

## HEARING LOSS DUE TO CYCLOSPORINE IN CHILDREN

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## Correspondence

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**ABSTRACT**

A 13-year-old boy known for steroid-resistant nephrotic syndrome taking cyclosporine for the last four years was referred from one private hospital for non-response to treatment and decreased hearing. On detailed history, it was revealed that hearing loss started after initiation of treatment with cyclosporine during the first year, and the patient was not properly followed for hearing issues. Rather cyclosporine was continued despite no response to treatment. The patient raised alanine transaminase (ALT) and uric acid levels. The drug was discontinued, and ALT and uric acid were normalized on follow-up. Hearing on follow-up improved clinically. It was concluded that children taking calcineurin inhibitors should be screened for hearing when taking them long.

**KEYWORDS:** Hearing Loss, Nephrotic Syndrome, FSGS, Cyclosporine

## INTRODUCTION

In children with nephrotic syndrome, there is resistance to steroids in 10% - 30% of patients and steroid-resistant nephrotic syndrome (SRNS) is treated with combinations of steroids and immunosuppressive medicines.<sup>1</sup> There is a 50% risk of end-stage renal failure in children with SRNS if the patient does not achieve complete or partial remission as management of SRNS is challenging due to adverse effects of drugs and progression of the disease to end stage.<sup>2</sup> Cyclosporine is one of calcineurin inhibitor being used in patients with organ transplant.<sup>3,4</sup> It is also used to manage SRNS in children with resultant remission of the disease.<sup>5,6</sup> Most common adverse effects associated with cyclosporine are; hypolipoproteinemia, hepatotoxicity, nephrotoxicity, gingival hyperplasia, hypertension, hypertrichosis, hyperkalemia, hyperglycemia, neurotoxicity, malignancy, infections and rarely ototoxicity.<sup>7</sup> There are many theories for hearing loss associated with chronic cyclosporine use. However, the exact mechanism for hearing loss is unknown.<sup>8</sup> Here, presenting a case of a patient with a history of chronic use of cyclosporine who had hearing loss after the use of cyclosporine, and there was an improvement in hearing when the drug was discontinued. Patient proper consent was taken for this case report.

## CASE

A 13-year-old patient has had a known nephrotic syndrome for the last 4.5 years, being managed as a case of SRNS for the last four years. The patient took oral cyclosporine 75 mg twice daily for four years. The patient was referred to our institute from one of the private hospitals with a history of persistent

proteinuria for the last four years despite taking immunosuppressant medicines. There was a history of decreased hearing after starting the use of cyclosporine. Parents and treating doctors ignored the hearing issue. Nevertheless, after one year of the start of the hearing loss, the patient was taken to an ENT doctor, and a hearing assessment test was done, which showed severe bilateral hearing loss. A patient renal biopsy was done, and it showed findings of focal segmental glomerulosclerosis. There was a history of the death of one sibling secondary to end-stage renal disease, but the aetiology is unknown. After taking a detailed history and examination, patient investigations were done, and cyclosporine was stopped. Serum ALT was 279 IU/dl, uric acid 10.5 mg/dl, Mg 1.6 mg/dl, potassium 4.5 mg, and serum trough level of cyclosporine 143.5 ng/ml. The patient was called for follow-up after being given angiotensin receptor blockers/inhibitors to control proteinuria. On follow-up, after 12 weeks, the patient's ALT was 40 IU/dl, and uric acid was 5 mg/dl. The hearing assessment was done, and it showed a right moderate degree of sensory hearing loss and left showing a mild degree of hearing loss. The patient also improved clinically in hearing.

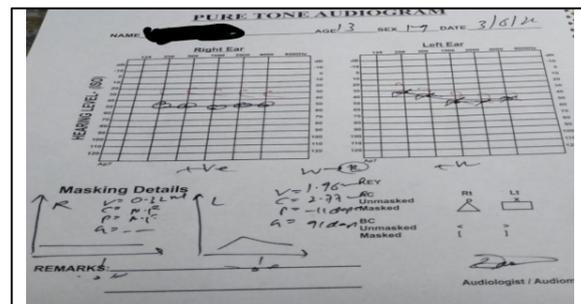


Figure 1: Pure Tone Audiogram of the Patient on Follow Up

## DISCUSSION

This patient has got cyclosporine toxicity and developed hearing loss despite normal trough levels of cyclosporine. The treating doctor has prescribed cyclosporine for a very long time despite the patient not showing any improvement in proteinuria. In one of the reference guides, Rizk HG et al.<sup>9</sup> described cyclosporine as a drug having cochlear toxicity, which can occur during treatment or afterwards and its unknown if hearing loss is reversible. In one study by Rageh MTR et al.<sup>10</sup>, it was concluded that cyclosporine is a potential cause of hearing loss in children. It is used for the treatment of the nephrotic syndrome. Hearing assessment should be routine in patients taking cyclosporine for a long duration. Like our patient, the patient was continuously taking cyclosporine for four years. One review article by Franz L et al.<sup>11</sup> analyzed that the most common drugs causing ototoxicity were calcineurin inhibitors, including cyclosporine, and hearing loss either recovered or improved in most patients with discontinuation of the drug. It was concluded by Franz L et al. that clinicians treating patients with immunosuppressant drugs should monitor patients for hearing during treatment. Likewise, our patient's hearing loss improved after discontinuation of the drug. One opinion published by Waissbluth S recommended that clinicians treating patients with cyclosporine should take ototoxicity as an adverse effect, and other ototoxic drugs should be avoided and should screen patients for hearing loss.<sup>12</sup> One prospective observational study done by El-Farsy MS et al checked for the effect of cyclosporine on hearing in children with steroid-resistant and steroid-dependent nephrotic syndrome.<sup>13</sup> It is observed that there was no effect on hearing on the follow-up to 6 months. However, our patient took cyclosporine for 4 years and had a hearing issue since the first year of cyclosporine use.

## CONCLUSION

It was concluded that children taking calcineurin inhibitors should be screened for hearing when taking them long.

**CONFLICT OF INTEREST:** None

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## CONTRIBUTORS

- Syed Sajid Hussain Shah** - Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval



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