

Case Report

## Multiple Sclerosis – Challenges in Diagnosis

Nur Ezzaty Mohammad Kazmin<sup>1</sup>, Hui Jan Tan<sup>2</sup>, Hana Maizuliana Solehan<sup>1</sup>, Fatimah Zanirah<sup>1</sup>, Wei Ming Tan<sup>1</sup>, M Firdaus A Bakar<sup>1</sup> and Sarah Zulaikha Samad<sup>1</sup>

<sup>1</sup>Department of Medicine, Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (USIM), Persiaran Ilmu, Putra Nilai, 71800 Nilai, Negeri Sembilan, Malaysia.  
<sup>2</sup>Department of Medicine, Hospital Canselor Tuanku Muhriz UKM, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Wilayah Persekutuan Kuala Lumpur, Malaysia.

Correspondence should be addressed to:

Nur Ezzaty Mohammad Kazmin; ezzatykazmin@usim.edu.my

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**Abstract** — Multiple Sclerosis is an inflammatory demyelinating disease that affects the central nervous system, and is uncommon among the Asian population. It can present with a variety of symptoms, depending on the location of the demyelinating plaques, which could also potentially mimic a range of neurological and non-neurological disorders. We report a 24-year-old woman who presented with recurrent non-specific lower limb numbness, without any other neurological symptoms or signs. The symptoms were presumed to be nonspecific, but they re-occurred eight months later, leading to a more extensive investigation, including whole spine and brain MRI. The MRI showed multiple white matter lesions that are hyperintense on T2W/FLAIR, seen at the right corona radiata, bilateral parietal lobes, right periventricular region and spinal cord, with a simultaneous presence of gadolinium-enhancing and nonenhancing lesions, fulfilling 2017 Mc Donald's diagnostic criteria for multiple sclerosis. After the careful exclusion of differential diagnoses, she was given pulsed IV methylprednisolone for 5 days, followed by oral teriflunomide. She improved partially, and at 2 months following discharge, she was tolerating the medication well with no further relapses.

**Keywords** — multiple sclerosis; numbness; challenge; diagnosis; non-specific.

### I. INTRODUCTION

Multiple sclerosis (MS) is the commonest chronic, inflammatory demyelinating disease that affects the central nervous system [1]. The worldwide prevalence varies between countries, and it primarily affects people of European descent. It is rare among Asians, black, and Native Americans [2]. In Malaysia, a single-centred study conducted at the largest tertiary hospital in Malaysia found that MS was uncommon, with only 104 patients diagnosed in between 2008 to 2013. They were predominantly females, with a 5:1 ratio, with Malays and indigenous people affected more commonly. Similar to studies on Caucasian, it affects mostly young adults with a mean age onset of 29 years old [3]. Herewith we report

a young patient who presented with recurrent vague symptoms over a few months' duration, the diagnostic approach, as well as challenges associated with reaching an early diagnosis.

### II. CASE REPORT

A 23-year-old female software developer with no known medical illness, first presented to the orthopaedic clinic in June 2018, with right lower limb numbness extending to the right hip, which was exacerbated by walking. Magnetic resonance imaging (MRI) was done to exclude lumbar nerve root compression. Since it was normal and the symptoms improved, she was discharged and reassured without further

follow-up. Eight months later, she presented again with bilateral lower limb numbness, which was worse on the right side, extending to bilateral hips. She denied any pain, weakness, or changes in bladder or bowel function. There was no history of fever, cognitive changes, visual disturbances, dysarthria, dysphagia or fatigue. Reviews of other systems were generally normal. There was no family history of neurological or autoimmune disease. She was admitted to the orthopaedic ward and MRI lumbosacral was repeated, showing only minimal posterior disc bulge of the lumbar spine, without significant spinal stenosis or nerve root impingement. She was referred to the neuromedical team for further evaluation. The neuromedical assessment revealed that the patient complained of numbness for the past three weeks. Since then, the numbness has ascended to the bilateral chest.

A neurological examination revealed patchy pinprick sensory loss over the left hemithorax up to the neck level, as well as bilateral anterior thighs, inconsistent with any peripheral nerve or dermatomal distribution. Gait, coordination, and the remainder of the motor examinations were all normal. The Romberg sign was not present. Deep tendon reflexes were present and normal, and the plantar response was flexor bilaterally. Otherwise, her vital signs were normal, and the rest of the systemic examination, (cardiovascular, respiratory, and abdominal examination) were also normal.

With the new neurological findings, albeit inconclusive, we obtained a repeat MRI to include the cervical and thoracic region, as well as nerve conduction study (NCS). The NCS results revealed L5-S1 radiculopathies. An MRI of the thoracolumbar region showed a short enhancing lesion at T6/T7 with mid cord oedema cranially. The brain MRI showed multiple white matter lesions which are hyperintense on T2W/FLAIR, seen at the right corona radiata, bilateral parietal lobes, and right periventricular region (Figure 1). A lumbar puncture and cerebrospinal fluid (CSF) examination were also arranged to exclude other differential diagnoses. A CSF fluid examination revealed clear, acellular fluid with normal protein and sugar. Bacterial latex agglutination was negative and CSF oligoclonal band was not detected. Serum Aquaporin-4 receptor antibody and Myelin oligodendrocyte glycoprotein (MOG) antibody were also sent, and turned out to be negative.

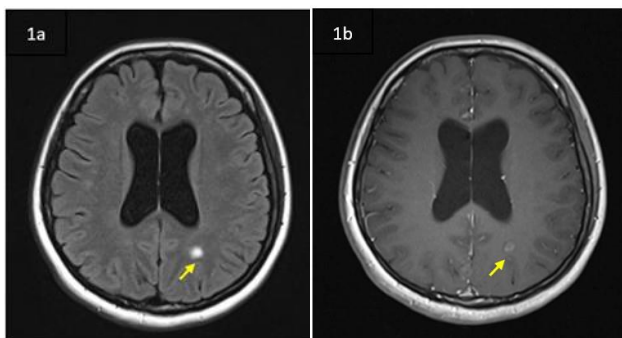


Fig. 1(a) shows a hyperintense lesion over the left corona radiata on T2/FLAIR MRI sequence, which shows post-contrast enhancement on the T1 sequence 1(b).

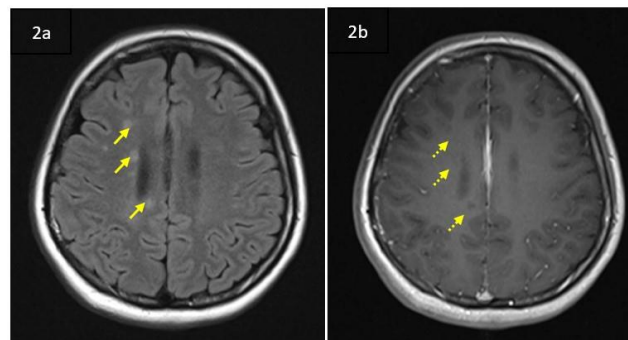


Fig. 2(a) shows a hyperintense lesion over the right corona radiata and periventricular region on T2/FLAIR MRI sequence which did not enhance on T1 sequence 2(b). In this case, dissemination in time (DIT) of MS can be demonstrated by a simultaneous presence of gadolinium- enhancing (image 1b) and non-enhancing lesions (image 2b) simultaneously.



Fig. 3 shows a short segment hyperintense lesion involving the spinal cord. Dissemination in space (DIS) is demonstrated by T2-hyperintense lesions in over two of four typical areas of the central nervous system, (2a): periventricular and juxtacortical lesions, and (3): a spinal cord lesion

After exclusion of the possible mimicking disorders and with the MRI lesion fulfilling Mc Donald's diagnostic criteria, the patient was diagnosed with multiple sclerosis, and received intravenous methylprednisolone 500 mg daily for 5 days. Subsequently, she was maintained on prednisolone 20mg daily and started on disease modifying treatment (DMT) teriflunomide 14mg daily. Upon discharge, she still has residual numbness involving the bilateral lower limbs, up to T2 level, but no worsening of neurological deficits. A review of her condition at 2 months showed improvement in the numbness, with no new relapse.

### III. DISCUSSION

In 2017, the Mc Donald criteria was updated to simplify and facilitate earlier diagnosis, while maintaining specificity of the 2010 Mc Donald criteria [4]. The updated criteria continue to define the needs to fulfil dissemination in time (DIT) and space (DIS) while stressing the importance of excluding mimicking conditions, especially in regions with lower MS disease burden [4]. In this region, special care needs to be taken to exclude Neuromyelitis Optica Spectrum Disorder (NMOSD), which is a more prevalent demyelination disease with serious implication on long term treatment.

Paraesthesia is often described as a numbness or tingling sensation of the body, and is a relatively common symptom. Unintentional compression of the nerve by pressure on the arms and legs may cause transient paraesthesia, which is common. At the time of the patient's first presentation, when she presented with only numbness involving lower limb after walking, spinal nerve root compression may have been given serious consideration. However, it was excluded after a normal lumbosacral MRI finding as well as spontaneous resolution of the symptoms. In the second presentation, however, more serious attention was given due to the recurrence and evolution of the symptoms to involve not only the lower limbs, but also the trunk and upper limbs. Without specific signs or symptoms to support a specific diagnosis, the possible diagnoses considered were quite broad.

In a young woman, few differential diagnoses were high in the list, such as vasculitis affecting peripheral nerves due to systemic lupus erythematosus, as well as demyelinating diseases, such as multiple sclerosis or NMOSD [1]. Sensory symptoms are the first clinical manifestation in up to 43% of patients with MS, and are primarily caused by myelitis or brainstem syndromes [4]. Other causes that have been considered and excluded include metabolic disorders such as diabetes mellitus, hypothyroidism, uraemia, vitamin B12 deficiency and porphyria. No history suggests the use of implicated agents such as alcohol, drugs, or other toxins. Cancers may also cause nerve compression or may be associated with paraneoplastic syndrome, although it is unlikely in this case. Infectious disease such as Lyme disease is rare in this region, and was much lower in the list, as patients have no exposure or visits to endemic areas.

In this case, fortunately, by application of the 2017 McDonald Criteria, an MRI was able to substitute clinical findings in determination of DIS and DIT for diagnosis of MS. This has been extremely helpful, since the patient's presenting complaint provides little clues to enable lesion localization on the central nervous system. The MRI has been used increasingly to aid in the diagnosis of multiple sclerosis, as well as to search for atypical radiological features which are against it [5]. A standardised MRI protocol for brain and spinal cord imaging was proposed for the evaluation of patients with clinically definite or suspected multiple sclerosis to help with the diagnostic process, prognosis and as baseline for follow up scans [6, 7].

In our centre, interferon beta is the only available injectable treatment, and the patient was started on teriflunomide, an oral pyrimidine synthesis inhibitor which has been proven to reduce the annual relapse rate by 34% [8]. Side effects reported by this medication include headache, diarrhoea, hair loss, transaminitis, leukopenia, paraesthesia as well as

infections [9, 10]. After 2 months of taking the prescribed medication, the patient did not show any signs of significant adverse effects, which encouraged her compliance to medication. She also reported no further relapse of her symptoms.

### IV. CONCLUSIONS

Paraesthesia is a potentially alarming symptom that should be taken seriously, and merits further assessment to rule out any possible local as well as systemic diseases such as multiple sclerosis. It is hard to imagine debilitating neurological consequences if we were to continue to dismiss the symptoms or to label these patients as suffering from anxiety or depression. While diagnosis is not always straightforward, the availability of MRI imaging has been tremendously helpful to demonstrate lesions which otherwise cannot be picked up based on clinical presentation alone.

### CONSENT TO PARTICIPATE

Written informed consent was obtained from the patient for the anonymized information to be published in this article.

### CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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### REFERENCES

- [1] Filippi, M., & Bar-Or, A. (2018). Piehl et al. Multiple sclerosis. *Nat Rev Dis Primers*, 4(1), 43.
- [2] Rosati, G. (2001). The prevalence of multiple sclerosis in the world: an update. *Neurological sciences*, 22(2), 117-139. doi.org/10.1007/s100720170011
- [3] Viswanathan, S., Rose, N., Masita, A., Dhaliwal, J. S., Puvanarajah, S. D., Rafia, M. H., & Muda, S. (2013). Multiple sclerosis in Malaysia: demographics, clinical features, and neuroimaging characteristics. *Multiple sclerosis international*, 2013. doi.org/10.1155/2013/614716
- [4] Thompson, A. J., Banwell, B. L., Barkhof, F., Carroll, W. M., Coetzee, T., Comi, G., ... & Cohen, J. A. (2018). Diagnosis of multiple sclerosis: 2017 revisions of the McDonald criteria. *The Lancet Neurology*, 17(2), 162-173. doi.org/10.1016/S1474-4422(17)30470-2
- [5] Rae-Grant, A. D., Eckert, N. J., Bartz, S., & Reed, J. F. (1999). Sensory symptoms of multiple sclerosis: a hidden reservoir of morbidity. *Multiple Sclerosis Journal*, 5(3), 179-183. doi.org/10.1177/135245859900500307
- [6] Brownlee, W. J., Hardy, T. A., Fazekas, F., & Miller, D. H. (2017). Diagnosis of multiple sclerosis: progress and challenges. *The Lancet*, 389(10076), 1336-1346. doi.org/10.1016/S0140-6736(16)30959-X

- [7] Traboulsee, A., Simon, J.H., Stone, L., Fisher, E., Jones, D.E., Malhotra, A., Newsome, S.D., Oh, J., Reich, D.S., Richert, N. and Rammohan, K. (2016). Revised recommendations of the consortium of MS centers task force for a standardized MRI protocol and clinical guidelines for the diagnosis and follow-up of multiple sclerosis. *American Journal of Neuroradiology*, 37(3), 394-401. doi.org/10.3174/ajnr.A4539
- [8] Rovira, À., Wattjes, M.P., Tintoré, M., Tur, C., Yousry, T.A., Sormani, M.P., De Stefano, N., Filippi, M., Auger, C., Rocca, M.A. and Barkhof, F. (2015). MAGNIMS consensus guidelines on the use of MRI in multiple sclerosis—clinical implementation in the diagnostic process. *Nature Reviews Neurology*, 11(8), 471-482. doi.org/10.1038/nrneurol.2015.106
- [9] onfavreux, C., O'Connor, P., Comi, G., Freedman, M.S., Miller, A.E., Olsson, T.P., Wolinsky, J.S., Bagulho, T., Delhay, J.L., Dukovic, D. and Truffinet, P. (2014). Oral teriflunomide for patients with relapsing multiple sclerosis (TOWER): a randomised, double-blind, placebo-controlled, phase 3 trial. *The Lancet Neurology*, 13(3), 247-256. doi.org/10.1016/S1474-4422(13)70308-9
- [10] O'Connor, P., Wolinsky, J.S., Confavreux, C., Comi, G., Kappos, L., Olsson, T.P., Benzerdjeb, H., Truffinet, P., Wang, L., Miller, A. and Freedman, M.S. (2011). Randomized trial of oral teriflunomide for relapsing multiple sclerosis. *New England Journal of Medicine*, 365(14), 1293-1303. doi.org/10.1056/NEJMoa1014656