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Neurolisteriosis mimicking Weber's syndrome: A rare clinical presentation

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Abstract

Neurolisteriosis, an infection of the central nervous system caused by *Listeria monocytogenes*, can present with a wide variety of clinical signs and symptoms thereby rendering the diagnosis and treatment challenging. This report pertains to a 67-year-old woman with a history of autoimmune haemolytic anaemia on long-term steroid therapy who developed generalized weakness, lethargy, double vision, right third cranial nerve palsy and left hemiparesis. MRI brain revealed multiple brain abscesses in the cerebrum and the brainstem. The cerebrospinal fluid (CSF) culture confirmed the presence of *Listeria monocytogenes* bacteriae. The patient was treated with high-dose ampicillin and gentamicin leading to significant improvement and near complete neurological recovery at the end of six weeks. While neurolisteriosis presents quite often as a case of meningitis, it can rarely masquerade as stroke, encephalitis and/or cranial nerve palsies. This extremely rare clinical presentation as seen in our patient with multiple brain abscesses, including one in the ventromedial midbrain leading to Weber's syndrome (crossed hemiplegia), prompted us to report this case.

Keywords: Neurolisteriosis, brain-stem abscess, Weber's syndrome

CASE REPORT

A 67-year-old woman presented with one week history of generalized weakness, lethargy and double vision, following a brief episode of headache and fever. She reported no significant weight loss or appetite changes. She was taking treatment for auto-immune haemolytic anaemia (AIHA) since 2022 and two months prior to this admission she had a relapse and was treated with intravenous methylprednisolone followed by maintenance of oral prednisolone 30 mg OD and T. azathioprine 50 mg OD.

On examination, she was alert, and her Glasgow Coma Scale was 14/15 (E3V5M6). Neurological assessment revealed mild neck stiffness and evidence of right third cranial nerve palsy. (Figure 1). Pupils were however equal and reactive to light. Motor power testing showed left hemiparesis, (MRC 3/5), with an up-going plantar response. The rest of the neurologic examination was normal. Her body temperature was normal (36.9^0C) and other system examination were unremarkable.

Laboratory findings, including blood counts, renal and liver function tests were within normal limits, with no elevated inflammatory markers. Routine blood culture reports were negative and serological testing for Hepatitis B, and C, syphilis and retroviral screening were also negative. Cerebrospinal fluid (CSF) analysis showed 300 cells/mm³ (predominantly polymorphonuclear leukocytes), elevated protein level of 2.27 g/L and a low glucose concentration of 0.9 mmol/L. The CSF report favoured the diagnosis of meningitis. CT scan brain showed a hypodense, non-enhancing lesion in the right basal ganglia and mild hydrocephalus. MRI brain with contrast further revealed multiple rim-enhancing lesions in the right fronto-temporal regions, basal ganglia with surrounding white matter oedema and a right ventromedial midbrain lesion (Figure 2). These findings suggested multiple abscesses, possibly due to septic emboli.

Based on the suspicion of bacterial meningitis with super-added multiple pyogenic abscesses, the patient was started empirically on intravenous

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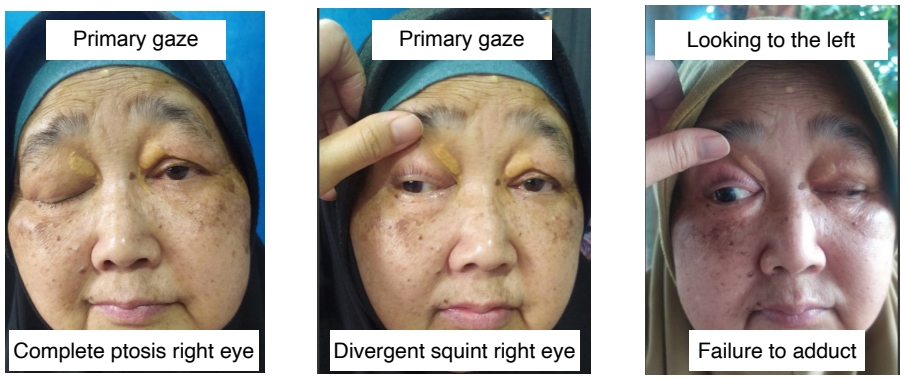

Figure 1. Eye examination on admission.

(IV) ceftriaxone and IV metronidazole. The CSF culture report received subsequently showed Gram-positive bacilli, which was identified as *Listeria monocytogenes*, sensitive to ampicillin, meropenem and gentamycin. Hence, the antibiotic regimen was revised to IV ampicillin and gentamicin. Thus, a final diagnosis of *Listeria monocytogenes* meningitis complicated by multiple cerebral abscesses with an abscess in the brainstem resulting in the Weber's syndrome was confirmed.

After completing six weeks of treatment, the patient was discharged from hospital in a stable condition with marked improvement of her eye symptoms (Figure 3) and the left sided weakness as well.

A follow-up MRI four weeks later showed a resolution in the size and intensity of the rim-enhancing lesions in the right frontal, temporal, basal ganglia and midbrain along with decreased peri-lesional edema (Figure 4).

DISCUSSION

L. monocytogenes is a gram-positive, rod-shaped facultative intracellular bacterium that is catalase-positive and exhibits beta-haemolysis on blood agar; and it is commonly found in soil, water and decomposing plant material. It has the potential to contaminate various food products including meats and dairy produce. *L. monocytogenes* infection is essentially a food borne disease, but it can eventually involve the nervous system by entering the blood stream from the gastro-intestinal tract and reaching the central nervous system. *L. monocytogenes* meningitis forms the third most common cause for bacterial meningitis with more than 50% mortality rate[1] Immune-compromised persons, diabetic individuals and those with malignancies undergoing chemotherapy are more susceptible for an adverse outcome. Apart from bacterial meningitis, the spectrum of neurological manifestations due to *L monocytogenes* infection of the brain (neurolisteriosis) is quite wide. It also includes some uncommon presentations like isolated third cranial nerve palsy[2], bilateral facial palsy[3], axonal polyneuropathy[4], brain abscess[5], brainstem encephalitis[6] and brainstem abscess.[7] It should however be borne in mind that

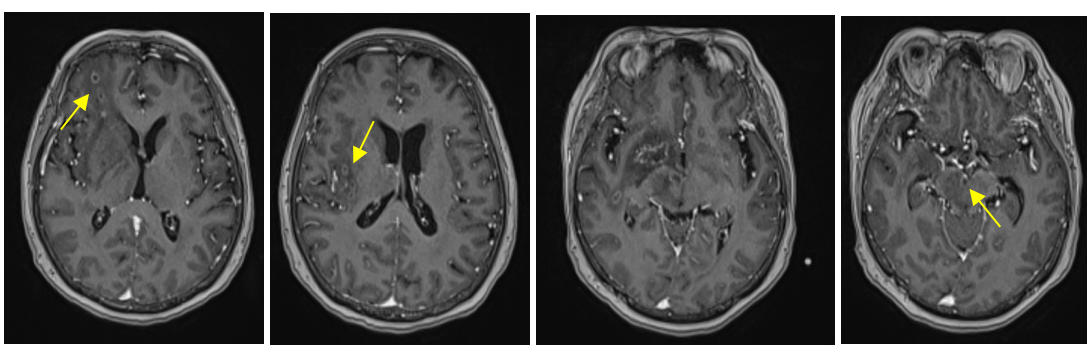

Figure 2. MRI Brain axial images post gadolinium on admission showing multiple rim-enhancing lesions at the right frontal, temporal, basal ganglia and right ventromedial midbrain with white matter oedema causing mild midline shift.

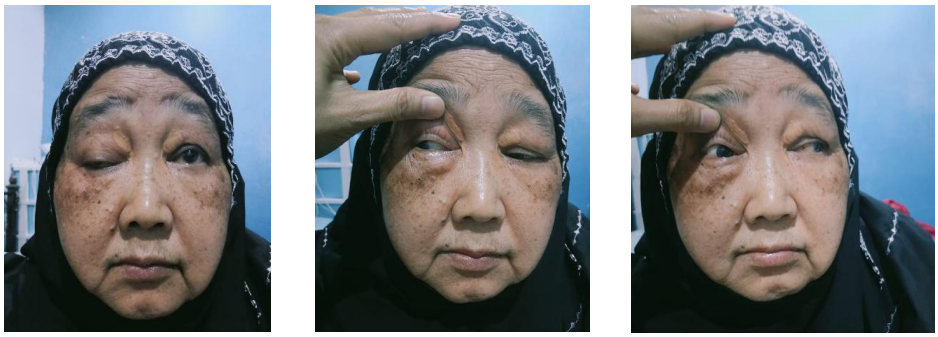

Figure 3. Eye examination 6 weeks after treatment

abscesses are quite rare, occurring in only 2% of neurolisteriosis patients.[7]

Our patient presented with meningitis symptoms associated with right third cranial nerve palsy. and contralateral (left) hemiparesis—characteristic of the Weber's syndrome, first described by Weber in a 52-year-old male due to an acute haemorrhagic stroke in the left cerebral peduncle.[8] The well recognised etiological causes for Weber's syndrome however are brainstem stroke and demyelinating diseases, while rarely tumours and infective processes can also lead to Weber's syndrome. However, to the best of our knowledge, a brain stem abscess caused by *L. monocytogenes* infection resulting in Weber's syndrome remains an extremely rare presentation and it has not been already reported in literature.

Furthermore, it must be emphasised that early diagnosis and institution of appropriate antibiotic therapy for neurolisteriosis are crucial for a good outcome. This can be achieved only when the physician is aware of the possibility of neurolisteriosis when confronted with complex clinical neurological presentations with or without overt meningitis features.

In conclusion, neurolisteriosis presents mainly as meningitis, though other neurological deficits can occur concomitantly in a few of the affected individuals. Our case illustrates the extremely rare presentation of neurolisteriosis with Weber's (crossed hemiplegia) syndrome. Neuro-imaging and timely identification of the causative organism (*Listeria monocytogenes*) through CSF analysis had been crucial for effective management that resulted in our patient's remarkable recovery. In view of the fact neurolisteriosis can be fatal, especially in immune-compromised individuals, a heightened clinical awareness is vital for ensuring optimal patient outcomes.

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DISCLOSURES

Ethics: Written informed consent was obtained from the patient for their information and photos to be published in this article.

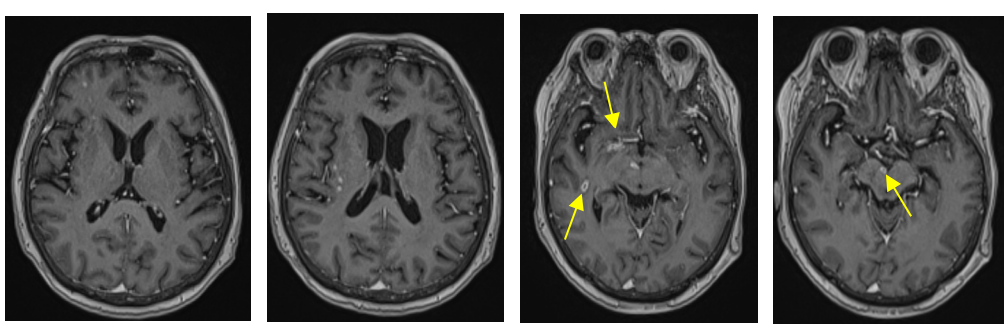

Figure 4. MRI Brain Axial images post gadolinium 4 weeks after treatment showing the right frontal lesion had disappeared, and the temporal and midbrain lesion appeared smaller in size with reduced peri-lesional oedema.

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