Incidentals and Artifacts in the Chest on Whole-body PET/CT

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Why are there so many false positives?

- PET is not a cancer test
- PET is a mapper of metabolism
- Metabolically active tumors and non-tumors light up

The Message

Correctly identifying non-pathologic causes of FDG uptake will make us better PET readers.

Topics

We’ll focus on non-pathologic FDG uptake seen in the lower neck and chest.

8 examples of non-cancer uptake.

Name that uptake!

1. Paraspinal Uptake

Hx: Treated Ewing’s (circle).
Q: What are the arrows pointing to?
1. Paraspinal Uptake
Hx: Treated Ewing’s (circle).
Q: What are the arrows pointing to?
- Brown Fat

1. Brown Fat
- Characteristics
  - Tends to be in neck and/or chest
  - ~5% of all PET patients
  - More common in females & low body weight patients & the young
  - No racial differences

2. Focal Laryngeal Uptake
Hx: Colon cancer
Q: What is the arrow pointing to?
- Constrictor Muscle Activity
2. Physiologic Laryngeal Uptake

Similar case:

vocal cords and muscles of phonation

Activity at both sites is very common

DDX: squamous cell carcinoma

DDX: non-cancerous abnormalities

Differentiate:

1) CT findings

2) Pattern of uptake

3. Diffuse Thyroid Uptake

Hx: Lung Adenocarcinoma

Q: What is the differential for this finding?

Thyroiditis vs. Physiologic

Look for nodules

Correlate to symptoms

Know it’s not a tumor!

3. Thyroid Companion Case: Focal Thyroid Uptake

Up to a 34% chance of malignancy

We often dictate this in the impression
4. Neck Lymph Node Activity

Hx: 2.3 cm lung cancer
Q: How do you report this?

 Likely Reactive Lymph Nodes

4. Reactive Lymph Nodes

- Low level, symmetric, normal/slightly enlarged nodes, in low likelihood sites for metastases:
  - “Reactive Lymph Nodes”
  - “Reactive Lymph Nodes: Attention on Follow up”
- Very hypermetabolic, focal, asymmetric, large nodes which could be sites (e.g. in a contiguous node chains, lymphoma):
  - “May be cancer.”

4. Reactive Lymph Nodes

- Common sites for reactive nodes
  - Neck
  - Mediastinum
  - Retroperitoneal
  - Mesenteric
  - Groin

5. Breast Uptake

Hx: 35 year old with ovarian Malignancy
Q: How do you report this?

 Physiologic Breast Uptake
5. Physiologic Breast Uptake

- Physiologic Uptake:
  - Can be cyclical
  - More tissue can result in more activity
- Caveat:
  - Focal breast uptake is a different matter!

5. Variant: Focal Breast Uptake

- 0.8% of non-breast CA patients have focal breast uptake
- 57% of the foci represent cancer
- Higher activity = higher likelihood of cancer
- Lack of a CT correlate confers a higher risk of cancer, not less.

6. Activity Near the Clavicle

Hx: lymphoma surveillance
Q: What are the arrows pointing to?

PET Artifact from IV Contrast

7. Pleural Activity

Hx: Lymphoma. Long standing shortness of breath.
Q: What is causing this activity?
7. Pleural Activity
3 months earlier

7. Pleurodesis
- Pleurodesis causes inflammation (which is why it works). Very hypermetabolic.
- Main DDX is mesothelioma.

8. Bone Marrow Activity
Hx: Lymphoma post treatment evaluation.
Q: What is causing this bone marrow activity?

8. Bone Marrow Activation
- Diffuse bone marrow activation is common after chemotherapy
- DDX: Infiltrative metastases/leukemia
- History is important and often available
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References


Thank you!

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