>
<td></td>
<td></td>
<td>HCC 8 (+2.625)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GLOS (geometric length of stay) HCC (Hierarchical Condition Category) *Complication/comorbidity **Major complication/comorbidity

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## Chemotherapy for Metastatic Breast Cancer

Impact of documentation on risk adjustment

Registered dietitian consultation

<table>
<thead>
<tr>
<th>846–848 Encounter for chemotherapy</th>
<th>Breast cancer Mult metastatic sites*</th>
<th>Malnutrition, unspecified* (3/1)</th>
<th>Severe malnutrition** (4/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare GLOS</td>
<td>3.5 days</td>
<td>3.5 days</td>
<td>5.8 days</td>
</tr>
<tr>
<td>Severity of illness</td>
<td>2 - Moderate</td>
<td>3 - Major</td>
<td>3 - Major</td>
</tr>
<tr>
<td>Risk of mortality</td>
<td>3 - Major</td>
<td>3 - Major</td>
<td>3 - Major</td>
</tr>
<tr>
<td>HCC (score)</td>
<td></td>
<td>HCC 21 (+0.545)</td>
<td>HCC 21 (+0.545)</td>
</tr>
</tbody>
</table>

GLOS (geometric length of stay)  HCC (Hierarchical Condition Category)  *Complication/comorbidity  **Major complication/comorbidity
Summary

• Get comfortable discussing metastatic cancer and recognizing the manifestations
• Identify what motivates your oncologists
• Use your knowledge to close the gap between implied risk and documented (codable) risk
References

Thank you. Questions?

bwolf cw@mmm.com

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