

Single brain lesion on Gallium-67 scan in a patient with FUO: A Case Report and Review of the Literature

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Abstract

We present the case of false-positive Gallium-67 (Ga-67) accumulation in the brain in a patient with fever of unknown origin (FUO) and review other cases of abnormal Ga-67 brain uptake reported in the literature. A 79-year-old patient with history of aortic valve replacement and Enterococcus bacteremia underwent Ga-67 scan for detection of possible source of prolonged fever. Whole body Ga-67 scan revealed a focal area of increased tracer accumulation in the left fronto-parietal region. Tomographic images showed focal area of abnormal tracer accumulation in the parietal lobe of left hemisphere. A diagnosis of septic embolus was suggested. Brain computerized tomography (CT) visualized a typical appearance of subacute stroke in the same area. This case demonstrates lack of specificity of Ga-67 brain uptake and value of correlation with conventional imaging modalities. Keywords: fever of unknown origin, Gallium-67 scan, brain lesion, stroke

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Introduction

Fever of unknown origin remains one of the most common and difficult diagnostic problems for the clinician. In the presence of nonspecific physical examination findings and laboratory results, imaging modalities are very helpful for the localization of the disease. Although radiological techniques provide excellent anatomical information,

nuclear medicine procedures can assess the pathological process based on metabolic and pathophysiologic tissue changes. Several radiopharmaceuticals are proposed for scintigraphic evaluation of patients with FUO including Gallium 67 Citrate, labeled leucocytes and FDG-PET (FDG). Ga-67 citrate plays a role as a tumor imaging agent, it lacks specificity as a result of uptake into sites of infection and inflammation. It is traditionally used for the management of patients with FUO (1, 2). The lack of specificity appears to be an advantage, as it can be of use in all FUO cases.

Case report

A 79-year-old man with aortic valve replacement was hospitalized due to fever for two weeks prior to admission. Physical examination was normal. Laboratory tests showed leukocytosis. Blood culture revealed Enterococcus bacteremia. As a result bacterial endocarditis was suspected, but no vegetations were found on echocardiography.

A whole body Ga-67 scan was performed (not shown) revealing a focal area of increased tracer uptake in the left frontoparietal region. No other area of abnormal Ga-67 accumulation was noted. SPECT study showed focal area of abnormal tracer accumulation in the parietal lobe of the left hemisphere. A diagnosis of septic embolus was suggested (Figure 1). Brain CT demonstrated a typical appearance of subacute stroke in the same region (Figure 2).

Discussion

The exact mechanism of Ga-67 accumulation is unknown. The distribution of this radiopharmaceutical after intravenous administration depends on various factors including blood supply, bacterial uptake, binding to leucocytes, transferrin receptors and cytoplasmic proteins such as ferritin and lactoferrin (3).

Multifactorial mechanisms of Ga-67 uptake may explain this tracer accumulation in different pathological conditions: tumors such as lymphoma, germinoma, glioblastoma, meningioma and secondary malignancies (4). Infections: such as toxoplasmosis (5), nocardia abscess

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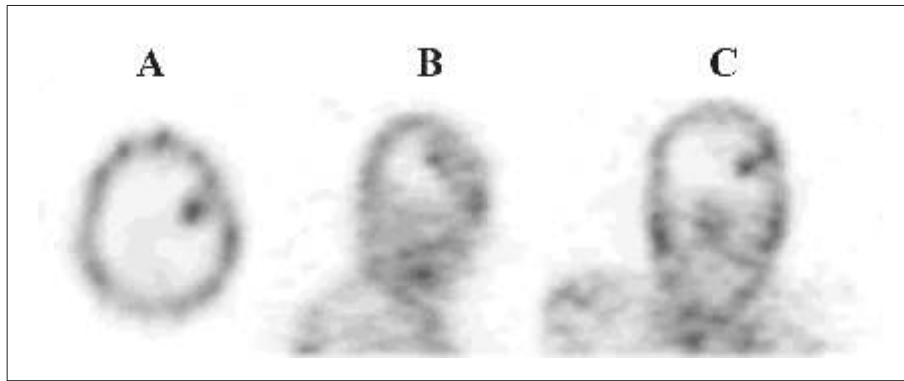


Figure 1. Ga-67 SPECT study of Brain, axial (A), sagittal (B) and Coronal (C) views. A focal area of abnormal increased radio tracer accumulation is noted in the parietal lobe of the left hemisphere.

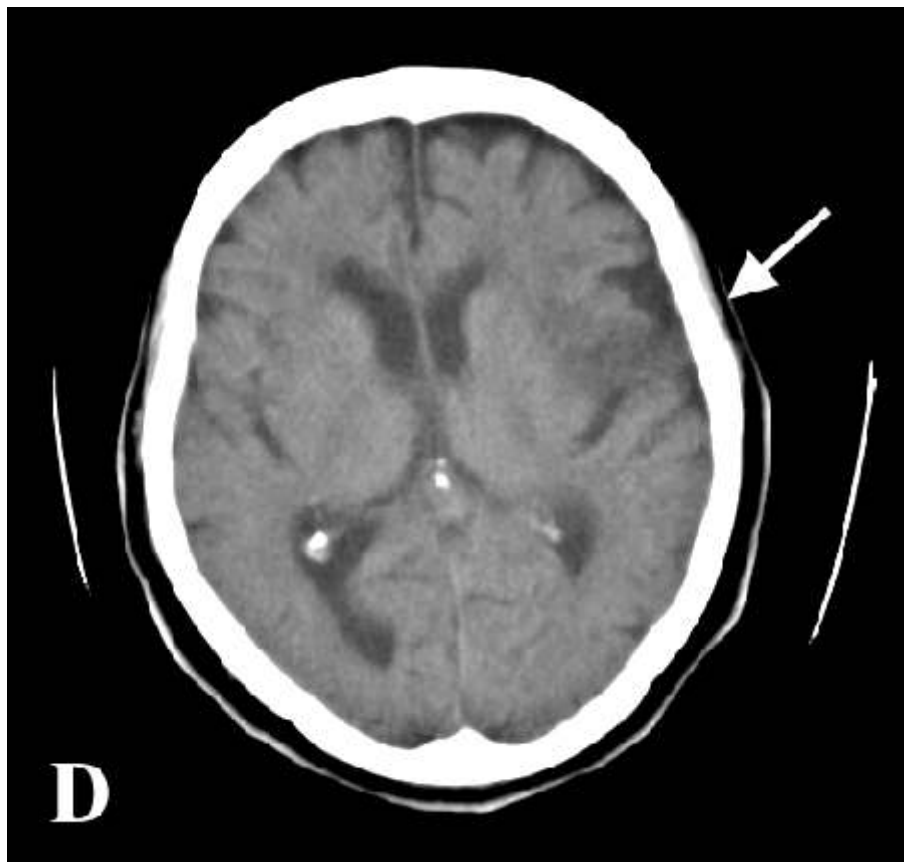


Figure 2. Brain CT demonstrated a typical appearance of subacute stroke in the same region (as seen in Figure 1)

(6), aspergillosis (7), tuberculosis, cryptococcus infection (8), cerebritis and meningitis (9) and other disorders such as sarcoidosis (10) and granulomatous hypophysitis (11).

Many case reports with pathologic intracranial Ga-67 accumulation have been previously described. Several authors reported the variable Ga-67 concentration in cases of cerebro vascular accidents (9, 12), possibly caused by blood brain barrier insufficiency (13).

Review of the literature and this particular case show that Ga-67 accumulation in brain lesions is extremely nonspecific and cannot distinguish between tumor, infection and previous cerebral infarction.

In conclusion, management of all patients with intracranial findings on Ga-67 scan should include clinical evaluation

and radiologic examinations (such as CT and MRI).

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