QJM: An International Journal of Medicine, 2019, 695–697

doi: 10.1093/qjmed/hcz148
Advance Access Publication Date: 21 June 2019
Case report

CASE REPORT

Neurosarcoidosis and infliximab therapy monitored by ^{18}FDG PET/CT

E. Rivière[1,2], P. Schwartz[3], I. Machelart[1], C. Greib[1], J.-L. Pellegrin[1,4], J.-F. Viallard[1,2] and E. Lazaro[1,4]

From the [1]Department of Internal Medicine and Infectious Diseases, Haut-Leveque Hospital, University Hospital of Bordeaux, 33604 Pessac, France, [2]INSERM U1034, University of Bordeaux, Pessac, France, [3]Nuclear Medicine Department, Haut-Leveque Hospital, University Hospital of Bordeaux, 33604 Pessac, France and [4]CIRID, UMR/CNRS 5164, University of Bordeaux, Bordeaux, France

Address correspondence to Dr Etienne Rivière MD, PhD, MA(Ed), Department of Internal Medicine and Infectious Diseases, Haut-Leveque Hospital, University Hospital of Bordeaux, 1 Avenue Magellan, 33604 Pessac, France. email: etienne.riviere@chu-bordeaux.fr

Learning points for clinicians

- Neurosarcoidosis is a severe disease affecting young adults with a mortality rate of 5%.
- Cranial nerve palsy, spinal cord disease, seizures or headaches are the main symptoms.
- ^{18}FDG PET/CT is useful in diagnosing neurosarcoidosis involving cranial nerves and in monitoring treatment response under tumor necrosis factor-alpha inhibitors, such as infliximab.

Background

Neurosarcoidosis is a challenging diagnosis because of the disease rarity and differential diagnoses that are common to multiple neurological disorders. The main neurological manifestations are cranial nerve palsy (63%), spinal cord disease (19%), seizures (17%) and headaches (17%).[1] Whereas cranial nerves including facial, optic or trigeminal nerves are commonly involved, glossopharyngeal and vagus nerve lesions are rarely reported (4%).[2] According to recently developed criteria,[3] in addition to clinical, biological and radiological evidence, histological analysis is mandatory to maintain a probable or definite diagnosis of neurosarcoidosis. However, the exact role of 18-fludeoxyglucose-positron emission tomography (^{18}FDG PET/CT) is still unclear in the diagnostic work-up. Here, we report the case of a 49-year-old man with sarcoidosis relapse presenting with glossopharyngeal and vagus nerve palsy, diagnosed by ^{18}FDG PET/CT, and successfully treated with infliximab.

Case report

A 49-year-old man was admitted to our unit in May 2017 for progressive dysphagia, dysphonia, Horner syndrome of the left eye and general health deterioration. Sarcoidosis of the lungs and mediastinal lymph nodes was diagnosed in 2015 following mediastinal lymph node biopsy and treated with steroids, but stopped prematurely at 11 months due to psychiatric side effects. Dysphonia, at the time thought to be related to compression of the left recurrent nerve by the lymph nodes, persisted despite steroid therapy. Physical examination at admission revealed an isolated right deviation of the tongue and soft palate (Figure 1). Routine biological tests demonstrated isolated lymphopenia (1.10^9/l). Brain magnetic resonance imaging and cerebrospinal fluid analysis were normal. ^{18}FDG PET/CT revealed significant hypermetabolism of the mediastinal lymph nodes, liver nodules, the roots of the ninth and 10th cranial nerves and the upper cervical ganglion (Figure 2A and B). Over 6 months, other diagnoses were eliminated and sarcoidosis relapse was confirmed. Prednisone (80 mg/day) and mycophenolate mofetil (3 g/day) were introduced, however tapering of prednisone at 6 months resulted in relapse. Mycophenolate mofetil was stopped, and infliximab (5 mg/kg) was added to prednisone (20 mg/day), which was further tapered (5 mg/day) after 4 months. Symptoms

Received: 3 June 2019; **Revised (in revised form):** 3 June 2019

progressively disappeared and ^{18}FDG PET/CT at 6 months demonstrated a complete remission of the disease (Figure 2C and D), which was also confirmed at 12 months.

Discussion

Neurosarcoidosis is a potentially severe disease affecting young adults with a mortality rate of 5%.[2] The mean age at onset is 43.[2] Neurological symptoms are observed in ~5% of patients with systemic sarcoidosis, but are the first signs of sarcoidosis in 50% of cases.[2] Even though facial, ocular, trigeminal and eighth nerves are frequently involved, overt lesions of the 9th and 10th cranial nerves and Horner syndrome are rare.[2] A lesion of the second neuron resulting from enlarged upper mediastinal lymph nodes or a collateral infiltration of the upper cervical ganglion could explain the Horner syndrome of our patient. Magnetic resonance imaging can be useful to diagnose brain, spinal cord, optic or eighth nerve lesions, but may miss lesions on other cranial nerves.[4] As illustrated here, advantages of ^{18}FDG PET/CT in sarcoidosis include:[1] providing evidence for the disease in very tiny regions such as cranial nerves;[2] establishing a pre-therapeutic map of affected organs; and[3] guiding the overall response to therapy.[5]

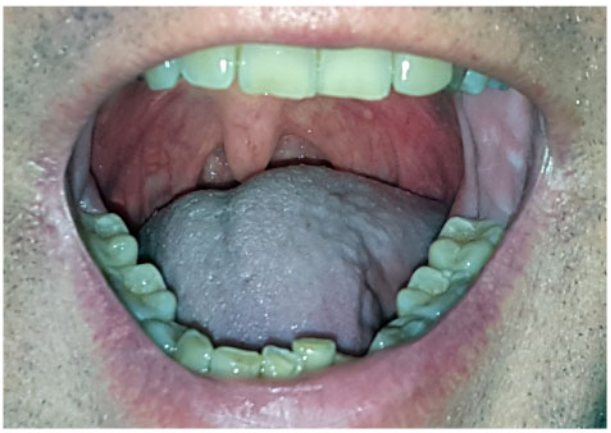

Figure 1. Right deviation of the tongue and soft palate related to left glossopharyngeal nerve (IX) palsy.

Our case also demonstrates that infliximab can control neurosarcoidosis. In a previously published retrospective study of 66 patients, 29% completely recovered, 48.5% partly recovered, 18% stabilized and 3% worsened.[6] Unlike our patient, 74% of patients had another non-biologic immunosuppressant and nearly all took steroids.[6] Of note, 56% of patients in remission relapsed at a median of 5.7 months once infliximab was suspended.[6]

Taken together, our report highlights the utility of ^{18}FDG PET/CT in diagnosing neurosarcoidosis involving cranial nerves and monitoring the treatment response under tumor necrosis factor-alpha inhibitors, such as infliximab.

Patient consent: The authors obtained patient's consent to publish his case.

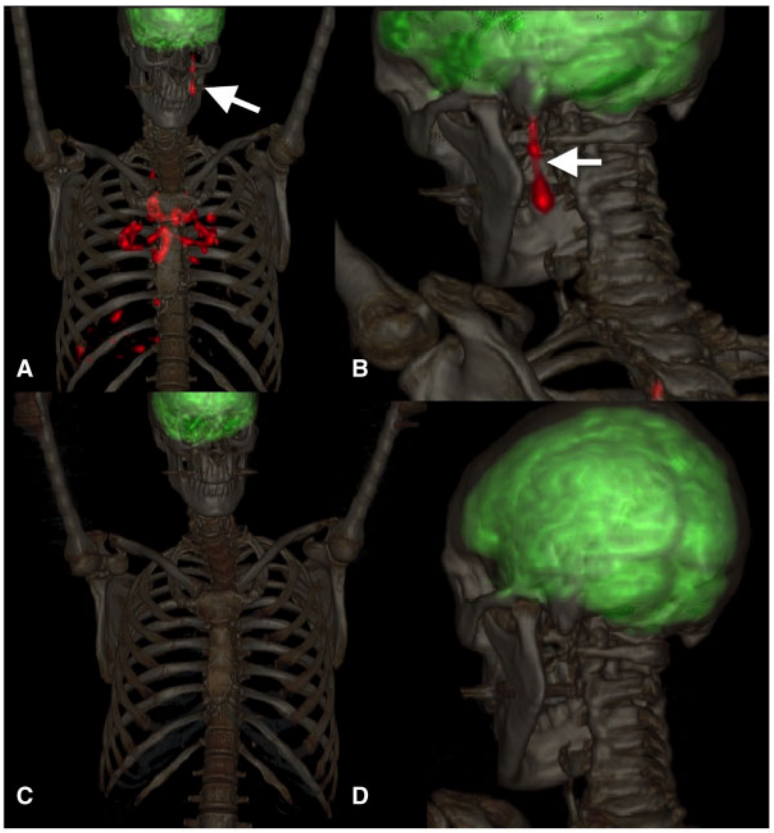

Figure 2. The 3D reconstruction of ^{18}FDG PET/CT images revealing ^{18}FDG uptake of mediastinal lymph nodes, liver nodules, the emergence of left glossopharyngeal and vagus nerves and the upper cervical ganglion related to sarcoidosis (**A**, arrow, zoomed in **B**, standardized uptake value of 8.4), with a complete remission at 6 months under infliximab therapy (**C**, zoomed in **D**).

Acknowledgements

The authors acknowledge the assistance of Tamar Aprahamian, Ph.D., of JetPub Scientific Communications LLC, in the preparation of this manuscript, in accordance with Good Publication Practice (GPP3) guidelines.

Funding

No funding received for this work.

Conflict of interest: None declared.

References

1. Pawate S, Moses H, Sriram S. Presentations and outcomes of neurosarcoidosis: a study of 54 cases. *QJM* 2009; **102**:449–60.
2. Fritz D, van de Beek D, Brouwer MC. Clinical features, treatment and outcome in neurosarcoidosis: systematic review and meta-analysis. *BMC Neurol* 2016; **16**:220.
3. Stern BJ, Royal W, Gelfand JM, Clifford DB, Tavee J, Pawate S, *et al*. Definition and consensus diagnostic criteria for neurosarcoidosis: from the Neurosarcoidosis Consortium Consensus Group. *JAMA Neurol* 2018; **75**:1546.
4. Kidd DP. Sarcoidosis of the central nervous system: clinical features, imaging, and CSF results. *J Neurol* 2018; **265**:1906–15.
5. Sobic-Saranovic D, Grozdic I, Videnovic-Ivanov J, Vucinic-Mihailovic V, Artiko V, Saranovic D, *et al*. The utility of 18F-FDG PET/CT for diagnosis and adjustment of therapy in patients with active chronic sarcoidosis. *J Nucl Med* 2012; **53**:1543–9.
6. Gelfand JM, Bradshaw MJ, Stern BJ, Clifford DB, Wang Y, Cho TA, *et al*. Infliximab for the treatment of CNS sarcoidosis: a multi-institutional series. *Neurology* 2017; **89**:2092–100.