

Bradycardia, Renal failure, AV Nodal Blockade, Shock and Hyperkalemia: A Rare Syndrome Threatening Cardiovascular Collapse

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BACKGROUND: BRASH syndrome consists of Bradycardia, Renal failure, Shock and Hyperkalemia in the setting of exposure to AV nodal blocking agents. It is thought that the synergistic interaction between these medications and hyperkalemia results in this rare life-threatening condition. This case is unique as atenolol is one of the few renally excreted beta-blockers and likely further worsened the patient's bradycardia.

CASE: A 72-year-old female with a history of hypertension and stage III chronic kidney disease presented with progressive weakness and recent viral gastroenteritis. She had been taking her medications as prescribed including atenolol for hypertension. In the Emergency Department, the patient was found to be bradycardic to 30 beats per minute with a blood pressure of 141/67 mmHg. Electrocardiography revealed a junctional escape rhythm without evidence of peaked T waves or widening of the QRS interval. She was found to have significant acute kidney injury (AKI) with a creatinine of 3.23 mg/dL (baseline 1.8 mg/dL) and hyperkalemia (6.0 mmol/L).

DECISION-MAKING: The patient was treated with intravenous fluids, calcium gluconate, insulin/dextrose, and patiomer. Cardiology was consulted with plans for pacemaker placement, however the patient's bradycardia resolved with volume resuscitation and treatment of hyperkalemia in addition to holding atenolol. Her AKI improved and atenolol therapy was discontinued at discharge as there was no cardiac indication for beta-blockade.

CONCLUSION: BRASH syndrome can be instigated by relatively mild insults such as illness, dehydration, or medication changes. Hyperkalemia can precipitate QRS widening, P wave flattening, AV block, and peaked T waves, but BRASH syndrome does not typically demonstrate these findings. Prompt recognition of BRASH syndrome allows interruption of the cycle of bradycardia, renal hypoperfusion, AKI, and hyperkalemia with resultant worsening bradycardia. Many patients continue to be on beta-blocking medications without a clear indication, potentially placing them at risk for BRASH syndrome.