• T1 grade 1 and ER-PR positive

• 18/24 LN positive = Stage IV
Stiff Person Syndrome

- Rare neurologic disorder of severe, progressive muscle stiffness and spasm
- Associated with auto-immune disorders, including Type 1 diabetes or amphiphysin antibodies
- Antibodies + profound stiffness mandates breast and lung cancer search
- Treatment: Neo-adjuvant chemotherapy, surgery, radiation therapy and endocrine therapy;

Breast Cancer can be associated with several antibody-related paraneoplastic syndromes affecting one or more organ systems.

Table 1. Paraneoplastic neurological syndromes in breast cancer.

<table>
<thead>
<tr>
<th>Paraneoplastic neurological syndrome</th>
<th>Associated tumors neurological syndrome</th>
<th>Clinical presentation</th>
<th>Associated antibodies</th>
<th>Diagnostic studies</th>
<th>Treatment options</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limbic encephalitis</td>
<td>SCLC, germ cell tumors, testis, breast cancer, Hodgkin's lymphoma, immature teratoma, thymoma</td>
<td>Short-term memory loss, seizures, confusion, hallucinations, mood disorder, personality changes</td>
<td>Anti-Ma2</td>
<td>MRI: abnormalities in limbic system; EEG: epileptic foci in temporal lobes, focal or generalized slow activity; CSF analysis: pleocytosis, elevated protein, elevated IgG, oligodendroglial bands</td>
<td>IVIG, methyl prednisone, prednisone, plasma exchange, cyclophosphamide, rituximab</td>
<td>[1,4,15,16]</td>
</tr>
<tr>
<td>Cerebellar degeneration</td>
<td>Breast cancer, SCLC, gynecologic cancer, Hodgkin's lymphoma</td>
<td>Ataxia, diplopia, dysphasia, dysarthria, dizziness, nausea, vomiting</td>
<td>Yo-Ab (PCA1 Ab)</td>
<td>FDG-PET: increased metabolism (early stage) and then decreased metabolism (late stage); MRI: cerebellar atrophy (late stage); CSF: lymphocytic pleocytosis with elevated protein and IgG levels</td>
<td>IVIG, methyl prednisone, plasma exchange, cyclophosphamide, rituximab</td>
<td>[1,3-6,17,19,20,30]</td>
</tr>
<tr>
<td>Subacute sensory neuropathy</td>
<td>Breast cancer, SCLC, ovarian cancer, sarcomas, Hodgkin's lymphoma</td>
<td>Paresthesia typically progressing from upper to lower extremities</td>
<td>Anti-Hu, anti-GAD65, antiamphiphysins</td>
<td>NCS: reduced or absent sensory nerve action potentials; CSF: pleocytosis, high IgG, oligodendroglial bands</td>
<td>Methyl prednisone, tricyclic antidepressants, antiepileptics</td>
<td>[1,3,4,32,33]</td>
</tr>
<tr>
<td>Opsoclonus-myoclonus</td>
<td>Breast cancer, neuroblastoma (in children), SCLC, ovarian cancer</td>
<td>Involuntary, arrhythmic, high-amplitude conjugate saccades of eyes, myoclonic jerks</td>
<td>Anti-Ri (ANNA-2)</td>
<td>MRI: usually normal but may show hyperintensities in the brainstem on T2* weighted images; fMRI: disorganization of the fastigial nucleus of the cerebellum; CSF: mild pleocytosis and protein elevation</td>
<td>IVIG, prednisone, plasma exchange, thiamin, clonazepam, baclofen</td>
<td>[1,5,23,24,25]</td>
</tr>
<tr>
<td>Stiff person syndrome</td>
<td>Breast cancer, lung cancer, colon cancer, Hodgkin's disease</td>
<td>Stiffness, most prominent in axial muscles, with cocontraction of agonist and antagonist muscle groups and painful spasms precipitated by sensory stimuli</td>
<td>Antiamphiphysins EMG: continuous motor activity in affected muscles at rest; MRI/CT of brain: normal; CSF: oligodendroglial bands, IgG, antiamphiphysins Abs</td>
<td>Baclofen, diazepam, valproate, vigabatrin, carbamazepine, opioids</td>
<td>[1,3,33,35,38,40,41]</td>
<td></td>
</tr>
</tbody>
</table>

History: 65 year old, lymphoma
Core Needle Biopsy: Lymph node tissue consistent with previously diagnosed T cell lymphoma. No carcinoma
Breast Lymphoma

• < 0.4% of all breast malignancies
  - Uncommon because sparse lymphoid tissue in breast
• Primary or Secondary
  - Primary = breast first or major site of disease, no lymphoma elsewhere (except ipsilateral axilla)
  - Secondary = more common than primary

Lymphoma affecting the breast: a pictorial review of multimodal imaging findings.

Breast Lymphoma

• Mammogram:
  - Oval or round small mass or diffuse infiltration
  - Calcifications, spiculations, and architectural distortion “distinctively absent”

• Ultrasound:
  - Hypoechoic solid mass, circumscribed or indistinct margins
  - Often posterior acoustic enhancement

• MRI:
  - Inhomogenous enhancement, suspicious kinetics
History - Age 75, lymphoma; mammogram 3 years ago

PET CT July -
Mammogram recommended

PET CT December
Mammogram recommended
January: Diagnosis?

1.1 cm invasive ductal with Ca++
PET Breast Lesions - Benign

- Gynecomastia
- Fat Necrosis
- Fibroadenoma

Also Lactation, Fibrocystic Disease, Infection
Clinical significance of incidental finding of focal activity in the breast at 18F-FDG PET/CT

- Focal uptake often malignant (37.5%)
- always merits US
- SUV Max < 2 AND benign US appearance = may not require biopsy

- PET sensitivity for breast cancer ~ 90%
  - depends on tumor size (>1cm), grade
Incidental Breast Lesions PET CT: What Differentiates Benign from Malignant?

- Age
- SUV Max
- US and mammographic appearance (BI-RADS score)
- US lesion size

  - Breast Imaging features most important
What is this image?

Album: PET SOUNDS, BEACH BOYS
61 years- primary hyperparathyroidism

parathyroid sestamibi scan
Spect image
Benign intraductal papilloma

Sestamibi; specificity 71-93%, if dedicated system
Chunky Calcifications
History: 59 years

Lumpectomy and radiation therapy 12 years ago

New lump
Radiation induced sarcoma

High-grade fibroblastic type
Radiation induced Sarcomas

Criteria:
- Therapeutic radiation > 3 years before sarcoma
- Arising in field of previous radiation
- Differing histology sarcoma vs primary tumor

5-year survival = 36%
History

71-years lumpectomy and radiation therapy 10 years ago
new palpable lump near lumpectomy site