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Case report

# Neurolymphomatosis detected by $^{18}$F-FDG PET/CT scan – a case report

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## Abstract

Lymphoma involvement of the peripheral nerves is a rare clinical presentation of non-Hodgkin lymphoma. We report the case of a 59-year-old woman with the defect of peripheral motor neuron admitted for PET/CT scan. The scan disclosed increased $^{18}$F-FDG activity along the brachial and lumbar plexuses together with very intense $^{18}$F-FDG uptake in the cervical lymph node masses. The diagnosis, based on the subsequent histopathologic lymph node examination, was diffuse large B-cell lymphoma.

**Key words: neurolymphomatosis, $^{18}$F-FDG PET/CT scan, diffuse large B-cell lymphoma**

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## Introduction

Infiltration of the peripheral nervous system by lymphoma is a very rare clinical presentation of nervous system lymphoma. It involves lymphocytic infiltration of roots, plexuses, or nerves. [1]. The entity was first described and termed "neurolymphomatosis" (NL) in 1934 [2]. Diagnosis can be difficult since NL may mimic many conditions, and a clinical or histopathological diagnosis may not be established until autopsy [3]. We present a case of NL first diagnosed at the PET/CT scan.

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## Case report

We report the case of a 59-year-old woman who presented in our centre for $^{18}$F-fluorine-dexy-glucose (18F-FDG) PET/CT scan due to a defect of the peripheral motor neuron.

The patient had a history of squamous cell carcinoma of the uterine cervix, diagnosed 2 years previously and treated with brachytherapy.

One month ago the patient was hospitalized in the department of neurology due to a progressing weakness of the extremities on the left side and severe pain of the left arm. Subsequently, progressive palsy of the right upper extremity occurred. The neurological examination revealed left-sided paresis of the upper and lower extremities. Diagnostic tests involving imaging techniques (computed tomography of the brain, magnetic resonance (MR) of the brain and cervical spine, abdominal ultrasonography) failed to disclose any relevant lesion responsible for the defect of the peripheral motor neuron.

On the day of the PET/CT scan the patient appeared conscious with pain in the right arm and paralysis of both upper extremities and left lower extremity. She complained of difficulty swallowing and loss of weight of 20 kg in two months. On physical examination, a prominent palpable tumour on the right side of the neck was found. The PET/CT scan revealed intensive $^{18}$F-FDG activity (SUVmax $^{18}$F-FDG = 18.5) in the enlarged lymph nodes of the neck on the right side and in the mediastinum (Figure 1). The metabolically active mass involved the area of the right brachial plexus. Additionally, increased 18F-FDG activity ($SUV_{max}$ $^{18}$F-FDG = 8.1) along the nerves in the left brachial plexus as well as both lumbar plexuses was observed (Figure 2 and 3). Because of the unusual enlargement of the lymph nodes with very high activity of $^{18}$F-FDG, we concluded that a malignant lymphoma with involvement of the peripheral nerves was the most likely diagnosis. This was confirmed by histopathological examination of a resected cervical lymph node that revealed diffuse large B-cell lymphoma (DLBCL). The patient was sent to the department of haematology for rescue chemotherapy.

## Discussion

Neurological dysfunction in patients with lymphoma is not uncommon, but it is usually attributed to central nervous system involvement. Differential diagnosis of NL should also include post-

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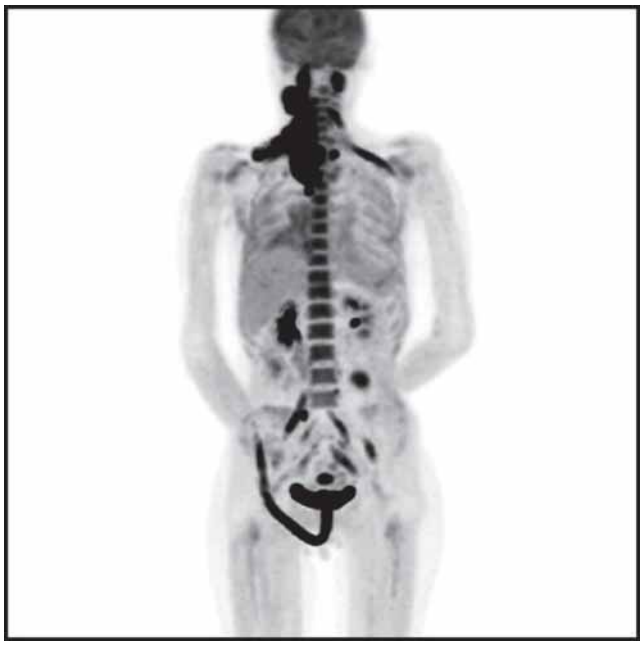

**Figure 1.** Maximum intensity projection (MIP) image showing intense $^{18}$F-FDG activity in the right cervical and mediastinal lymph nodes. Longitudinal areas of $^{18}$F-FDG uptake correspond to the nerves of the brachial and lumbar plexuses. Note also activity in the urinary bladder catheter.

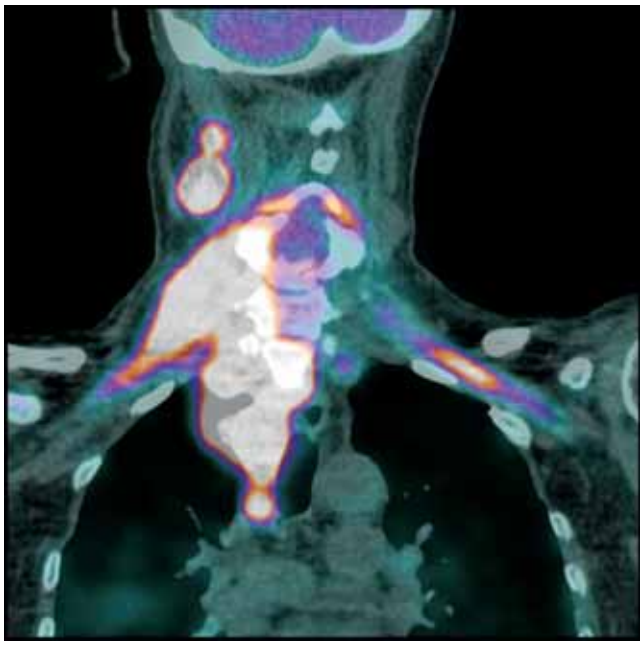

**Figure 2.** PET/CT scan showing increased activity in the lymph node masses of the neck and mediastinum on the right side and the brachial plexus in the left subclavian region.

chemotherapy polyneuropathy, especially after treatment with vinca alkaloids [4], consequences of plexus irradiation, and paraneoplastic and Guillain-Barre syndromes [1, 5].

The diagnostic method of choice of NL, nerve biopsy, is difficult and often fails because of patchy involvement of the nerves.

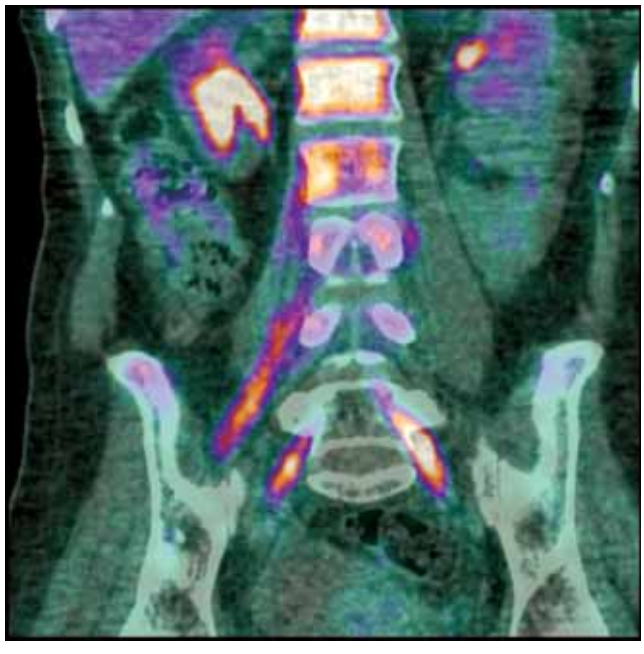

**Figure 3.** PET/CT scan showing increased $^{18}$F-FDG activity in three nerve roots of the lumbar plexus on both sides of the vertebral column.

MR may be not sensitive enough to identify small lesions in the affected nerves [6]. In our case, $^{18}$F-FDG PET/CT demonstrated involvement of the neural structures that had not been reported in morphological imaging techniques (MR). Together with histopathological examination of the lymph node, the PET/CT scan substituted the nerve biopsy.

Our case confirms the diagnostic utility of PET/CT in the detection of NL. This imaging technique has opened the way to the correct diagnosis and treatment of this life-threatening condition. However, there have been a few reports of NL in patients without any sign of the lymph node disease detected on an $^{18}$F-FDG PET scan [7–10]. In these case reports, the diagnosis would have been even more difficult without PET.

The well-known utility of PET/CT in the evaluation of treatment response of lymphoma was also confirmed in patients with NL [3, 11]. As our patient is currently under chemotherapy, we are going to follow-up the case to evaluate the treatment response and the final outcome.

Another, more general teaching point is that despite development of modern diagnostic tools, thorough physical examination remains crucial in providing the right diagnosis — the obvious cervical lymphadenopathy did not alert clinicians who were concentrating strictly on the neurological symptoms.

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