Midazolam and Low Magnesium Associated With Myoclonic Jerks: A Case Report

To the Editor: We present the case of a 64-year-old man who experienced myoclonus after administration of midazolam. Myoclonus is a rare, but easily missed, side effect of midazolam. The myoclonus resolved once the patient was off of the midazolam for 1 day and had his magnesium level corrected. A review of the literature was conducted, and few cases of this reaction have been reported.

Case report. Mr A, a 64-year-old man with a history of bipolar disorder, somatic symptom disorder, benzodiazepine use disorder, and generalized anxiety disorder, was admitted to the hospital for a revision of his pacemaker. Mr A's bipolar disorder was being managed with aripiprazole 7.5 mg every morning and his anxiety with gabapentin 600 mg twice per day. The psychiatry department was consulted by the surgery team after the pacemaker revision procedure due to Mr A's increased anxiety and agitation. Upon examination, Mr A was noted to have continuous myoclonic jerking of his legs. There was no other evidence of dystonia or extrapyramidal symptoms. Mr A expressed that his anxiety was due to these jerking movements. He also reported that he had never experienced these jerky movements before. After careful examination of his chart, it was noted that Mr A had a magnesium level of 1.3 mEq/L (reference range, 1.7–2.4) and that he was given midazolam preoperatively. Mr A had never taken midazolam, so we hypothesized that this medication was the cause of the myoclonus. A brief literature search was conducted on midazolam with relation to myoclonus, and we found several case studies that showed similar symptoms of myoclonus after administration of midazolam.[1–5] One case in particular reported resolution of myoclonus after midazolam was stopped and magnesium was administered.[1] We therefore recommended to the surgical team to correct Mr A's magnesium level and avoid future use of midazolam. Mr A's magnesium levels were corrected with magnesium supplementation, and the myoclonus resolved 1 day later. His anxiety improved, although he began perseverating about chest wall discomfort. We spoke to Mr A's psychiatrist, who reported that he has a baseline anxiety and often perseverates about somatic complaints. His psychiatric symptoms and specifically his anxieties were being managed in an outpatient setting with pharmacology and psychotherapy.

In a case series, myoclonic movements were reported in term newborns after administration of midazolam. In one of the infants, the myoclonic movements subsided after flumazenil was administered.[2] Short et al[3] describe a case of identical twins experiencing similar paradoxical reactions to midazolam. Some of the symptoms described include restlessness and heightened motor response of the extremities.[3] In another case report, a woman with history of alcohol abuse and anger problems became verbally abusive and developed disruptive movement of her extremities after being administered midazolam for a dental procedure.[4] In a case series looking at 58 patients who had surgery and were administered midazolam, 6 of the patients experienced paradoxical reactions to midazolam, of which flailing of the arms and writhing on the examination table were mentioned.[5]

It appears as though Mr A had a paradoxical reaction to midazolam. Paradoxical reactions are known to occur with benzodiazepine use in less than 1% of patients. Some of the paradoxical reactions include increased talkativeness, emotional release, excitement, and excessive movement. Our patient exhibited excessive movement, which subsided after 1 day. The relationship between paradoxical reactions and genetics, psychiatric illness, and history of alcohol and/or benzodiazepine abuse remains unclear, but growing evidence is showing a possible link.[6] Mr A had a history of benzodiazepine abuse as well as a history of psychiatric illness, and it is possible that these factors played a role in his adverse reaction to midazolam.

REFERENCES

1. Galeone M, Montreuil B, Stewart J, et al. Midazolam, spinal anesthesia, and myoclonic jerks. *Anesth Analg*. 2003;97(3):921–922.
2. Zaw W, Knoppert DC, da Silva O. Flumazenil's reversal of myoclonic-like movements associated with midazolam in term newborns. *Pharmacotherapy*. 2001;21(5):642–646.
3. Short TG, Forrest P, Galletly DC. Paradoxical reactions to benzodiazepines: a genetically determined phenomenon? *Anaesth Intensive Care*. 1987;15(3):330–331.
4. Fiset L, Milgrom P, Beirne OR, et al. Disinhibition of behaviors with midazolam: report of a case. *J Oral Maxillofac Surg*. 1992;50(6):645–649.
5. Weinbroum AA, Szold O, Ogorek D, et al. The midazolam-induced paradox phenomenon is reversible by flumazenil: epidemiology, patient characteristics and review of the literature. *Eur J Anaesthesiol*. 2001;18(12):789–797.
6. Mancuso CE, Tanzi MG, Gabay M. Paradoxical reactions to benzodiazepines: literature review and treatment options. *Pharmacotherapy*. 2004;24(9):1177–1185.

Shady S. Shebak, MD
ssshebak@carilionclinic.org
Geoffrey Bader, MD

Author affiliations: Department of Psychiatry, Virginia Tech Carilion School of Medicine, Roanoke (Dr Shebak) and Salem Veterans Affairs Medical Center, Salem (Dr Bader), Virginia.

Potential conflicts of interest: None reported.
Funding/support: None reported.
Published online: March 19, 2015.
Prim Care Companion CNS Disord 2015;17(2):doi:10.4088/PCC.14l01724