Case Report

Bilateral trigeminal nerve recurrence of non-hodgkin lymphoma revealed with FDG PET/CT

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ABSTRACT

Bilateral trigeminal nerve involvement is a rare presentation of Non-Hodgkin lymphoma (NHL). The trigeminal nerve, also called the fifth cranial nerve, leaves the brainstem and exits the base of the skull to supply sensation to the face. In this case, we present a case of a 63-year-old male patient with a history of NHL and a more recent history of headache and trigeminal neuralgia. The patient underwent PET/CT demonstrating bilateral increased FDG uptake in trigeminal nerves.

Keywords: FDG PET, neurolymphomatosis, trigeminal nerve involvement

INTRODUCTION

Infiltration of the nervous system by hematological malignancy, generally lymphoma, is termed as neurolymphomatosis (NL). It's mostly seen in B-cell lymphomas and rarely in T-cell lymphomas. It's a rare clinical entity. Seventy-two cases of NL caused by NHL were identified in the most comprehensive review that was reported during a 28-year period.[1] Neurolymphomatosis is typically presented as neuropathy that may affect cranial nerves, nerve roots/plexus or peripheral nerves with the predilection of the brachial and lumbar plexuses, along the course of peripheral nerves of the extremities, and the trigeminal nerve root.[2] Diagnosis of NL is difficult because of the variable presenting symptoms and wide differential diagnosis including the viral, inflammatory or paraneoplastic neuropathy, (cranial) neuritis multiplex, leptomeningeal lymphomatosis, nerve root compression, disc herniation, radiochemotherapy, lymphoma-associated vasculitis and degenerative joint disease.[3] Nerve biopsy may show negative results despite the widespread lymphomatous infiltration of peripheral nerves. Furthermore, performing a biopsy of the involved nervous structure may result in permanent nerve damage; in addition, it may be difficult to obtain, especially in central localizations.[4] Cerebrospinal fluid (CSF) cytology and bone marrow examination may be negative also.[5,6] Although, magnetic resonance imaging (MRI) typically shows enlargement and enhancement of affected nerves, it does not always provide optimal visualization of lymphomatous involvement of peripheral nerves.[1]

FDG PET/CT has been using increasingly in diagnosis, to guide sites for biopsy and in the assessment of response to therapy in NHL. By the help of CT component, it provides important information about anatomical details of less commonly involved peripheral nerves also, especially in cases with NL.[5,7,8]

CASE REPORT

A 63-year-old male patient treated for diffuse large B cell type NHL of left testis was in complete remission for 5 years. He presented with weakness, headache and trigeminal neuralgia to internal medicine. He was referred to Nuclear Medicine department for FDG PET/CT imaging to search for possible recurrence. For PET/CT examination, patient was intravenously injected 550 MBq of F18-FDG after 8 h of fasting period. After one hour of waiting period in a silent room, patient was imaged using an integrated PET/CT camera, which consisted of a 6-slices CT gantry integrated on a LSO based full ring PET scanner (Siemens Biograph 6). The injected dose, injection time and body weight were used to calculate the maximum standardized uptake values (SUVmax). PET and fusion images showed bilateral pathological intense FDG uptake in trigeminal nerves with a SUVmax of 16,6 [Figure 1, arrows]. There were also increased FDG accumulation (SUVmax = 6,4) at the D1 spinal nerve root and slightly increased tracer uptake located at spinal

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Website: www.ijnm.in

DOI: 10.4103/0972-3919.125778

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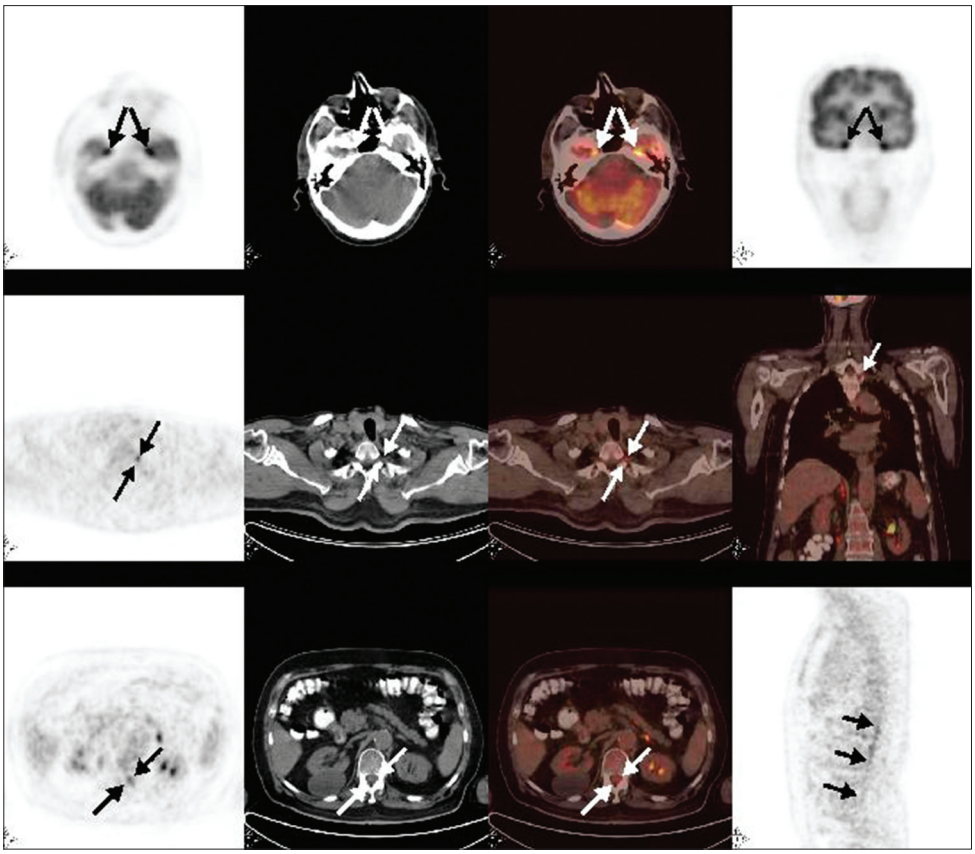

Figure 1: PET and fusion images showed bilateral pathological increased FDG uptake in trigeminal nerves with a SUVmax of 8.9 (arrows) consistent with lymphoma involvement. There were also increased FDG accumulation (SUVmax = 6,4) at the D1 spinal nerve root and slightly increased tracer uptake at the spinal cord located from the level of D12 to cauda equine suggestive of disease recurrence

cord between the level of D12 and cauda equina. Cranial MRI revealed thickening of bilateral 5th cranial nerve [Figure 2a and b]. Spinal MRI demonstrated pathologic signal changes at the spinal cord between D12 level and cauda equina suspicious for lymphomatous involvement. Lumbar puncture was performed and cytopathology revealed lymphoma involvement. After administration of 6-cycles of intrathecal methotrexate, repeated CSF analysis was negative.

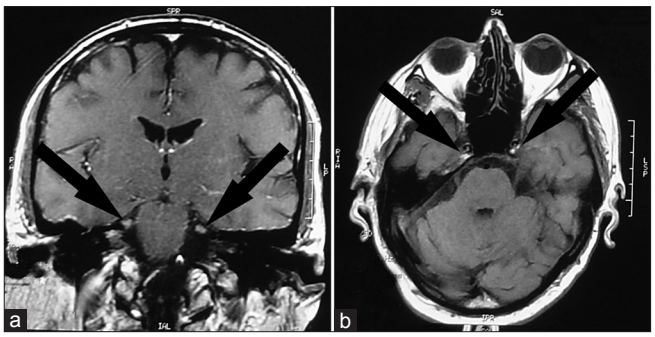

Figure 2: (a and b) Cranial MRI showed increased signal intensity and thickening of the trigeminal nerves (arrow), suspicious of lymphomatous involvement

DISCUSSION

Four clinical patterns of NL with decreasing frequency are painful polyneuropathy or polyradiculopathy, followed by cranial neuropathy, painless polyneuropathy, and peripheral mononeuropathy. In the case of delayed diagnosis or ineffective empiric treatment, it may progress over weeks to several months.[9] Cranial neuropathy is a rare presentation of NL which is sometimes hard to diagnose using the conventional imaging modalities. Diagnosis of NL depends on histopathological examination showing the infiltration of affected nerves by malignant lymphocytes.[4] Nerve biopsy may not be feasible when deep-seated roots or cranial nerves are involved and is often nondiagnostic.[10] CSF cytopathological examination may be helpful in a few cases of NL accompanied by meningeal dissemination which constitute 20-40% of patients. Hence imaging methods play an important role for diagnosis of NL. Although MRI is the most commonly used imaging method of NL and typically shows enlargement and enhancement of affected nerves after gadolinium administration, it does not always provide the optimal visualization of lymphomatous involvement of peripheral nerves.[1,2] F-18 FDG whole-body PET/CT imaging is useful for early diagnosis, identifying the distribution of neurolymphomatosis and determination of possible biopsy sites. FDG PET demonstrated NL as nodular or linear hypermetabolic lesions at the affected cranial nerves, nerve roots/plexus or peripheral nerves.[10-12] Diagnostic yield of MRI and FDG-PET was reported as 77% and 84%, respectively in

NL patients.[2] However, both imaging techniques have diagnostic limitations such as false positivity in infection or inflammation.[6] NL is a challenging diagnosis however PET/CT imaging may allow for accurate determination of the extent of the disease, as in our case.

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How to cite this article: Yılmaz S, Sağer S, Şen F, Halac M. Bilateral trigeminal nerve recurrence of non-hodgkin lymphoma revealed with FDG PET/CT. Indian J Nucl Med 2014;29:50-2.

Source of Support: Nil. **Conflict of Interest:** None declared.