Medicine Clerkship: Cancer

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Case #1: Mr. C

- 49 year old man with a chief complaint of fever, cough, and SOB x 2 weeks
  - Cough, sometimes productive
  - Shortness of breath, dyspnea on exertion
  - Fevers to 100.8
  - Sweats intermittently

- PMH and PSH: Hypertension. No surgeries.

- Social history: Works as a mechanic full time. Former smoker. No alcohol or drugs.
Mr. C...continued

- Exam in ER – tachycardia (HR in 110s), O2 saturation 88%, crackles at right lung base, palpable left supraclavicular node
- CXR suspicious for lung mass and pneumonia
- CBC:
  - WBC 13.2 (89% neutrophils)
  - Hgb 11, hematocrit 34%
  - Platelets normal
- CT scan ordered
Mr. C’s CT chest
And a normal CT for comparison
Mr. C

- Intern in the ER: “You have lung cancer and it doesn’t look curable”
- Admitted to Internal Medicine for work up.

If you were the intern, would you have handled this differently?

What is the RIGHT way to make a cancer diagnosis?
Step 1: Diagnostic Workup

- What type of biopsy would you recommend for this patient?

- Biopsy confirms:
  - CD 15+, CD, 30+, CD 45+

- Macroscopy appears like:

What is the Diagnosis
Step 2: Staging

How would you stage his cancer?
How Would you Stage Mr. C?

- Bone marrow biopsy:
- Diffuse involvement with Hodgkins Lymphoma

What stage is his disease?
What treatment would you offer to Mr. C?
Now Sit Back and Let’s Learn!
Cancer Cases & Deaths, 2013

- What is the most common cancer in both men and women?
  - **Skin Cancer**

- What is the most common cancer in males? How about females?
  - **Prostate and Breast**

- What cancer leads to the most deaths in both men and women?
  - **Lung Cancer**

- What cancer is the 2nd most common cause of death in both men and women?
  - **Colorectal Cancer**
Can we make a diagnosis of a solid tumor based on imaging alone?
Step 1: Making a Cancer Diagnosis

- Need tissue
- “tissue is the issue”
  - Fine needle aspirate
  - Core needle biopsy
  - Excisional Biopsy
    - Best for lymphoma dx
What’s the Diagnosis?
What’s the Diagnosis?

Pulmonary nocardia

Metastatic lung cancer
Sometimes the microscope can make a diagnosis! Blood disorders

CLL

AML: M3 APL
Beyond the Microscope:

- Immunohistochemistry
  - ER/PR receptors in breast cancer

- Molecular markers
  - BCR-ABL
    - Translocation between chromosomes 9 & 22
    - Philadelphia Chromosome
Step 2: Staging
Importance of Staging?

- Understanding the extent to which the cancer is involved
- Helps to accurately predict a patient's prognosis
- Dictates how patients are treated
- Gives a common language
## Two Methods of Staging

<table>
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<th>Clinical Staging</th>
<th>Pathologic Staging</th>
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<td>Physical exam</td>
<td>Information obtained during a surgical procedure</td>
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<tr>
<td>Imaging</td>
<td>Endoscopic exams in GI cancers: EUS</td>
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<tr>
<td>CT and Pet scan</td>
<td>Pathologic specimen – fluid or tissue</td>
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<td>MRI</td>
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</table>
Staging System: AJCC ("TNM") for solid tumors

- Tumor
- Node
- Metastases
Ann Arbor Staging for Lymphomas

Stage I

Hodgkin’s lymphoma
Diaphragm

Stage II

Hodgkin’s lymphoma on the same side of the diaphragm
Diaphragm
Ann Arbor Staging for Lymphomas

Stage III

Hodgkin's lymphoma on both sides of the diaphragm

Stage IV

Hodgkin's lymphoma in the lymph nodes above and below the diaphragm and has spread to the liver
Prognosis Varies by Stage

Overall survival for non-small cell lung cancer, by stage (TNM)

Overall survival, expressed as median survival time (MST) and five-year survival, using the sixth edition of TNM staging system by (A) clinical stage and (B) pathologic stage. Reproduced with permission from: Goldstraw, P, Crowley, J, Chansky, K, et al. The IASLC Lung Cancer Staging Project: proposal for the revision of the TNM stage groupings in the forthcoming (seventh) edition of the TNM Classification of malignant tumours. J Thorac Oncol 2007; 2:706. Copyright © 2007 Lippincott Williams & Wilkins.
The Big Picture

Stage I early
Stage II and III advanced
Stage IV metastatic or very advanced

Prognosis worsens

Important to know that **NOT ALL** stage IV cancers are incurable
- Lymphoma
- Colon cancer
- Breast Cancer
- Head and Neck Cancers
Lymphomas have their own prognostic scoring systems further help characterize how patients will do

- APLES
  - A: age >60
  - P: performance status
  - L: LDH elevated
  - E: extranodal sites
  - S: stage III or IV

Higher scores = Worse prognosis
And Mr. C’s prognosis?

- Stage IV by bone marrow involvement
- IPS = 2

Cancer Treatment
Goals of Therapy
Response to Treatment
Goals of Therapy

- Curable vs Not Curable
  - Localized disease or Metastatic
  - Performance status
  - Wishes

- Improve survival and extend life

- Palliate symptoms in the non-curable setting
  - quality versus quantity
  - Treatment can be TOXIC
### Treatment Modalities

<table>
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<th>Local Therapies</th>
<th>Systemic Therapies</th>
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<td>- Surgery</td>
<td>- Chemotherapy</td>
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<tr>
<td>- To cut is to cure</td>
<td>- Hormonal therapy</td>
</tr>
<tr>
<td>- Its best in a bucket</td>
<td>- Targeted agents against specific receptors or pathways</td>
</tr>
<tr>
<td>- Radiation</td>
<td>- Immunotherapy</td>
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</table>

All of these can be used in the curative or palliative setting.
Most solid tumor cancers cannot be cured unless they are cut out.

Some cancers are curable without surgery:
- Lymphoma and blood cancers
- Small cell lung cancer
Radiation Therapy

- For localized disease of an organ in a fixed location
- Reduces the risk of the cancer coming back locally
- Shrink a cancer so it can be cut out successfully
- Can offer better cosmesis and eliminate the need for more extensive surgery
  - Breast cancer
    - mastectomy vs lumpectomy
Systemic Therapy:

- Chemotherapy, Hormonal therapy, Biologic Agents, Immunotherapy
- Adjuvant: to kill micrometastatic disease after cancer resection
- Neoadjuvant: to result in better surgical outcomes and downsize tumor
How was Mr. C treated?

- 6 months of chemotherapy with ABVD and cured
- He developed cough and DOE 2 months after stopping chemo:

Bleomycin Toxicity: Treat with Steroids
Case #2: Solid Tumor = Ms. J

- 48 yo AAF with rectal bleeding for 2 months with bowel movements. Complains of difficulty defecating.

- Colonoscopy shows a friable, partially obstructing ...a biopsy is taken:

Well differentiated adenocarcinoma of the rectum
Step 2: Staging

- CT Chest, ABD, and PEL shows no evidence of distant metastatic disease, particularly a clear liver and normal lung fields
- An endoscopic US (EUS) is performed for additional staging
- Stage II T3N0M0

How would you treat:

- Chemoradiation → downstage and prevent local recurrence
- Surgery → cure
- Adjuvant chemotherapy → prevent distant recurrence
Monitoring Response to Therapy

- Tumor markers
  - CEA
  - β-HCG
  - CA 19-9
  - CA 125

- Imaging:
  - CT scans
  - MRI
  - PET scans

- Bone marrow biopsy
Defining Response to Therapy

Complete Response
- Tumor/disease is no longer detectable
- Does not necessarily mean “cured”

Partial Response or Stable disease

Progressive Disease
- Growth of cancer or new lesions that develop
Common Side Effects of Chemotherapy and/or Radiation

- Nausea and vomiting
- Hair loss
- Myelosuppression
  - Neutropenic fever
- Mucositis
- Diarrhea
- Burns (radiation)
- Neuropathy
Cancer Prevention
Seven Steps to Prevent Cancer

1. Don't use tobacco.
2. Protect your skin from the sun.
3. Eat a healthy diet.
4. Maintain a healthy weight and be physically active.
5. Practice safer sex and avoid risky behaviors.
7. Know your family medical history and get regular cancer screenings.

To learn more, please visit www.preventcancer.org
Prevention

- Lifestyle changes to prevent cancer
  - The 3 BIG ones
    - Smoking cessation
  - Reduction in alcohol use
  - Exercise
Prevention

- Screening programs
  - Colonoscopy for colorectal cancer
  - PAP smears for cervical cancer
  - Mammograms for breast cancer
  - PSA measurement for prostate cancer
  - CT scans for lung cancer in smokers