39 Unknown Primary

Case 39.1: Unknown Primary

Case History
A 60-year-old woman presents with right chin numbness. Brain MRI identifies a cerebellar mass. Because her physician suspects that the mass is a metastasis, a positron emission tomography–computed tomography (PET-CT) scan is performed, which demonstrates abnormal uptake in the left breast and thyroid. After the PET-CT scan, bilateral mammograms and left breast sonogram are performed. The sonogram identifies a cystic mass that is biopsied and found to be ductal carcinoma in situ. Bilateral breast MRI is then performed demonstrating extensive abnormal left breast enhancement. Because mastectomy is being considered, a second left breast sonogram is performed to identify lesions to biopsy that would be distant from the primary mass.

The PET-CT thyroid abnormalities are also followed up with a thyroid sonogram, which identifies a suspicious right thyroid nodule.

Physical Examination (Figs. 39.1 and 39.2)
• Right chin decreased sensation
• Normal breast examination
• Multiple nodules in both thyroid glands

Fig. 39.1 Axial T2-weighted MRI of the brain. There is a high-intensity mass in the left cerebellum. The differential diagnosis is a metastasis versus a slow-growing glioma.
Fig. 39.2 After the cerebellar mass is discovered, positron emission PET-CT scan is performed to identify a primary malignancy. The PET-CT demonstrates increased uptake in the thyroid (T) and the left breast (B). (A) Coronal PET-CT. (B) Axial PET-CT of chest.

Mammogram (Fig. 39.3)
- Normal

Fig. 39.3 Mammograms are performed as a result of the abnormal PET-CT scan. Left breast has heterogeneous breast composition without suspicious mass or calcifications. (A) Left MLO mammogram. (B) Left CC mammogram.
Applications of PET-CT

Ultrasound

Frequency (Figs. 39.4, 39.5, 39.6, and 39.7)
- 14 MHz

Fig. 39.4 Initial left breast sonogram. Breast sonogram is performed as a result of the abnormal PET-CT scan. A 1.5 cm complex cyst is identified 12 cm from the nipple at the 4 o’clock position. This mass is biopsied and found to be ductal carcinoma in situ (DCIS). It is considered to be the primary malignancy.

Fig. 39.5 After the left breast sonographic mass is found to be DCIS, breast MRI is performed to stage the breast. The MRI demonstrates enhancement of the known primary malignancy (P), as well as the ducts extending from the primary mass to the nipple (arrows). (A) Bilateral contrast-enhanced, T1-weighted axial breast high-resolution MRI. (B) Bilateral contrast-enhanced, T1-weighted axial breast high-resolution MRI, inferior to that in A.

Other Modalities: MRI and Second Look Sonography (Figs. 39.5 and 39.6), Thyroid Sonogram (Figs. 39.7)
Pathology

- Left breast primary mass at the 4 o’clock position, 12 cm from nipple; sonographic biopsy: ductal carcinoma in situ (DCIS)
- Left breast duct sonographic biopsy at the 3 o’clock position, 2 cm from the nipple: DCIS
- Left mastectomy specimen demonstrated > 7 cm of ductal carcinoma in situ in the left outer breast.
- Total thyroidectomy demonstrated papillary carcinoma in bilateral glands. Right gland had three foci (largest was 1.2 cm). Left gland had one 0.2 cm cancer.
- No biopsy of cerebellar mass has been performed. The mass did not change in size for 9 months.

Management (Left Breast MRI Findings)

- Sonographic left mass at the 4 o’clock position. BI-RADS assessment category 4, suspicious; biopsy should be considered.
Pearls and Pitfalls

• About 2 to 5% of all new patients with cancer present with malignancy that cannot be attributed to a specific origin and are classified as having occult primary malignancy. In these patients, PET has been found to identify approximately 40% of primary tumors not detected by conventional imaging such as CT.
• Korn et al reported that 6 (1.1%) of 533 women who had PET-CT were found to have incidental focal increased \(^{18}\)F-fluorodeoxyglucose (FDG) uptake in the breast. Five of the six women subsequently were found to have invasive ductal carcinoma. Therefore, women with focally increased FDG in the breast should be worked up for breast cancer.
• DCIS is sometimes difficult to identify on MRI. However, this case illustrates that this malignancy may appear as a mass or as ductal enhancement.
• To biopsy suspicious MRI lesions sonographically, the imager needs to be familiar with the sonographic signs of DCIS. These findings include solid masses, cystic masses, abnormal ducts (duct ectasia—focal or diffuse, intraductal mass or calcifications, thick walled ducts, or ducts affecting the surrounding tissues such as hyperechoic haze), and normal ducts with increased color flow Doppler. When these findings are anatomically matched with the MRI lesion, then biopsy should be performed.

Reference

Suggested Reading