Cycloserine Induced Neurotoxicity: A Rare Case Report

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ABSTRACT
Cycloserine is one of the many drugs used in treatment of Multidrug Resistant Tuberculosis (MDR-TB). Neuropsychiatric complaints are common after cycloserine administration. Reports of neuroimaging in cycloserine neurotoxicity are rare. Authors hereby reports a case of 17-year-old female, who presented with hallucination and delirium since 2 weeks. She was a known case of pulmonary MDR-TB and was on Anti-Koch’s Treatment category IV (AKT) for the same since last 12 months. On clinical examination, the patient was conscious and co-operative but disoriented. Magnetic Resonance Imaging (MRI) revealed, symmetric hyperintensities on T2 weighted images in bilateral dentate nuclei with restriction of diffusion, on diffusion weighted images. In addition, two well-defined T2 hypointense ring enhancing lesions were seen in right parietal and occipital regions. Patient’s symptoms improved on stoppage of cycloserine. On follow-up MRI, 4 weeks after withdrawing the drug, there was complete reversal of MRI findings.

CASE REPORT
A 17-year-old female presented to the Outpatient Department of a tertiary care hospital with complaints of hallucinations and delirium since last 2 weeks. She was a known case of pulmonary Multidrug Resistant Tuberculosis (MDR-TB) and was on Anti-Koch’s Treatment category IV (AKT) for the same since last 12 months. The drugs included in this category were kanamycin, ofloxacin, ethionamide, ethambutol, pyrazinamide and cycloserine [1]. There was no history of any neuropsychiatric complaints in the past. Lumbar puncture was not done as a part of current investigation as the patient did not have any meningeal signs. Other laboratory parameters like hemogram, liver function tests and serum electrolytes were within normal limits. Electroencephalogram (EEG) was normal and did not show any abnormal finding. On Magnetic Resonance Imaging (MRI), there were symmetrical areas of hyperintense signal in bilateral dentate nuclei on T2 Weighted Images (WI) [Table/Fig-1] with restriction of diffusion, on diffusion WI and corresponding drop on signal on Apparent Diffusion Coefficient (ADC) maps [Table/Fig-2]. No evidence of signal dropout was noted on Susceptibility Weighted Images (SWI).

Findings on MRI were suggestive of tuberculomas with cycloserine neurotoxicity. Hence, cycloserine was withheld and clofazimine was added.

On follow-up MRI after 4 weeks, there was interval resolution of symmetrical hyperintense signal on T2 WI [Table/Fig-4] with no evidence of restricted diffusion [Table/Fig-5]. The ring enhancing lesions on T2 WI which showed ring enhancement on postcontrast images in right parietal and occipital regions [Table/Fig-3a,b].
lesions in right temporal and parietal region showed no significant interval change. Clinically, the patient showed improvement and there were no hallucinations, however the patient had low mood even after withdrawing cycloserine. On last visit, patient was doing well and is on regular follow-up.

Similar case has been reported by Sharma S et al., where a young boy who developed neurological symptoms during therapy for MDR-TB which included cycloserine [3]. The MRI of the brain showed reversible bilateral symmetrical T2/FLAIR hyperintensities in dentate nuclei. Clinical and MRI findings were consistent with cycloserine toxicity. The patients MRI findings and clinical symptoms resolved on stoppage of cycloserine.

A similar case has been reported by Jain M et al., where a young lady suddenly felt dizzy with graying out of her vision during her MDR-TB treatment. MRI revealed symmetrical high signal intensity in the dentate nuclei on Diffusion Weighted Images (DWI) and decreased ADC values [5]. After 2 weeks, a follow-up MRI was done after the stoppage of cycloserine, which showed the resolution of the high signal intensity in the dentate nuclei.

Another case has been reported by Kwon et al., where a 69-year-old female, developed hypersomnolence and asterixis during the therapy for tuberculous lymphadenopathy which included cycloserine. The MRI of the brain revealed hyperintense signal on T2WI in both thalami. On stoppage of cycloserine, there was resolution of patient’s symptoms and the follow-up MRI after one month showed marked reduction of the high signal intensities in both thalami [7].

In case reported by Jain M et al., reported a 24 year old lady diagnosed with primary MDR-TB at a tertiary hospital treated with cycloserine, supplemental pyridoxine and other drugs. The patient presented after two months with hypervigilance, labile mood, daytime somnolence and suicidal thoughts. The MRI of the brain showed T2 hyperintense signal in the dentate nuclei with restricted diffusion on DWI and decreased apparent diffusion coefficient values. Following cycloserine discontinuation, some symptoms and MRI findings resolved except persistent labile mood [2].

The present case highlights the importance of MRI in diagnosing the neurotoxicity caused by cycloserine and how it can help in timely management by withdrawal of the drug which leads to reversibility of symptoms.

**CONCLUSION(S)**

The major findings on MRI associated with cycloserine toxicity were hyperintense signal on T2 WI showing restricted diffusion on DWI and ADC maps in the dentate nuclei. Early diagnosis by using brain MRI and prompt discontinuation of the medication leads to reversibility of the brain findings on MRI and symptomatic relief as well.

**REFERENCES**


