Metastases Imaging Melanoma: Imaging Melanoma: Focus on Patient with Unsuspected Focus on Patient with Unsuspected

Sasha Girouard, HMS III
Gillian Lieberman, MD
Lieberman, MD

April 16, 2010
Our Patient: Clinical Presentation

48 year old female presented with a bleeding lesion on her clavicle, in September 2006. The lesion was raised, itchy, and non-bloody. It was on her right chest, just inferior to her clavicle, and just inferior to her right clavicle.
old
woman complains of -

Lesion biopsied by dermatology in

per high powered field with ulceration and two mitoses with

November 2006

0.9 mm Clarks level IV melanoma
Referred to oncology and surgery

What should be done next?
and it’s staging. and it’s staging. steps for this patient’s steps for this patient’s an appreciation for melanoma an appreciation for melanoma In order to understand the next In order to understand the next
management, we must first gain
Melanoma
a Melanoma
has improved overall.
Over the past 3 decades, there has been an increased rate of melanoma incidence, though 5 year survival...
5 years; t
prognosis and Staging dictates treatment options

Staging also influences what imaging studies
are chosen, but there is no clear algorithm to follow Buzaid, Gershenwald, and Ross. Tumor node metastasis (TMN) staging system and other prognostic factors in cutaneous melanoma. UpToDate. Jan 2010.
Stage Groupings

- Stages I and II
- localized
- primary melanomas

- Stage I: low risk
- reoccurrence

- Stage II: higher risk of Stage II: higher risk of

Stage III - involvement of

Stage IV - involvement of
regional lymph nodes

Stage IV

- distant

metastases
course of our index patient. We have now reviewed the staging of melanoma. Let us continue to discuss the clinical
continue to discuss the clinical
Our Patient: Pathology Report

Primary Tumor: T1b: Melanoma 1.0 mm with ulceration.
Distant metastasis:

Distant metastasis: metastasis cannot be assessed. Presence of distant MX:

Regional Lymph Nodes: Regional Lymph Nodes: NX

nodes cannot be assessed. at this point. Let us begin with lymph node staging...

Lymph nodes and metastases have not been assessed
Lymphoscintigraphy

Nuclear medicine study in which a radioactive colloid and/or blue dye is injected into the primary tumor site to identify the sentinel lymph node(s).
Gamma camera -

mark focal areas of tracer uptake on

that take up tracer in nuclear medicine suite just prior to surgery. Radiologists used to image nodes

overlying skin.

Gamma probe -

hand held probe used during surgery to redetect focal areas of
tracer uptake.

False negative rate: 5% or less

http://www.neoprobe.com/detector.asp

Accessed April 14, 2010
Lymphoscintigraphy on Our Patient: Sentinel Lymph Nodes

Our Patient: Sentinel Lymph Nodes
Two foci of tracer uptake in the right axilla
Pathology Report: No evidence of melanoma in two examined lymph nodes

Our Patient: Staging

Stage 1B

December 2006

Operation: Wide excision of right axillary chest melanoma with concurrent right sentinel lymph node sampling

December 2006
Patient had 6 month follow-up skin checks with dermatologist.
Our Patient: Re April 2010 April 2010

Dysphagia, and intermittent palpitations progressively dyspnea years later, complaining of 4 months of Patient presents to outside hospital 4 months of
(Hint: where do her symptoms anatomically localize to)
Our Patient: Lung Nodule and Adenopathy on Chest Radiograph

Mediastinal Adenopathy
1.

2. **Right tracheal deviation**
   - Right paratracheal
   - Right paratracheal
   - Right abnormal soft tissue
   - abnormal soft tissue
   - subcarinal Splayed carina, and soft tissue
   - subcarinal soft tissue
   - fullness
   - Splayed carina, and
   - fullness

3. fullness

4. F hilum

5. Full R hilum

6. I hilum

7. **Pulmonary nodule**
   - Pulmonary nodule
   - R
Our Patient: Lung Nodules and Mediastinal Mass on CT

Chest CT with contrast, Axial View, Lung Window

Findings:
1. Two round nodules in R lung field
2. Mediastinal mass opacities in right middle lobe, likely subpleural pneumatosis
3. Bilateral pleural effusions
4. Parenchyma PACS, BIDMC
multiple lung nodules. The different diagnosis (ddx) of our patient’s lung nodules is metastatic melanoma, let us consider from the case to review.
break from the case to ddx
review

While the most likely etiology of
Ddx Multiple Lung Nodules

- Sarcoidosis

Inflammation

Amyloidosis

- Karposi's
Malignancy
Metastatic Neoplasm

Infection
- No Hodgkin’s lymphoma
- Sarcoma in
  - Hodgkin’s sarcoma in HIV+
  - Sarcoidosis
  - Wegner’s granulomatosis
  - Rheumatoid arthritis
  - Lymphomatoid granulomatosis
- Abscesses
Our Patient: Additional Staging

- Needle aspiration of lung nodule was performed using endobronchial ultrasound.
metastatic malignant melanoma

Tissue and cytology was positive for mediastinal

Let us now turn our attention to the mediastinal mass seen on imaging...
Brief Anatomy Review of Mediastinum

Subcompartments:
- Superior Mediastinum
- Middle Mediastinum (inferior)
- Posterior Mediastinum (inferior)
- Brachiocephalic vessels
Subcompartments

Superior:

upper trachea, Superior:
thyroid, upper esophagus

Middle:
pericardium, lower trachea
Middle:
heart, great vessels,

Anterior:
thymus, germ cells
dorsal root ganglia, thoracic
esophagus, system, Posterior: sympathetic ducts descending aorta, azygous chain,

Ddx Mediastinal Mass

Superior: diverticulum, upper tracheal mass, thyroid mass, upper Zenker’s tracheal mass, thyroid mass, 
– Zenker’s
subcompartment: mediastinal mass may be based on–

Middle: bronchogeniclessions, pericardial tumors/cysts, vascular

–

– Posterior: Posterior:
varices, esophageal dilation/masses,
, thoracic duct cysts/chylomas, esophageal dilation/masses, ganglion series tumors
Our Patient: Mediastinal Mass on CT

Mass on CT

Findings:

Mediastinal adenopathy,

coalescing together to appear as

Chest CT with contrast, Axial Views, Mediastinal Window
inferior pulmonary veins
Our Patient: Mediastinal Mass, which is not specific to any mediastinal adenopathy.
mediastinal

subcompartment:

- Adenopathy
- Hemangioma
- Lymphangioma
- Connective tissue tumors
- Vascular lesions
Our Patient: Summary of Clinical

Report is negative for melanoma. Her right chest. She has wide excision of the lesion and her right chest. She has wide excision of the lesion and 48 year old woman presents with localized melanoma on 48 year old woman presents with localized melanoma on sentinel lymph nodes are removed. Lymph node pathology sentinel lymph nodes are removed. Lymph node pathology
Patient returns 4 years later with palpitations, and is found on chest radiograph and CT to have 2 lung nodules in her right lung and mediastinal adenopathy, compressing her trachea, esophagus, and pulmonary veins. Where else might our patient have metastases?
<table>
<thead>
<tr>
<th>Organ</th>
<th>Metastasis Site</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart</td>
<td>Lungs</td>
<td>5</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Melanoma</td>
<td></td>
</tr>
<tr>
<td>Adrenals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*all of these sites of metastasis?* How can we survey the body to detect or rule out *all of these sites of metastasis?* How can we survey the body to detect or rule out
Metastatic Melanoma

Menu of Imaging Tests for

- Lymphoscintigraphy
- Plain
Plain Radiographs

CT Torso

MRI Brain

Ultrasonography

PET and PET/CT
Bone Scan
Our Patient: Outcome

- metastatic melanoma
- CT of abdomen/pelvis: negative for evidence of metastatic melanoma
- MRI head w/ and w/out contrast: negative for evidence of metastatic melanoma
contrast: negative for

Stage IV mediastinum Currently receiving palliative radiation to
the PET scan. One imaging study which our patient did not receive during her clinical course, but is very sensitive in detecting areas of metastasis, is clinical
course, but is very sensitive
PET and PET/CT

Physiological imaging technique versus anatomical imaging

Uses glucose labeled with 18-fluorine, called FDG, which emits positrons detected by crystals and converted to light signals.

Tumor cells take up FDG because they are metabolically active.

Areas of inflammation and tissue repair are also sites of FDG.
inflammation and tissue repair are also sites of FDG accumulation. PET/CT combines physiologic and anatomic imaging and has been shown to be superior to PET alone for detection of metastases.
PET and PET/CT

Useful for:

- 
- 
- 
- 
- 
- 
- 
- 
- 
- 
-
Stage III disease
Detection of metastases in patients with
To instruct surgery
Detection of extent of disease in therapy prior to initiation of therapy
patients eligible for adjuvant interferon
Pelvic Metastases on PET Companion
Patient #1: Liver and

Findings:
Focal areas of increased uptake
Companion Patient #1: Liver Metastasis on PET/CT
Focal area of increased uptake in left lobe of liver
Companion Patient #1: Pelvic Metastasis on PET/CT
Focal area of increased uptake in right pelvis
Melanoma has a high potential for metastatic spread. Imaging studies are helpful in staging and postmelanoma surgical planning, and intraoperative management.
The use of imaging studies in melanoma needs support for any particular protocol for their use and management.
evaluation, as current evidence does not study benefits. Further study benefits are not clear.
References


   Cancer Facts American Cancer Society.


Acknowledgements

Krithica

Kevin, MDDonohoe

Kevin Donohoe
Kaliannan, MD
Ma
Ho, MD
Maria

Lan Ma
Ho, MD

Levantakis

Gillian Lieberman, MD