Visualisation of the inflammatory process in Behçet's disease using fluorodeoxyglucose positron emission tomography: a case report

Sirs,

A 54-year-old Korean female with a history of recurrent oral and genital ulcerations, erythema nodosum-like skin lesions and arthralgias was diagnosed with an incomplete type of Behçet's disease (BD) two years prior to presentation according to the diagnostic criteria outlined by the International Study Group for BD and BD Research Committee of Japan (1, 2). Following diagnosis, the patient had been treated intermittently for BD symptoms at several private clinics. She had also been treated for binocular cataracts with focal visual field defects for five years.

On initial presentation, a patient index score of BD was calculated using the BD Current Activity Form and was determined as 4 out of 12 given the presence of mouth ulceration, genital ulceration, arthralgias, and arthritis which had manifested over the past four weeks (3). Ophthalmologic evaluation failed to identify any active inflammatory processes associated with BD. Laboratory tests including complete blood count, blood glucose, renal and liver function tests, erythrocyte sedimentation rate (ESR), C-reactive protein, anti-streptolysin O titers, rheumatoid factor, anti-cyclic citrullinated peptide antibodies, antinuclear antibodies, venereal disease research laboratory tests, and HLA B51 genotyping were obtained. Results were unremarkable with the exception of an elevated ESR of 27 mm/hour (normal range, ≤20 mm/hour).

A whole body ^{18}F-fluorodeoxyglucose positron emission tomography (FDG PET) scan was performed to exclude the possibility of large vessel vasculitis, gastrointestinal system involvement and associated occult malignancies. On the day of FDG PET examination, the patient had painful ulcerations on the pharynx and vulva, and also complained of joint pain in both shoulders and knees as well as intermittent swelling of the left knee. The patient was instructed to fast for a minimum of four hours prior to administration of the radiotracer. Scanning was initiated 60 minutes after the intravenous administration of approximately 370 MBq of FDG. Images were obtained on an advanced PET scanner (GE Healthcare, Milwaukee, WI, USA), which acquired data in a two-dimensional mode. Focal FDG uptake was detected in the retromandibular region of oropharynx, genital area, and left tibiofibular joint (Fig. 1). Diffuse FDG uptake was identified in bilateral knee and shoulder joints, suggestive of arthritis. A quantitative analysis using the standardised uptake value (SUV) was performed and uptake index, the ratio of maximum lesional SUV to mean liver SUV, was calculated and summarised in Table I. The FDG PET findings were anatomically correlated with clinical manifestations of active inflammatory processes which had presented over the course of four weeks.

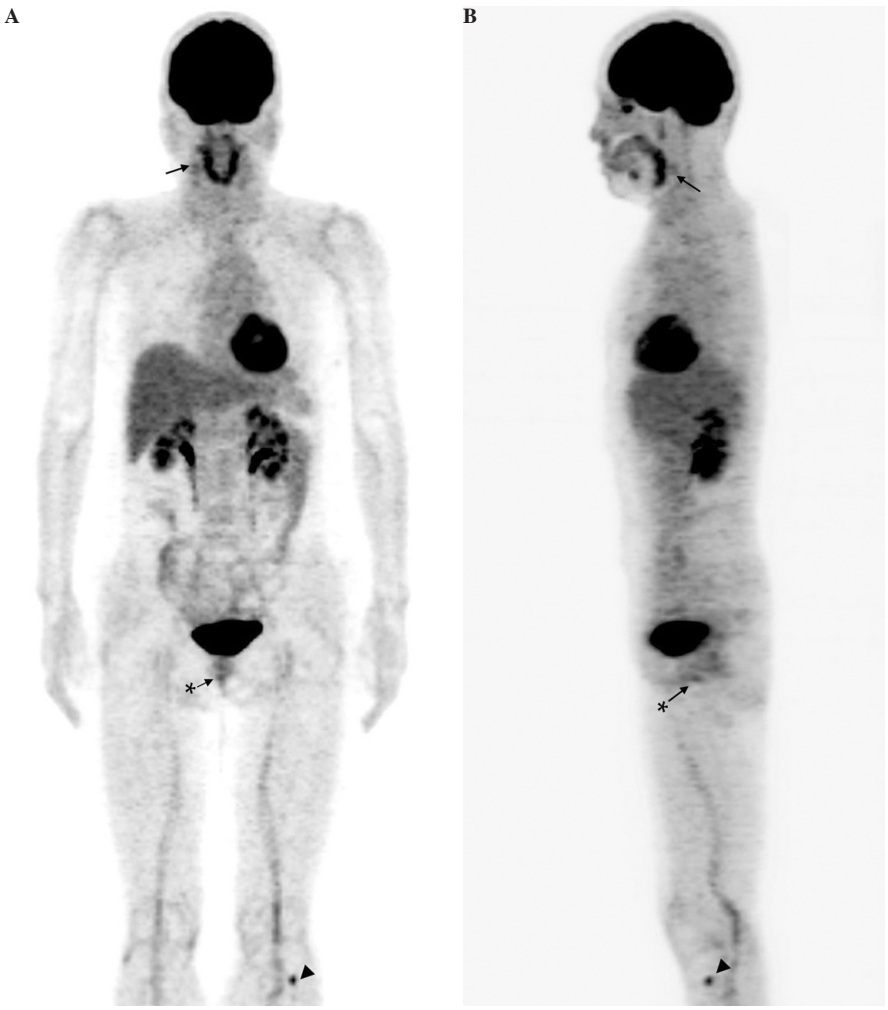

Fig. 1. ^{18}F-fluorodeoxyglucose (FDG) positron emission tomography (coronal (**A**) and sagittal (**B**) views of the 3D reconstructed image) showing focal FDG uptake in the retromandibular region of oropharynx (arrow), genital area (asterisk), and left tibiofibular joint (arrowhead) and diffuse FDG uptake in bilateral knee and shoulder joints suggestive of arthritis.

Table I. Quantitative analysis using standardised uptake value (SUV) of ^{18}F-fluorodeoxyglucose.

Sites	Maximum lesional SUV	Uptake intensity*
Oropharynx	4.36	2.25
Genitalia	2.85	1.47
Shoulder joints (right/left)	1.50/1.59	0.77/0.82
Knee joints (right/left)	1.97/2.41	1.02/1.24
Tibiofibular joint	3.70	1.91

*Uptake index refers to the ratio of maximum lesional SUV to mean liver SUV; mean liver SUV = 1.94

FDG PET and PET/computed tomography (CT) has been widely used for cerebral functional mapping in the field of neuroscience and as a whole-body imaging modality in clinical oncology. Moreover, several reports have described the clinical efficacy of FDG PET and PET/CT in numerous inflammatory diseases, including various arthridites, inflammatory bowel disease, vascular disorders, and BD (4-12). Investigations into the value of FDG PET in the diagnosis of rheumatoid arthritis with active inflammatory processes, extra-articular synovial cysts complicated by rheumatoid arthritis, and osteoarthritis with degenerative joints and synovitis have been published as presenting with FDG uptake (4-6). FDG PET and PET/CT have also proven their clinical efficacy in diagnosing various vascular disorders, such as Takayasu's arteritis, arteriosclerotic vascular disease, polymyalgia

rheumatica, systemic lupus erythematosus, polyarteritis nodosa, Wegener's granulomatosis and giant cell arteritis, with high sensitivity and specificity (4, 7-9).

BD is a systemic inflammatory disease considered to be a type of vasculitis. Recurrent oral and genital ulceration, erythema nodosum-like skin lesions or pseudofolliculitis, ocular lesions and joint involvement are the most frequently observed major and minor symptoms of BD. To date, there have been a few investigations describing the clinical efficacy of using FDG PET or PET/CT in detecting systemic involvement in BD patients (10-12), including reports describing the clinical use of FDG PET in patients with neuro-BD and a report regarding the inflammatory activity of pulmonary artery aneurysms detected by FDG PET/CT in a BD patient. However, FDG PET evaluation has not been emphasised for associated mucocutaneous and articular inflammatory processes, despite their high prevalence.

In this report, although FDG PET was performed to exclude the possibility of vascular or gastrointestinal system involvement and associated occult malignancies, FDG uptake was identified to reflect inflammatory activity in the mucocutaneous and articular tissues in this patient with BD. We believe that because BD theoretically affects all sizes and types of vessels in various systems and carries the possibility of malignant transformation (13), FDG PET, which has the ability to scan the entire body, may have clinical value as a baseline workup study for BD. However, our findings do not indicate that FDG PET is necessary for BD patients because there is no comparison study regarding the cost-effectiveness between using FDG PET and conventional imaging modalities.

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