SUBMITTED 30 JAN 23
REVISION REQ. 19 MAR 23; REVISIONS RECD. 23 MAR 23
ACCEPTED 4 APR 23
ONLINE-FIRST: MAY 2023
DOI: https://doi.org/10.18295/squmj.5.2023.023

Longitudinal Extensive Transverse Myelitis (LETM) in a Four-year-old Boy Liver Transplant Recipient

***Roshan Koul,[1] Shalini Thapar,[2] Rajeev Khanna,[3] Seema Alam[3]**

Departments of [1]Neurology, [2]Radiology and [3]Pediatric Hepatology, Institute of liver and biliary sciences, New Delhi, India
**Corresponding Author's e-mail: koulroshan@gmail.com*

Acute transverse myelitis (ATM) is defined as acute onset quadriplegia or paraplegia with sensory and autonomic involvement progressing in three to four days' time. [1] If the myelitis involves more than three consecutive vertebral segments on magnetic resonance imaging (MRI), it is called longitudinal extensive transverse myelitis (LETM). [1] On Google and PubMed search only, one adult case of transverse myelitis was seen in a liver transplant (LT) recipient.[2] This is the first case of LETM to be reported in a child who had LT.

Introduction

Four years eight months old boy diagnosed with biliary atresia at neonatal period, underwent living liver donor transplantation at the age of one year and five months. He was third child in the family with no family history of liver disease. He had tubercular lymphadenitis soon after transplant which was treated appropriately. He also had prolonged unprovoked seizure in November 2020, which was treated with levetiracetam. He developed Epstein-Barr virus (EBV) infection and was treated with ganciclovir. He had graft dysfunction due to hepatitis E infection which settled of its own. Two years and ten months after transplant (June 2022) he developed right mandibular mass. Positron emission tomography (PET) computerized tomography (CT) scan showed fluoro-deoxy glucose (FDG) avid irregular mass involving right maxillary sinus, retro-orbital region, and ethmoid sinus with lytic destruction of maxilla. Histopathology revealed Burkett's lymphoma stage IV. Bone marrow and cerebro spinal fluid

(CSF) were normal. He was started on rituximab, cyclophosphamide, hydroxydaunorubicin, vincristine, prednisolone (R-CHOP) chemotherapy along with intrathecal methotrexate. By end of August 23, 2022 he had received 3 cycles of CHOP with intrathecal methotrexate and 5th pulse of rituximab. On September 5th 2022 he was admitted with progressive weakness of all four limbs which started in the left arm first and completely paralyzed him below neck in three days' time. His cranial nerves and sensorium were normal. MRI brain was normal and MRI spine revealed almost whole length spinal cord myelitis [Figure 1]. CSF examination was normal. No malignant cells were seen. Viral studies were negative. Aquaporin antibody test was not done as the facility to test this, was not available in the hospital. He was treated with pulse methylprednisolone 30mg/kg/day for five days followed by oral steroids for four weeks and IVIG 400mg/kg/day for five days. He started improvement in his weakness after ten days of treatment. Currently he has grade three power (medical research council grading) in right upper limb, grade 2 to 3 in lower limbs and grade 1 in left upper limb. Sensory examination was normal all over. He received repeat chemotherapy on 29th November 2022, including intrathecal methotrexate. There was no worsening of his weakness after intrathecal methotrexate. During the hospital stay he had recurrence of seizures which evolved into status epilepticus requiring four anti-epileptic drugs (midazolam, levetiracetam, phenytoin sodium, lacosamide and phenobarbital) to control.

Comment

There are many neurological complications seen in liver transplant recipients. [3] These may be related to the transplant or immunosuppressants used in the treatment. [3] ATM is the rarest of all complications. Only few reports are in the literature. [2] Most of the ATM in children are of unknown etiology, believed to be some form of nervous system demyelinating illness in response to varied etiology. [1,4] A thorough workup is required in ATM to rule out infectious, autoimmune disorders or infiltrations. [1,4] In a single case of ATM reported in an adult liver transplant recipient, it was correlated to the high levels of tacrolimus.[2] This patient was a 39 years old male, with chronic liver disease due to Budd-Chiari syndrome. He underwent deceased liver transplant and was put on tacrolimus. He developed weakness of all four limbs on day five post operation. Blood tacrolimus level was normal. MRI brain was normal and MRI spine revealed whole length spinal cord demyelination. No underlying etiology was found on investigation. Immunoglobulins did not improve the weakness. Cyclosporine was added in the treatment and tacrolimus was stopped. This change of immunosuppressant resulted in improvement of his weakness. [2] Our patient had not received

tacrolimus, and CSF study was normal. Intrathecal methotrexate is widely used and there are few reports in literature about association of ATM and intrathecal methotrexate. [5] However our patient had received three doses previously and the weakness developed after thirteen days of the third dose. Further he was given fourth dose on 29th November 2022, without worsening of his neuro status. This observation rules out methotrexate induced ATM. Our patient is the first case of LETM seen in a liver transplant recipient. ATM is uncommon in children.[1,6] LETM presentation in our patient is possible due to his medical condition, making him more prone to various autoimmune conditions or coincidental. Several cofounders in setting of LT, it is difficult to pinpoint what predisposed this boy to LETM. A repeat follow up MRI spine and clinical monitoring will determine his long-term therapy for the LETM.

Authors' contribution

RoK, SA and RaK managed the patient. RoK provided the diagnosis. ST provided the radiological images. RoK drafted the manuscript and SA edited the manuscript. All authors approved the final version of the manuscript.

References

1. Wolf VL, Lupo PJ, Lotze TE. Pediatric Acute Transverse Myelitis. Overview and Differential diagnosis. J child Neurol 2012;27:1426-1436.doi:10.1177/0883073812452916
2. Aksoy F, Dundar HZ, Demir AB, Kiyici M, Kaya E. .Myelitis After Liver Transplant: A case Report. Experimental and Clinical Transplantation. 2021; 1-3. Doi:10.6002/ect.2020.0278
3. Weiss N, Thabut D. Neurological Complications Occurring After Liver Transplantation: Role of Risk Factors, Hepatic Encephalopathy and Acute (on Chronic) Brain Injury. Liver Transplantation.2019;25:469-487 https://doi.org/10.1002/lt.25420
4. Scott TE, Frohman EM, De Seze J, Gronseth GS, Weinshenker BG. Evidence based guidline: clinical evaluation and treatment of transverse myelitis: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology 2011; 77:2128-2134.
5. Castillo-Torres SA, Soto-Rincón CA, Villarreal-Montemayor HJ, Chávez-Luévanos B. Case of neuromyelitis optica: bilateral sensorineural hearing loss

and transverse myelopathy following intrathecal chemotherapy. BMJ Case Rep. 2020 Apr 15; 13(4):e234076. doi: 10.1136/bcr-2019-234076

6. Koul R, AlFutaisi A, Mani R, AbdelRahim R, Sankhla DK, AlAzri FM. Longitudinal extensive transverse myelitis in children from Oman. Neurosciences (Riyadh) 2017;22:127-130, doi.10.17712/nsj.2017.2.20160352

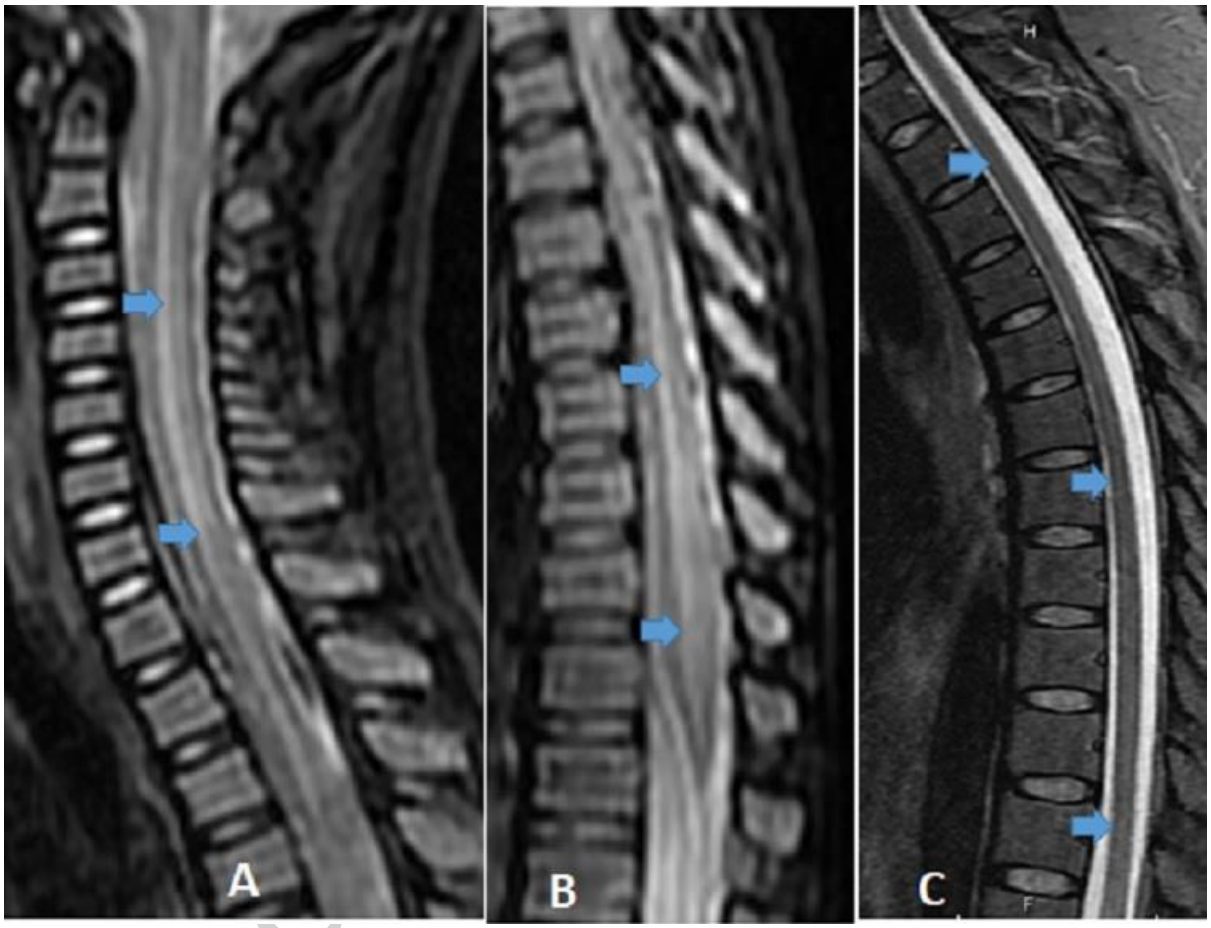

Figure 1:MRI short tau inversion recovery (STIR) sagittal image of spine, A shows cervical 1to dorsal 7 vertebra hyper-intense lesion, B shows dorsal 8 to conus medullaris lumbar 1 vertebra hyper-intense lesion (Whole spine could not come in single image due to mild scoliosis). C. STIR sagittal image spine as control shows normal appearance of the spinal cord.