

Large renal carbuncle mimicking intra-abdominal neoplasm on Ga-67 scintigraphy: A case of fever of unknown origin

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ABSTRACT

Fever of unknown origin is still a medical challenge. ^{67}Ga single photon emission computed tomography/computed tomography images are commonly used to evaluate the final diagnosis of fever of unknown origin. We presented a case of fever of unknown origin undergone ^{67}Ga scintigraphy and an intra-abdominal ^{67}Ga avid tumor was detected which suspected to be a neoplasm. Further contrast enhanced computed tomography revealed that the lesion was a large renal carbuncle. We concluded that the contrast-enhanced CT or single photon emission computed tomography/computed tomography with contrast enhancement can be performed to further improve diagnostic performance.

Keywords: Fever of Unknown Origin; Gallium Scintigraphy; Neoplasm; Renal Carbuncle

1. INTRODUCTION

Fever of unknown origin (FUO) remains to be a medical challenge despite nowadays technical improvements. It has evolved with time and now has covered wider diagnostic entities including HIV-associated FUO, neutropenic FUO and nosocomial FUO [1]. The diagnosis is made if three outpatient visits or 3 days in the hospital without elucidation of a cause or 1 week of intelligent and invasive ambulatory investigation [1,2]. Despite subsequent evaluations by many tools, up to 50% of cases with FUO reach no final diagnosis [2]. Literatures have indicated that various nuclear medicine images play an important role in investigating FUO [3], among these diagnostic images, ^{67}Ga scintigraphy is a valuable examination and is still used widely [4]. This is because

that both inflammatory disorders and some neoplasms can be detected by ^{67}Ga scintigraphy and FUO may be caused by various malignancies. However, this may also tell us that we may not be able to differentiate inflammation from neoplasm on ^{67}Ga scintigraphy. We reported a case with FUO underwent ^{67}Ga scintigraphy with ^{67}Ga avid renal carbuncle mimicking an intra-abdominal neoplasm.

2. CASE REPORT

A 51-year-old man complained of fever for 3 weeks despite out-patient investigations. The cerebrospinal fluid analysis, chest films and abdominal ultrasonography showed negative results. A serum C-reactive protein was 13.86 mg/dL. ^{67}Ga whole body scintigraphy was arranged and the images were taken 65 hours after 6.1 mCi (225.7 MBq) intravenous ^{67}Ga citrate. The planar image revealed dense ^{67}Ga accumulation in left upper abdomen (**Figure 1(a)**) and the single photon emission computed tomography/computed tomography (SPECT/CT) revealed that the radiotracers were located at a tumor (**Figures 1(b)** and **(c)**). It was unable to differentiate whether it was renal origin or not. Subsequent abdominal contrast-enhanced computed tomography (CT) revealed that the ^{67}Ga avid tumor was a renal cyst (**Figures 2(a)** and **(b)**) and a renal calculus was also noticed in the cyst. Previous abdominal CT also demonstrated the renal calculus, however, the cyst was smaller. A mid-stream urine culture yielded *Escherichia coli* of 7000 colony forming units per mL. The patient received daily intravenous ceftriaxone 2000 mg and he defeverized after the antibiotic treatment.

3. DISCUSSION

^{67}Ga scintigraphy is a common clinical strategy for pa-

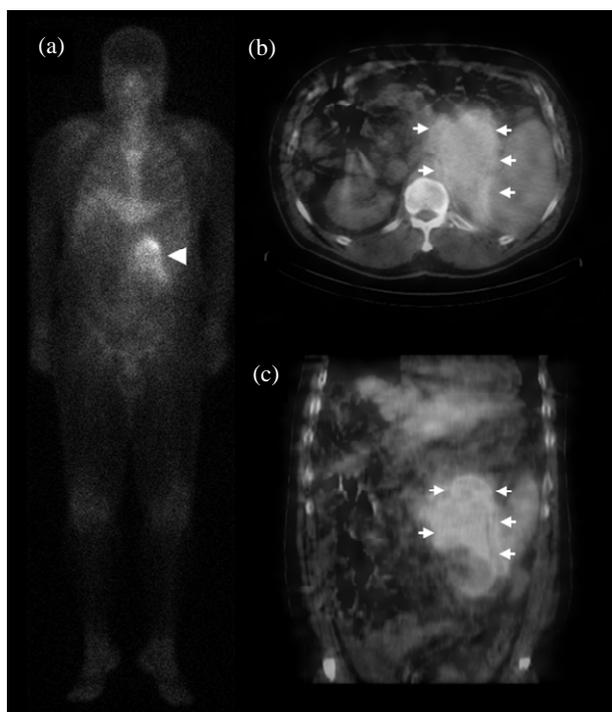


Figure 1. ^{67}Ga whole body scintigraphy: Planar image (a) revealed dense heterogeneous ^{67}Ga accumulation in left upper abdomen (Arrowhead). The trans-axial (b) and coronal (c) SPECT/CT images demonstrated that the ^{67}Ga avid lesion was located at a tumor above or at left kidney (Arrow).



Figure 2. The contrast enhanced computed tomography in coronal section (a) and sagittal section (b) showed a large renal cyst measured to be 7×6 cm (Arrow) at upper pole of left kidney, there were many small cystic lesions in the capsule. There was a nephrolithiasis (Arrowhead) in the sagittal section.

tients with FOU. ^{67}Ga behaves like iron and can bind to lactoferrin and siderophore, molecules present at site of inflammation and many neoplasms. According to the literature, ^{67}Ga scintigraphy can be helpful in diagnostic evaluation in 29% of cases with FOU [4]. Among the patients reach final diagnosis from ^{67}Ga scintigraphy, mostly (54%) are infectious, followed by neoplasm (19%) and inflammatory or rheumatologic (16%) [5]. Modern use of integrated SPECT/CT can significantly improve

26% of scan interpretation compared to planar image or SPECT image along [6]. Evidence also suggested that the application of SPECT/CT on ^{67}Ga scintigraphy can further improve diagnosis, localization and definition of extent of disease [7]. In our patient, SPECT/CT localized the lesion successfully; however, the images provided insufficient information to determine the nature of tumor. Further contrast-enhanced CT gave more detailed tissue vascularity information and the final diagnosis was made. Although the integration of CT into SPECT provides anatomical information to functional ^{67}Ga images, non-contrast enhanced CT lacks the information of vascularity, which is important in differentiating different type of tissues. Thus, with addition of contrast enhanced CT or even performing SPECT/CT with contrast enhancement may further improve the diagnostic performance of FOU.

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