

Gallium citrate uptake is a marker of breast malignancy: true or false?

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Abstract

A 34-year old lady had a ^{67}Ga citrate scan and demonstrated uptake by both of her breasts — diffuse in the right breast, but focal in the left breast at the “9 o'clock position”. Core biopsy from both breasts showed fibroadenoma and no malignant cells were found. Though uptake of ^{67}Ga citrate is normally associated with malignancy or infection there may be other causes of uptake and follow-up biopsy should be performed.

Key words: ^{67}Ga citrate, breast adenoma

Introduction

Gallium is a group III element in the Periodic Table with biological behaviour similar to iron. ^{67}Ga citrate was developed as a bone-seeking radiopharmaceutical but found use clinically as a tumour-imaging and infection-seeking agent in range of tumours including lymphoma, melanoma, mesothelioma, bronchial carcinoma. Other non-cancerous causes of uptake was found to be infection or inflammation especially in , tuberculosis and active sarcoidosis. These infection-seeking property was noted in the early 1970s, and ^{67}Ga citrate became the mainstay of infection scan for over a decade [1]. ^{67}Ga binds avidly to the protein lactoferrin and visualization of the breasts of ^{67}Ga citrate is commonly seen in pre-menopausal woman and is related to normal physiologic stimulation (puberty, postpartum, lactation) of the breast and increase in iron uptake. It has been reported in a small number of patients in the detection of breast cancer [2, 3].

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Case report

A 34-year non pregnant, non lactating woman with bilateral hilar lymphadenopathy was seen by a respiratory physician and had a suspected diagnosis sarcoidosis or lymphoma. A confirmatory ^{67}Ga citrate scan was performed 48 hours after administration of tracer. This demonstrated intense uptake in both breasts — being more diffuse in the right breast, but focal in the left breast at 9 o'clock position (Figure 1). A CT scan of the breast showed that there was high density tissue within both breasts (Figure 2) and subsequent core biopsy from both breasts showed bilateral fibroadenoma with no malignant cells found. There was no evidence for a raised prolactin level.

Discussion

In 1969 Edwards and Hayes noted on a bone scan the accumulation of ^{67}Ga citrate in the cervical lymphnodes of a pa-



Figure 1. Asymmetric uptake of ^{67}Ga -citrate in both breasts.

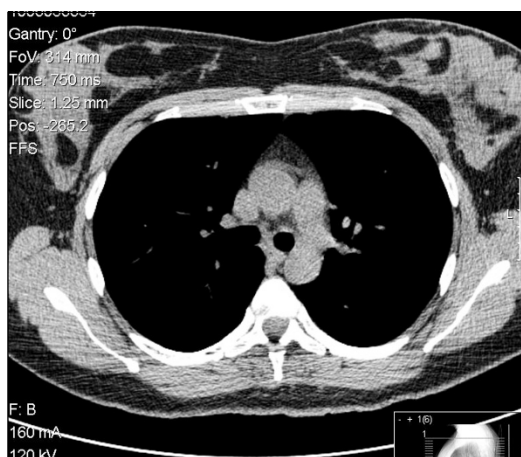


Figure 2. Computed tomography scan showing markedly increased density of both breasts.

tient with Hodgkin's disease [4]. Higasi et al [5] used ^{67}Ga citrate scanning in 149 patients with a variety of neoplasms and inflammatory lesions. They found six negative scans among the 16 cases of breast cancer and one false positive case among 19 cases of benign tumour, including six fibroadenomas and 13 cystic tumours — the false positive case was accompanied by inflammation which was thought to be the cause of the uptake of the ^{67}Ga citrate and it was concluded that ^{67}Ga citrate imaging is helpful only in advanced breast cancer or infection but no uptake was seen in benign breast tumours [6]. In hyperprolactinemia, ^{67}Ga citrate localizes in the breasts in a diffuse, bilaterally symmetrical pattern and not normally in the mixed diffuse and focal pattern seen in this patient. Other non-physiological causes for breast uptake of ^{67}Ga citrate include certain medications such as cimetidine, infections including breast abscess, and primary or metastatic malignancies. Indeed it may be

necessary to give women who are lactating specific radiation protection advice if they have a ^{67}Ga citrate injection to prevent the child receiving a significant dose of injected ^{67}Ga labelled milk.

Conclusion

Though it has previously been reported that non-physiological uptake of ^{67}Ga citrate in the breast if there is no endocrine disturbance is due to infection or malignancy it would appear that benign breast disease may also be a cause. Therefore, when unexplained breast uptake of ^{67}Ga citrate is seen biopsy should be performed.

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