

Manganese toxicity and Psychosis: A case report

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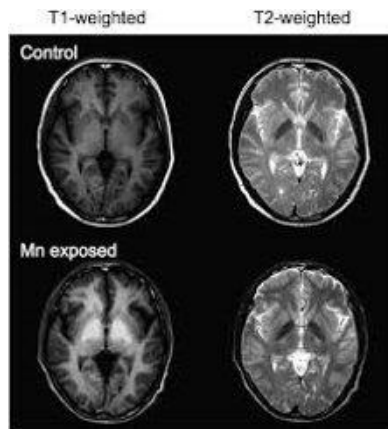
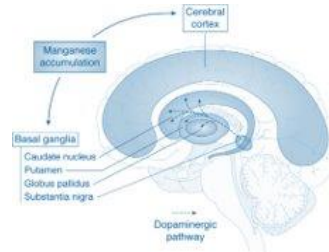
Learning Objectives

1. Understand associated neuropsychiatric symptoms of manganese toxicity
2. Understand the rationale for incorporating heavy metal panels into first episode psychosis workups
3. Demonstrate a comprehensive workup for first episode psychosis

Background

Manganese is a natural occurring element that is found in soil, rock and water. It is also present in some foods, including nuts, whole grains and leafy vegetables. While manganese is an essential nutrient, overexposure has been known to cause non-specific symptoms, including psychiatric symptoms such as hallucinations, paranoia, and mood changes including anxiety and depression^{1,5}. There are case reports of patients presenting with first episode psychosis who were later found to have elevated serum levels of manganese. Manganese can affect movement via its influence on neurons in the subthalamic nucleus and the substantia nigra.

Typically, manganese toxicity affects industry workers, or those with hepatic dysfunction that affect elimination.



Case

In this case, the patient was a 65-year-old male with a past medical history of hypertension initially presenting with a complaint of chest discomfort and palpitations for 3 days. Psychiatry was consulted for an additional complaint of 5 days of anxiety, visual hallucinations, and restlessness. The patient had no past psychiatric history or psychiatric hospitalizations. He had been living with his wife and working as an accountant for the past 35 years. His wife endorsed a 1 week change in behavior and denied any history of cognitive changes or decline. Patient was noted to be rubbing and scratching his head and shaking his leg throughout the encounter, which was a new behavior that also started approximately 1 week prior. Patient was distracted and appeared to be responding to internal stimuli on initial encounter. Initial workup which included a comprehensive blood count and metabolic panel were unremarkable. Urine toxicology was negative, as was urinalysis. Vitamins B12 and folate, thyroid stimulating hormone, homocysteine, and MMA were within normal limits. Infectious workup was unremarkable. Neurology was consulted as well given the recent motor changes, who recommended CT head, MRI brain, video EEG, and heavy metal screening. Heavy metal screening including arsenic, lead, cadmium, mercury, copper, and zinc were also within normal limits. ESR, ANA, p-ANCA and c-ANCA were negative. Manganese level was found to be double the upper limit of normal (level was 5.1, compared to normal <2.5). CT head was unrevealing. On hospital day 2, patient continued to present oddly, guarded, and paranoid. He continued to display involuntary movements throughout the encounter. On hospital day 3, patient had returned to his baseline functioning and was no longer experiencing hallucinations, paranoia, or involuntary movements. At this time, MRI was pending, however patient left the hospital against medical advice with plans to follow up with outpatient neurology.

Discussion

Manganese exposure can be considered in patients with first episodes of psychosis and present similarly to Parkinson's disease³. Manganese accumulates in the globus pallidus and leads to the involuntary movements that are usually seen in these cases. Psychiatric manifestations are thought to be due to modulation of dopamine². Diagnosis can be supported by MRI imaging, that would show deposition in the globus pallidus on T1 weighted imaging⁴. It is imperative to identify manganese toxicity early, as symptoms of early toxicity are reversible through chelation therapy.

Conclusion

While isolated heavy metal toxicity is rather rare in the general population, it is a simple test that can be added on to general workups. Heavy metal panels should be considered as part of the workup for first episode psychosis, as chelation therapy can reverse the course of the illness.

References

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