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General Medicine

A CASE REPORT OF BETA BLOCKER AND CALCIUM CHANNEL BLOCKER OVERDOSE: APPROACH AND MANAGEMENT

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ABSTRACT Poisoning cases are very common in rural parts of India. Most of them are due to organophosphorous compounds, insecticides, rat kill compounds, herbicides. Poisoning due to overdosage of antihypertensive medications is uncommon and presents with hypotension and bradycardia and in severe cases depending on compound can present with various arrythmias and central neurological manifestations. Management includes use of vasopressors, IV glucagon, Glucose-insulin drip, Lipid emulsions and IV calcium and magnesium salts for membrane stabilization. In suicidal cases psychiatric counselling is also equally important.

KEYWORDS :

Case Report

A 53 year old male patient with past medical history of systemic hypertension on regular medications was brought to Emergency Department in stuporous state with alleged history of consumption of 20-30 tablets of T. Nicardia 20 mg (i.e. Nifedipine) and T. MetXL 50 mg (i.e. Metoprolol). Patient was primarily assessed in casualty. On general examination his heart rate was 22 beats/min and blood pressure was non recordable. He had poor respiratory efforts with respiratory rate of 10 per min. He was found to have quadriparesis. Electrocardiogram was suggestive of sinus bradycardia on admission. Patient was immediately shifted to Critical Care Unit and got intubated in view of decreased respiratory efforts and desaturation with Spo2 of 40% and was put on mechanical ventilatory support.

A provisional diagnosis of Beta Blocker and Calcium Channel Blocker overdose was made. He was started on inotropic support. Injectable Noradrenaline (0.1ug/kg/min) infusion was started. Three doses of injectable Atropine 1 mg intravenously were given at an interval of 10-15 minutes in view of persistent bradycardia. There was no response to injectable Atropine. Injectable Glucagon was planned but was not given due to non-availability. He was given high dose Glucose-Insulin IV infusion (16 units Insulin in 100 ml D25%) in due course in view of refractory hypotension and persistent bradycardia-total three infusions were given. The response was increase in heart rate to 40 beats/min, on 3rd day after admission hence, further dosing was stopped. In view of refractory hypotension, injectable Dopamine (10 ug/kg/min) was also started on 3rd day after admission. On 5thday patient's heart rate was 80 beats/min with systolic blood pressure of 70 mmHg. Serial ECG monitoring and strict blood pressure charting was done.

Figure 1: ECG Suggestive Of Sinus Bradycardia On Day 2

Figure 2: ECG On Day 4 Of Same Patient

He was also given injectable MgSO4 and Calcium Gluconate for membrane stabilization thus, preventing further risk of arrythmias. Patient's consciousness and blood pressure recovered over a period of 5 days after high dose Insulin-Dextrose infusions. Once the blood pressure was stabilized careful tapering of inotropic supports after strict monitoring was done, eventually stopping inotropic supports. Patient was extubated on 7thday of admission.

Patient was then shifted to General Medicine ward where he was monitored for 3 more days. He recovered completely over a period of 10 days with stabilized vital parameters and without landing up in Multiple Organ Dysfunction Syndrome during hospital stay. Psychiatrist opinion was taken in view of suicidal attempt and patient was found to be suffering from Reactive Depression for which counselling was done and was started on antidepressants medications as advised.

Poisoning cases though very common in rural parts of India, poisoning due to overdose of antihypertensive medications is uncommon and approach and line of management in such case makes it a rare one.

While discharging, a detailed informed consent was taken from patient and his relatives in the language that they understand the best for publishing this case report and was advised follow up in Medicine and Psychiatry out patient department.

DISCUSSION

Poisoning cases are very common in rural parts of India. Most of them are due to organophosphorous compounds, herbicides, insecticides, rat kill compounds, etc. Poisoning due to overdosage of antihypertensive medications is very rare and has unusual clinical presentation and line of management thus making our case unique.

Complications following Beta blocker overdose are related to excessive beta-adrenergic blockade and occasionally the proarrythmic (membrane stabilizing) activity of these agents on cardiac conduction and also on coingestion of other cardioactive agents like calcium channel blockers [3]. Competitive antagonism of beta receptor decreases cellular levels of cyclic adenosine monophosphate [4]. Beta one selective blockade results in depressed myocardial contractility, decreased automaticity in pacemaker cells and decreased conduction velocity through Atrioventricular node [4]. In addition to beta adrenoreceptor blockade, properties that affect toxicity include membrane stabilizing activity, lipophilicity and intrinsic sympathomimetic activity of ingested agent [5]. Diagnosis of beta blocker intoxication is made on the basis of history and clinical presentation. Bradycardia and hypotension are the most common effects and in severe overdoses can result in profound myocardial depression and cardiogenic shock [9]. Other effects that are seen include ventricular arrythmias, mental status changes, seizures, hypoglycemia and bronchospasm [10,11,12]. Changes seen on electrocardiogram include increased PR prolongation and possibility of AV block, bradycardia, QRS prolongation, QTc prolongation [7],[11].

Diagnosis is made based on clinical presentation and physical examination. Management of such a patient begins with assessment of airway, breathing, and circulation. Atropine should be given early in bradycardiac patients. Hypotension is treated with intravenous boluses of isotonic fluid initially. Sodium bicarbonate and magnesium may be needed to treat QRS prolongation and ventricular arrythmia (torsades de pointe), respectively [7]. In most cases due to inability to completely reverse cardiotoxic effects of beta blocker overdose additional treatments are given based upon severity of presentation [17]. These may include :

- IV glucagon-increases cAMP—increased intracellular pool of calcium [19],[20,21]
- IV calcium salts
- Vasopressor[14]
- High dose insulin and glucose infusions-improve inotropy by providing substrate for aerobic metabolism within myocyte. [22,23.24,25]
- Lipid emulsion[5]

For milder symptoms, above mentioned treatments are given in succession, but proceed to next treatment only if prior treatment or combination of treatments is ineffective. A period of 15 minutes is reasonable to determine the effectiveness of a specific therapy before

proceeding to the next treatment. In severe poisoning give all of the above treatments. Hemodialysis may be needed in specific circumstances (eg, severely ill patient with ingestion of medication amenable to hemodialysis and not responding to medical therapy), although this is uncommon. IV glucagon is an antidote for beta blocker poisoning and high dose insulin and glucose infusion is an antidote especially of calcium channel blockers [16]. Gastrointestinal decontamination can be done with single dose of activated charcoal (1gm/kg) or whole bowel irrigation.

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