

# Ovarian Carcinoma Metastasis to Breast: Role of PET/CT

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The case presented is a 65 year old woman with a history of papillary serous ovarian carcinoma. Ovarian carcinoma is the gynecologic malignancy with the highest case-to-fatality ratio. Sixty-nine percent of all patients with ovarian carcinoma will succumb to their disease, as compared with 19% of those with breast cancer. The high mortality of this tumor is largely explained by the fact that the majority (75%) of patients present at an advanced stage with widely metastatic disease within the peritoneal cavity [1].

The most definitive role of fluorodeoxyglucose positron emission tomography (FDG-PET)/computed tomography currently is surveillance and detecting recurrence in patients who have completed primary therapy but demonstrate a rising serum tumor marker (e.g., CA-125 levels) [2,3]. In this scenario, PET/CT demonstrates high sensitivity and accuracy in detecting lesions that are otherwise

challenging and appears to be superior to CT alone. FDG-PET does not play a significant role in the primary diagnosis of ovarian cancers; however, the role of combined PET/CT modality has recently begun to be re-explored for initial disease staging, particularly because PET/CT can pick up small unsuspected lesions and thereby provide a better disease assessment of the whole body in a single examination. The baseline PET/CT also plays an important role for future monitoring of therapy response. Therapy monitoring by PET could help to optimize neoadjuvant therapy protocols and avoid ineffective therapy in non-responders early in its course [2,3].

The most common malignancies metastasizing to the breast include leukemia, lymphoma, carcinoma of the contralateral breast, melanoma and bronchogenic carcinoma. Ovarian malignancies spreading to the breast represent < 0.5% of breast metastases and are the result of hematogenous spread. This explains its rarity because ovarian cancer disseminates primarily intraperitoneally or via lymphatics, while hematogenous spread is less common. The most common type of ovarian cancer metastasizing to breast is papillary serous carcinoma [4-7].

The axial image shown here, PET/CT study (CT on the left and fused image of PET/CT on the right), demonstrates the value of this imaging modality in detecting a metastasis to the left breast (yellow arrows). Contrast-enhanced CT shows a subtle area of mild enhancement within the left breast whereas the fused image on the left clearly shows the corresponding lesion to be highly FDG-avid. Core biopsy of the mass revealed metastatic serous ovarian carcinoma. The differentiation between metastatic and primary tumors of the breast is of great importance because treatment and prognosis differ significantly [7].

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## References

- Lengyel E. Ovarian cancer development and metastasis. *Am J Pathol* 2010; 177 (3): 1053-64.
- García Velloso MJ, Boán García JF, Villar Luque LM, et al. F-18-FDG positron emission tomography in the diagnosis of ovarian recurrence. Comparison with CT scan and CA 125. *Rev Esp Med Nucl* 2003; 22 (4): 217-23.
- Kumar Dhingra V, Kand P, Basu S. Impact of FDG-PET and -PET/CT imaging in the clinical decision-making of ovarian carcinoma: an evidence-based approach. *Womens Health (Lond Engl)* 2012; 8 (2): 191-203.
- Williams SA, Ehlers RA 2nd, Hunt KK, et al. Metastases to the breast from nonbreast solid neoplasms: presentation and determinants of survival. *Cancer* 2007; 110 (4): 731-7.
- Vergier B, Trojani M, de Mascarel I, Coindre JM, Le Treut A. Metastases to the breast: differential diagnosis from primary breast carcinoma. *J Surg Oncol* 1991; 48 (2): 112-16.
- Wood B, Sterrett G, Frost F, Swarbrick N. Diagnosis of extramammary malignancy metastatic to the breast by fine needle biopsy. *Pathology* 2008; 40 (4): 345-51.
- Recine MA, Deavers MT, Middleton LP, Silva EG, Malpica A. Serous carcinoma of the ovary and peritoneum with metastases to the breast and axillary lymph nodes: a potential pitfall. *Am J Surg Pathol* 2004; 28 (12): 1646-51.

