

Ga-68 Chemokine Receptor-4 PET/CT Imaging in Schminke Type of Nasopharyngeal Carcinoma

Abstract

Nasopharyngeal carcinoma is a rare malignancy of the head-and-neck region. It is associated with Epstein–Barr virus infection and smoking. Its association with breast cancer is also infrequent. Chemokine receptor (CXCR)-4 imaging is a newer agent for imaging many malignancies with a good diagnostic value. We present a case of a young female diagnosed with left breast carcinoma in whom Ga-68 CXCR-4 PET/CT demonstrated tracer avid lesion in the nasopharynx. Biopsy of the nasopharyngeal lesion revealed Schminke type of lymphoepithelial cancer, indicating CXCR-4 PET/CT as a potential imaging modality for lymphoepithelial malignancy.

Keywords: Breast cancer, chemokine analog, chemokine receptor-4, nasopharyngeal carcinoma, positron emission tomography/computed tomography

A 43 years old woman presented with a lump in the left breast for ten months, gradually progressive in size with no associated symptoms. Fine needle aspiration cytology revealed features suggestive of malignancy which was followed with a core needle biopsy. The histopathological report revealed an

invasive ductal carcinoma grade III, ER 2+, PR -ve, HER2/neu 3+ with Ki 67 index of 30%. She underwent F-18 FDG PET/CT for initial staging [Figure 1]. As part of an ongoing project for evaluating CXCR4 receptor expression in newly diagnosed breast cancer, she underwent Ga-68 CXCR-4 PET/CT imaging [Figure 2].

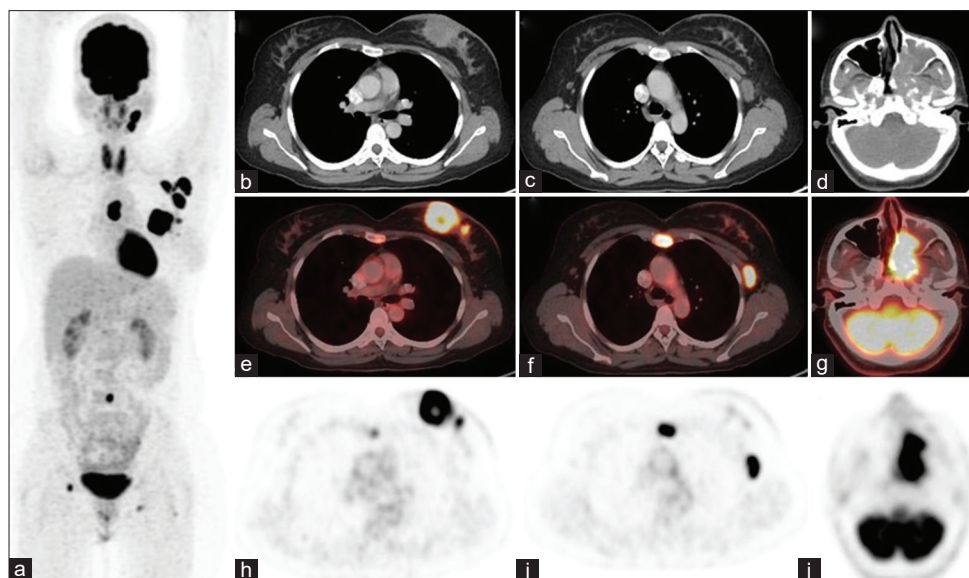


Figure 1: FDG PET/CT demonstrated multiple FDG avid lesions on the maximum intensity projection (MIP) image (a). Transaxial CT, fused PET/CT, and PET images localized the increased FDG avidity in the left breast lesion (b-d, SUVmax 7.8 with left axillary lymph nodes and skeleton; e-g, sternum) suggestive of metastatic breast cancer. Apart from these lesions, increased FDG uptake is also noted in the nasopharynx, which on transaxial images (h-j) is localized to an infiltrative soft tissue mass in the nasal cavity and nasopharynx predominantly on the left side. The mass is seen to involve the adjacent maxillary, sphenoid, and ethmoidal air sinuses with infiltration of surrounding structures with a SUVmax of 15.1

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How to cite this article: Ramachandran A, Krishnaraju VS, Kumar R, Shukla J, Laroya I. Ga-68 chemokine receptor-4 PET/CT imaging in schminke type of nasopharyngeal carcinoma. Indian J Nucl Med 2022;37:284-5.

**Arivan
Ramachandran,
Venkata
Subramanian
Krishnaraju,
Rajender Kumar,
Jaya Shukla,
Ishita Laroya¹**

Departments of Nuclear
Medicine and ¹General Surgery,
Post Graduate Institute
of Medical Education and
Research, Chandigarh, India

Address for correspondence:
Dr. Rajender Kumar,
Department of Nuclear
Medicine, Post Graduate
Institute of Medical
Education and Research,
Chandigarh - 160 012, India.
E-mail: drrajender2010@gmail.
com

Received: 25-11-2021
Accepted: 29-12-2021
Published: 02-11-2022

Access this article online

Website: www.ijnm.in

DOI: 10.4103/ijnm.ijnm_184_21

Quick Response Code:



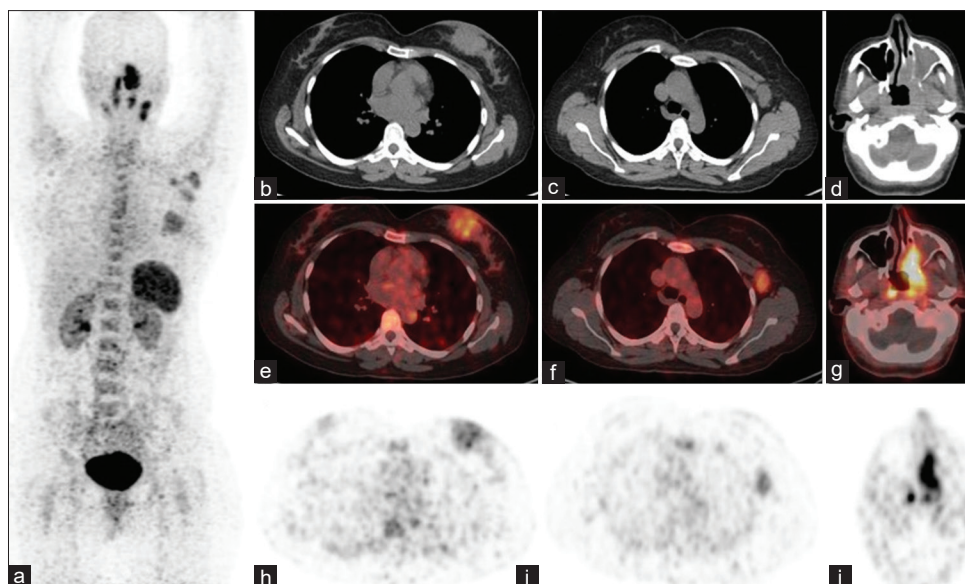


Figure 2: MIP image of CXCR-4 PET/CT demonstrated multiple tracer avid lesions. On transaxial images, mild increased tracer is localized to the left breast lesion (b-d) and left axillary and sternal lesion (e-g). In addition, intense CXCR-4 expression was noted in the nasopharyngeal lesion (h-j) and had a SUVmax value of 12.2. In view of clinical and imaging suspicion of a synchronous second primary in the nasopharynx, she underwent pathological confirmation, which demonstrated lymphoepithelial nasopharyngeal carcinoma (Schminke type)

Nasopharyngeal carcinoma is a rare malignancy arising from the epithelial cells of the nasopharynx. It is endemic to certain parts of Asia and Africa and has more incidence in males and smokers.^[1] The chemokine receptor overexpression has been reported as an adverse prognostic factor in various malignancies. Among these, CXCR-4 is the most widely expressed receptor on malignant tumors, and its role in tumor angiogenesis and lymphatic vasculature has been studied extensively.^[2,3]

Chemokine imaging was found to be more sensitive for *in vivo* quantification of CXCR-4.^[4] Lympholuciferin is a synthetic analog of CXCL12/SDF-1, the only known natural ligand of CXCR-4. Moderate CXCR-4 expression is noted in many solid tumors such as neuroendocrine tumors, cholangiocarcinoma, pancreatic carcinoma, and hepatocellular carcinoma.^[5] CXCR-4 imaging also demonstrated chemokine receptor expression in primary and recurrent breast carcinoma and plasmacytoma.^[6,7] However, its role in nasopharyngeal cancer is yet to be studied. In the present case, we highlight the CXCR-4 expression in a synchronous second primary of the nasopharynx in a known case of breast cancer. This case also gives insight into possible treatment strategies with CXCR-4 targeted therapy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not

be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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