

19. BRASH (Bradycardia, Renal Failure, Atrioventricular Blockage, Shock and Hyperkalemia) Syndrome: A Nightmare at Emergency Room

Chamath Hettiarachchi, Jagath Herath, Solith Senanayake, Nethmi Weerawardena, Kasun Lokuketagoda, Manuja Ranasinghe, Sri Jayewardenepura General Hospital, Nugegoda, Sri Lanka

Body

Background: Systemic hyperkalemia leads to a variety of electrophysiological abnormalities. Bradycardia and conduction abnormalities are usually associated with severe hyperkalemia (>7mmol/L). BRASH (Bradycardia, Renal failure, Atrioventricular blockage, Shock and Hyperkalemia) syndrome is an under reported clinical entity where patients who are on atrioventricular nodal blocking agents present with resistant bradycardia in the context of modest hyperkalemia.

Case: A 60 year old female patient with a background history diabetes mellitus, hypertension, hypothyroidism, ischemic heart disease and stable chronic kidney disease stage 4, presented with fever, recurrent vomiting and dizziness for 2 days duration preceded by respiratory tract symptoms. She has been on oral bisoprolol for several years. Upon presentation, she was dehydrated and blood pressure was 110/80 mmHg with a heart rate of 34 beats/min. Her electrocardiogram (ECG) showed nodal bradycardia. There was metabolic acidosis, hyperkalemia (6.8 mmol/L), deteriorated renal functions and mild hypocalcemia. Other electrolytes, cardiac troponin and thyroid functions were normal. Hyperkalemia was managed medically with calcium gluconate, Insulin-dextrose and salbutamol nebulization after fluid resuscitation and correction of acidosis. As the bradycardia was resistant to treatment, hemodialysis was done for further correction of hyperkalemia and a temporary pacemaker was inserted. With multimodal approach, her heart rate gradually improved and became sinus rhythm over 3 days.

Discussion: This patient was having resistant bradycardia even with modest hyperkalemia, without other hyperkalemic ECG changes and she has been on oral Bisoprolol. Refractory bradycardia leads to low cardiac output and impaired renal perfusion which leads to further accumulation of renally excreted medications (eg: beta blockers) as well as worsening hyperkalemia. The synergistic effect of hyperkalemia and beta blockers leads to resistant bradycardia and acts as a vicious cycle. So multimodal interventions are necessary rather than merely correcting the hyperkalemia. Therefore, knowledge on these atypical presentations is pivotal.



Figure 1. 12 lead ECG showing nodal bradycardia