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Pitfall of 18F-FDG PET/CT in Characterization of Relapsed Multisystem Lymphomatoid Granulomatosis

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Abstract

We present serial 18F-FDG PET/CT findings in a case of Epstein-Barr virus (EBV) positive pulmonary lymphomatoid granulomatosis, WHO grade 3. The patient experienced transient complete response to R-CHOP chemotherapy and subsequent multi-system recurrence, predominately involving the subcutaneous region of the torso on 18F-FDG PET/CT. Biopsy of the most hypermetabolic subcutaneous lesion demonstrated EBV negative cutaneous lymphomatoid granulomatosis, WHO grade 1. This report highlights the role of 18F-FDG PET/CT in characterizing and monitoring disease progression and regression, as well as its limitation in accurate grading of multisystem recurrence given the diversity of clinical and histopathological features of lymphomatoid granulomatosis.

Introduction:

Lymphomatoid granulomatosis (LYG) is a rare T cell rich, Epstein-Barr virus (EBV) associated B-cell lymphoproliferative disorder, predominately involving the lung (*1*). Accurate grading information of this abnormality determines clinical management and prognosis. 18F-FDG PETCT plays an important role in staging of LYG and monitoring response to therapy, as well as guiding of biopsy (*2*).

Case report:

This study was approved by institutional review board and the requirement to obtain informed consent was waived. A 65 year old man presented with multiple pulmonary nodules and underwent left lower lobe pulmonary wedge resection. Histopathology confirmed World Health Organization (WHO) grade 3 pulmonary LYG with atypical EBV positive large B cells. A staging 18F-FDG PET/CT demonstrated bilateral lung multiple hypermetabolic nodules (Fig 1. A). Patient received 6 cycles of rituximab, cyclophosphamide, doxorubicin, vincristine and prednisone (R-CHOP) chemotherapy. Post-therapeutic 18F-FDG PET/CT showed resolution of all lung lesions, indicating a complete response to therapy (Fig 1. B). Seven months later, the patient presented with left ear pain and subcutaneous nodules. A re-staging 18F-FDG PET/CT demonstrated numerous hypermetabolic

subcutaneous nodules in the torso and one left lung hypermetabolic nodule (Fig 1. C). Brain MRI showed a left trigeminal nerve enhancing lesion which was also 18F-FDG avid (Fig. 2 A-C) and presumed to be central nervous system involvement by LYG. Excisional biopsy of the most 18F-FDG avid right anterior chest wall subcutaneous nodule (Fig. 3 A&B) demonstrated EBV negative subcutaneous LYG, WHO grade 1. Patient declined lung biopsy and additional chemotherapy. Palliative radiation therapy was delivered for symptomatic trigeminal neuralgia.

Discussion: LYG predominantly affects lungs (>90%), followed by skin (25-50%), kidney (32-40%) and central nervous system (20-30%) (*1*). The clinical behavior of LYG is highly variable with approximately 12% of cases progressing to malignant lymphoma. Chemotherapy regimens for diffuse large B-cell lymphoma, such as R-CHOP, have shown promising therapeutic effect for high mortality grade 3 pulmonary LYG (*3*).

Histopathological diagnosis of LYG relies on the cytologic atypia and density of clonal EBV-positive B cells from the lung specimen (*1*). In a sparse amount of reported concomitant cutaneous LYG cases, up to 50% showed absence of EBV, indicating discordant grading between cutaneous and lung lesions (*4, 5*).

Therefore, the grading based on cutaneous specimen histopathology in current case is not reliable in predicting clinical course or guiding management.

Conclusion: 18F-FDG PET/CT is a useful imaging tool in surveillance of LYG, but lack of accuracy in grading LYG given the variability of EBV positivity and diversity of clinical features in cutaneous lesions. Lung lesion tissue specimen histopathology is the reliable grading method in relapsed multisystem LYG.

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Figure legend

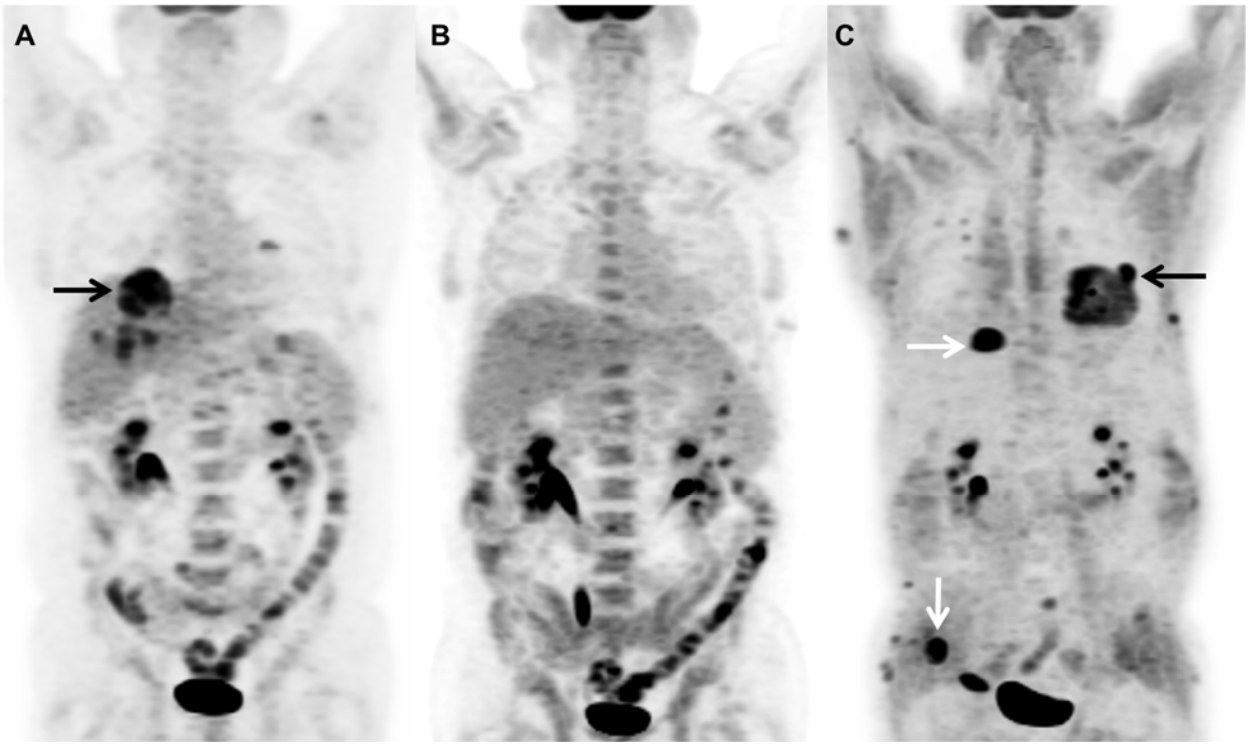

Figure 1. Staging 18F-FDG PET/CT showed multiple hypermetabolic lung lesions (arrow in A). After 6 cycles of R-CHOP therapy, all lesions resolved (B). Seven months later, a re-staging 18F-FDG PET/CT (C) showed recurrent multiple subcutaneous hypermetabolic lesions (white arrows) and one left lung hypermetabolic nodule (black arrow).

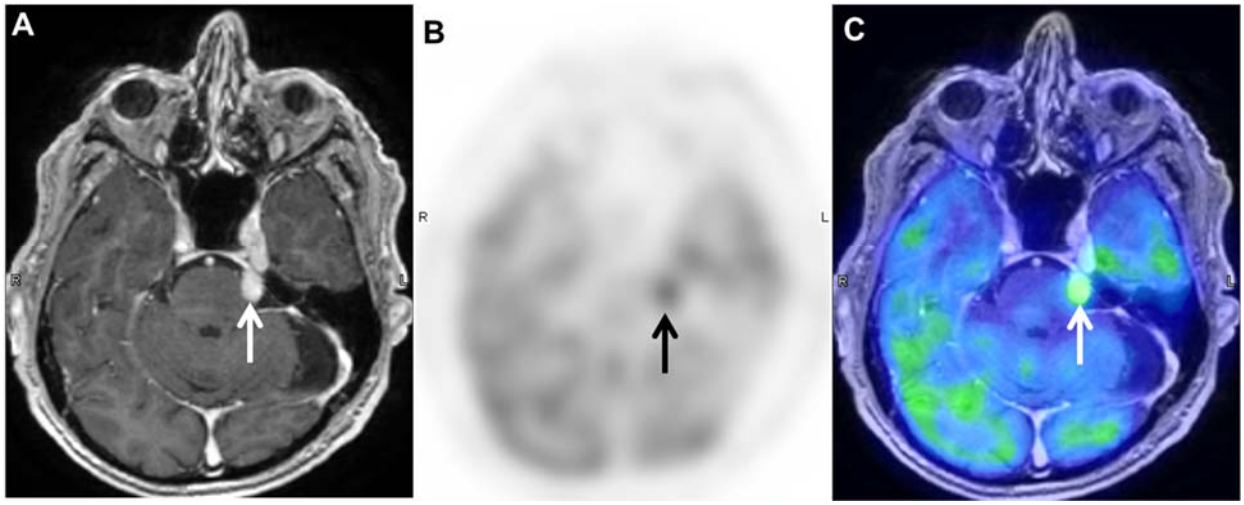

Figure 2. Contrast enhanced brain MRI showed enhancing lesion involving left trigeminal nerve (arrow in A), which was 18F-FDG avid with SUVmax 6.3 on restaging 18F-FDG PET image (arrow in B) and fused MR/PET image (arrow in C).

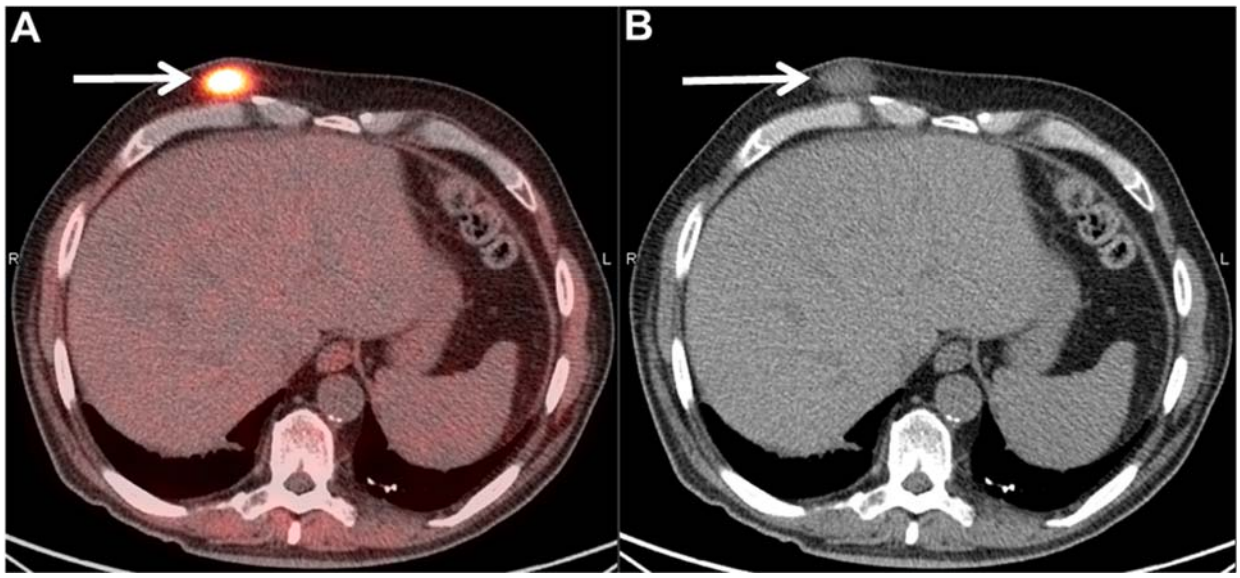

Figure 3. Restaging 18F-FDG PET/CT (arrows in A & B) images showed right anterior chest wall subcutaneous FDG-avid nodule with SUVmax 10.3. Excisional biopsy confirmed cutaneous LYG, WHO grade 1.