Intravenous Methylprednisolone–Induced Nocturnal Sinus Bradycardia in a Multiple Sclerosis Patient

To the Editor: Some cases of sinus bradycardia caused by intravenous methylprednisolone have been documented,[1] but to the best of our knowledge, however, ours is the first report of nocturnal sinus bradycardia caused by intravenous methylprednisolone.

Case report. Ms A is a 54-year-old white woman with a 10-year history of relapsing remitting multiple sclerosis (MS), vitamin D deficiency, gastric reflux, and hyperlipidemia who was admitted for a reexacerbation of her MS. She was started on intravenous methylprednisolone 1 g in 250 mL[3] of 0.9% normal saline administered daily over a 3-hour period for 5 days. On the night of the third day of treatment, the patient developed sinus bradycardia, which was documented by telemetry as median heart rates in the 40s. Ms A's blood pressure was within normal limits, despite the heart rates of approximately 40; her heart was in sinus rhythm and was not symptomatic. The patient had no prior history of cardiac disease, and results of the cardiovascular system examination were normal. Comprehensive metabolic panel and thyroid function test results were within normal limits, and the cardiologist's review of the 2-dimensional echocardiogram and overnight pulse oximeter readings detected no abnormalities, thus ruling out cardiopulmonary disease and obstructive sleep apnea (OSA). Atropine was ordered, but it was not administered.

During subsequent admissions, Ms A experienced the same bradycardia with intravenous administration of methylprednisolone sodium succinate. Since she was asymptomatic, intravenous methylprednisolone was continued on each occasion while the patient was closely monitored on telemetry. Ms A did not deteriorate, and she was transitioned to oral prednisone 60 mg daily on day 5 after she completed the course of intravenous methylprednisolone. The patient tolerated the intravenous administration and developed no adverse effects while undergoing oral prednisone taper.

Our patient did not have a prior history of cardiac disease, and the nocturnal sinus bradycardia was noticed while she was receiving intravenous methylprednisolone, suggesting that intravenous methylprednisolone induced this adverse effect. Although the patient's nocturnal sinus bradycardia stopped after the intravenous methylprednisolone was discontinued, the nocturnal nature of this cardiac adverse effect or the delay in its onset until the night of the third day cannot be explained by the pharmacokinetics of methylprednisolone.[2]

The precise mechanism via which methylprednisolone exerts this adverse effect is still a subject of debate. Proposed theories to explain these rare adverse effects suggest altered myocardial sensitivity to catecholamine or abnormal levels of serum electrolytes.[3] Our patient had no electrolyte abnormality, and her blood pressure was within normal limits during the entire bradycardic episode.

Significant autonomic nervous system dysfunction has been documented in patients with MS.[4] Extensively documented are abnormalities of bladder, bowel, and sexual issues, but cardiovascular autonomic dysfunction has been infrequently reported.[4]

Even though our patient had no past history of cardiac arrhythmias, it is possible that her background of MS might have made her more prone to intravenous methylprednisolone–induced nocturnal sinus bradycardia.

Cyclic variation of heart rate, which is characterized by progressive bradycardia during an apneic episode with subsequent tachycardia on resumption of respiration, has been associated with OSA.[5] However, we are unable to ascribe our patient's nocturnal sinus bradycardia to OSA because the pulse oximeter readings were within normal limits during the entire episode and the completion of intravenous methylprednisolone finally led to the resolution of the patient's symptoms.

Nocturnal sinus bradycardia is a potential adverse effect of using intravenous methylprednisolone; thus, it is imperative to ensure cardiac monitoring of patients while they undergo intravenous methylprednisolone treatment. If the patient exhibits no decompensation during intravenous methylprednisolone–induced nocturnal sinus bradycardia, then consider whether the patient should be allowed to complete the course of intravenous methylprednisolone.

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