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CORRESPONDENCE

Myasthenia Gravis: A Rare and Unusual Side Effect of Long Term Desferral Chelation

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To the Editor: Myasthenia gravis (MG) is the most common type of neuromuscular transmission disorder. About 40% patients seronegative for acetylcholine receptor antibodies (AChR-Abs) are positive for anti- muscle-specific kinase (anti-MuSK), anti- low-density lipoprotein receptor-related protein 4 (anti-LRP4), cortactin or agrin antibodies [1]. Medications precipitating autoimmunity may precipitate *de-novo* MG. Drugs adversely affecting the neuromuscular transmission may precipitate MG crisis, or unmask undiagnosed MG. Myasthenia following deferoxamine therapy has been anecdotally reported [2].

We report a rare presentation of myasthenia gravis, in a 7-y-old hypothyroid child post deferoxamine chelation. He was diagnosed with transfusion dependent thalassemia at 4 mo and was receiving annual transfusion of 15–18 leucodepleted packed red blood cells (LD-PRBC) units. Oral chelation was started at 3 y with deferasirox and deferiprone. Subsequent ferritin was 4990 ng/ml, therefore sub-cutaneous deferoxamine (40 mg/kg daily over 10 h for five days a wk) was started. Eleven months into therapy, he presented with drooping eye-lids and diplopia, peaking at day's end. A neuro-ophthalmic evaluation identified ophthalmic muscle weakness and horizontal binocular diplopia. The patient tested positive with tensilon test, however AChR or anti-MUSK antibodies were not demonstrated. Deferoxamine infusion was discontinued and deferiprone started for chelation. He was started on pyridostigmine, which led to complete resolution of symptoms and he continues follow up for Matched Sibling Donor (MSD) stem cell transplant.

An acquired myasthenia, secondary to transfer of donor antibodies post transfusion was considered, however no antibodies were detected. He was not tested for antibodies against LRP4, cortactin and agrin. The temporal relationship and marked improvement on withdrawal of deferoxamine was quite characteristic. The patient presented with symptoms after prolonged duration of exposure to deferoxamine, likewise reported by Krishnan et al. [3]. Klettner et al. demonstrated the direct toxic effect of deferoxamine, caused mitogen-activated protein kinase (MAP Kinase) activation causing changes in membrane permeability and membrane protein alteration [4]. Possibly a similar, direct toxic effect on neuromuscular synaptic membranes could explain seronegative MG.

Declarations

Conflict of Interest None.

References

1. Oger J, Frykman H. An update on laboratory diagnosis in myasthenia gravis. Clin Chim Acta. 2015;449:43–8.
2. Argov Z, Mastaglia FL. Drug therapy: Disorders of neuromuscular transmission caused by drugs. N Engl J Med. 1979;301:409–13.
3. Krishnan K, Trobe JD, Adams PT. Myasthenia gravis following iron chelation therapy with intravenous desferrioxamine. Eur J Hematol. 1995. https://doi.org/10.1111/j.1600-0609.1995.tb01826.x.
4. Klettner A, Koinzer S, Waetzig V, Herdegen T, Roider J. Deferoxamine mesylate is toxic for retinal pigment epithelium cells in vitro, and its toxicity is mediated by p38. Cutan Ocul Toxicol. 2010;29:122–9.

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