

Wernicke encephalopathy in a patient with Burkitt lymphoma with typical and atypical findings on MRI

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DESCRIPTION

Characterised by ocular, consciousness and gait alterations, Wernicke encephalopathy (WE) is an acute neurological pathology due to vitamin B₁ (thiamine) deficiency. Often associated with alcohol consumption, thiamine deficiency leading to WE can also occur in non-alcoholic (NA) patients and result from prolonged vomiting, systemic infections and chemotherapy.¹⁻³ Given WE's potential morbidity and mortality, early diagnosis and treatment are imperative. Unfortunately, it is often underdiagnosed, especially in the paediatric age, where NA causes are more frequent.³

MRI in WE can show symmetric signal change alterations typically involving the medial thalami, mammillary bodies, tectal plate and periaqueductal area. There are also atypical MRI findings, found more frequently in NA patients, with involvement of the cerebellum, cranial nerve nuclei, red nuclei, caudate nuclei, splenium and cerebral cortex.¹⁻³

A 16-year-old boy diagnosed with a stage IV Burkitt lymphoma (cerebrospinal fluid and marrow involvement), under treatment according to international indications from Protocol: Inter-B-NHL ritux 2010 and in complete remission after induction therapy, reporting recent weight loss, approximately 29 kg since the diagnosis 2 months earlier (24% of his body weight), was admitted to undergo a cycle of chemotherapy with rituximab, high-dose cytarabine and etoposide. At the third day of treatment, he suffered nausea, anorexia and apathy.

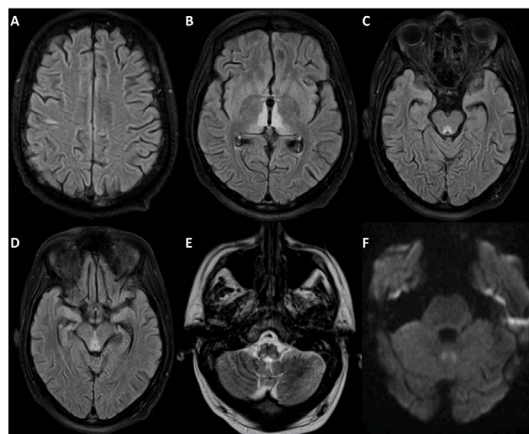


Figure 1 Axial FLAIR (A–D), T2 (E) and diffusion-weighted imaging (F) images showing multiple hyperintense lesions involving the medial thalami, periphery of the third ventricle, tectal plate and the periaqueductal grey matter. Abnormal signal intensity can also be seen in the frontal lobe cortex, medulla and vermis. FLAIR, FLuid-Attenuated Inversion Recovery.

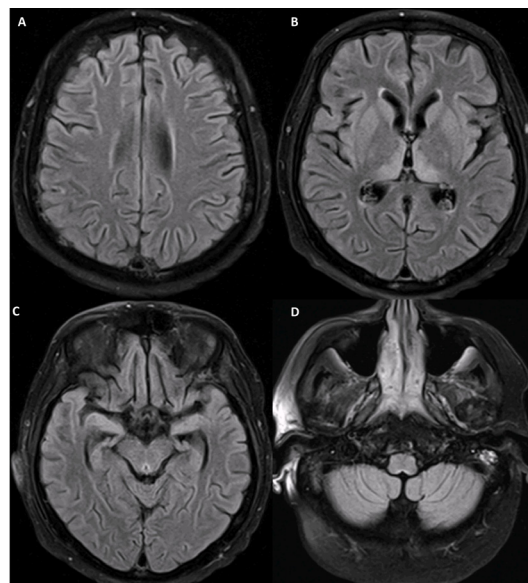


Figure 2 Axial FLAIR (A–D) images of follow-up MRI showing significant regression of the lesions after 5 days of thiamine. FLAIR, FLuid-Attenuated Inversion Recover.

After the fourth day and final day of treatment, he showed no signs of improvement and had pancytopenia requiring transfusion support.⁴ Over the next 10 days, his clinical status deteriorated, as he exhibited fluctuations in consciousness, fever and altered speech, later needing intubation. Lumbar puncture and CT of the head were conducted but showed no significant changes, other than mild brain atrophy, which was attributed to corticotherapy. Still, the clinical picture suggested Posterior Reversible Encephalopathy Syndrome (PRES), sometimes associated with the treatment, in particular high-dose cytarabine.⁵

However, subsequent MRI of the brain showed multiple T2 hyperintense lesions involving the medial thalami, periphery of the third ventricle, tectal plate and the periaqueductal grey matter, suggesting the diagnosis of WE. Additionally, abnormal signal intensity was seen in the frontal lobe cortex, medulla and vermis, the vermian lesions being more evident on diffusion-weighted imaging (figure 1). No enhancement was shown after gadolinium.

The patient was then started on intravenous thiamine in a daily high-dose protocol (500 mg/8 hours).⁶ The treatment was administered for 10 days, with radiological improvement on follow-up MRI on the sixth day, which showed significant regression of all lesions (figure 2). Clinical improvement was seen after the 10th day and final day of



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Images in...

thiamine, with the patient being discharged 5 days later, still showing periodic confusion and marked weakness, especially in the lower limbs.

Oncologic patients have several risk factors that can predispose to WE, whether it be decreased intake of thiamine due to anorexia, reduced absorption due to vomiting, increased expenditure in a hypermetabolic state (eg, rapidly growing tumours such as haematological malignancies, infections and steroid use) or inactivation by chemotherapy.¹

However, many of these same risk factors predispose to other neurologic pathologies hindering the diagnostic process. One study involving 1000 patients that underwent hematopoietic stem cell transplantation revealed 31% suffered from neurologic complications, one of the rarer (1%) but more serious ones being WE.^{7,8}

Rituximab has been associated with progressive multifocal leucoencephalopathy, and high-dose cytarabine use can be a risk factor for PRES.^{5,9} Still, both of these hypotheses were discarded given the clinical and imaging evolution.

The diagnosis of WE is complex, depending on clinical, laboratory and imaging findings. Ocular, cerebellar and consciousness alterations constitute the clinical triad often associated with this disease, but it is rarely reported. Direct measurements of thiamine can help confirm the diagnosis but do not exclude it (eg, mutations of thiamine transporter genes). MRI findings have relatively low sensitivity (53%), but are highly specific (93%), in the diagnosis.¹⁰

In this case, the MRI findings suggested the diagnosis of WE, which can be missed in NA patients, namely, in patients with cancer.

This case also highlights the occurrence of atypical locations for the disease, such as the cerebellum and cerebral cortex, in the group of NA patients.²

Contributors MJB was personally involved with the care of the patient described in this case report, discussed the case with SC and PB (neuroradiologists), who helped with the construct of this case report, and reviewing several drafts, including relevant radiological figures. ASE was also involved in background research and manuscript writing.

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Learning points

- ▶ Wernicke encephalopathy (WE) is an acute neurologic disease resulting from thiamine deficiency, often under-recognised, particularly in the paediatric age, and with severe consequences if not treated early.
- ▶ Despite often being a clinical diagnosis, MRI can be a useful tool in revealing WE-associated lesions and in excluding differential diagnosis.
- ▶ MRI in patients with WE can show lesions in typical and atypical locations, the latter being often associated with non-alcoholic patients.

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