ADULT RESPIRATORY DISTRESS SYNDROME ASSOCIATED WITH MASSIVE PROPRANOLOL OVERDOSE

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PROPRANOLOL is a nonselective beta-blocker agent without intrinsic sympathomimetic activity. Due to its widespread use in various cardiac and non-cardiac disorders, cases of self-poisoning with propranolol are also increasing. We report here a case of a 25-year-old woman who ingested 5 g of propranolol. She was brought to the Accident and Emergency Department of King Khalid University Hospital (KKUH) in an unresponsive state with circulatory collapse and cardiopulmonary arrest. She was resuscitated conventionally with isoprenaline intravenous infusion, temporary pacemaker insertion, and ventilatory support. She developed adult respiratory distress syndrome (ARDS) and was managed successfully with a broad spectrum of antibiotics, ventilatory support, and other supportive measures.

Case Report

A 25-year-old woman was brought to the Accident and Emergency Department of KKUH in an unresponsive state without any spontaneous breathing or pulse, one hour after ingesting 25 tablets of Inderal (40 mg/tablet). The patient was intubated and cardiopulmonary resuscitation (CPR) was initiated along with a total of 2 mg of atropine and 2 mg of adrenaline intravenous injections. She regained her spontaneous breathing which was shallow and slow; her pulse was very weak with a palpable blood pressure of 50 mm Hg. Isoprenaline intravenous infusion was started, but soon she developed generalized seizures and again had cardiopulmonary arrest. She was resuscitated again; intravenous Dopamine and isoprenaline infusions were continued and 1 mg of atropine was given as well. Gastric lavage was done and a transvenous temporary pacemaker was inserted. Blood pressure increased to 80 mm Hg within an hour and gradually rose to 90 mm Hg. The patient was in a flaccid state, deeply unconscious with dilated and fixed pupils, and had upgoing plantars, but after three hours her pupils became reactive to light and she started moving her limbs. After 12 hours, she was conscious but became hypoxic; chest examination at this stage revealed bilateral crepts and chest x-ray demonstrated bilateral diffuse infiltrates (Figure 1). Arterial blood gases obtained in the Medical Intensive Care Unit on 100% oxygen with mechanical ventilatory support showed P02 of 43 mm Hg. Fluid intake and output were evenly balanced. Swan-Ganz catheterization was done and pulmonary capillary wedge pressure at this stage was 9 mm Hg.

The patient was started on a broad spectrum of antibiotics (penicillin, ceftriaxone sodium, and Flagyl intravenous injection) for the possibility of aspiration pneumonia. She was maintained on mechanical ventilation (with positive end-expiratory pressure) with close monitoring of her oxygen delivery; her oxygenation improved gradually. Isoprenaline was discontinued after 6 hours of admission to the hospital, and the pacemaker was taken out after 36 hours. She was extubated after 4 days. Follow-up chest x-ray showed complete clearance of infiltrates (Figure 2) and she has made a full recovery.

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Discussion

Propranolol is a highly lipid-soluble, nonselective beta-blocker with a membrane stabilizing effect without intrinsic sympathomimetic activity. It is quickly absorbed from the stomach and readily crosses the blood-brain barrier to be concentrated in the brain tissues. Propranolol is 95% protein-bound and, therefore, dialysis is less likely to be effective. The average half-life of propranolol is 3 to 6 hours but it varies depending on renal and hepatic status. Reduction in hepatic and renal blood flow can prolong the chemical half-life up to 72 hours.

The side effects on the central nervous system (CNS) include delirium, convulsion, and coma. Convulsions may occur either due to inadequate blood supply to the brain or secondary to the direct CNS depressing effect. Cardiovascular effects include bradycardia, atrioventricular block, intraventricular conduction delays, hypotension, asystole, and shock. It is surprising that hypoglycemia and bronchospasm have not been a very prominent finding in propranolol overdose except in few cases. Beta-blockers have been well tolerated even in very high doses. With such widespread uses of beta-blockers for more than two decades, only few cases of serious overdose problems have been reported.

Our patient was on the ventilator from the time of admission to hospital post-CPR. When the patient's oxygenation was poor on 100% FiO₂ and her chest x-ray showed diffuse pattern, aspiration pneumonia versus cardiogenic pulmonary edema was raised as a possibility. Fluid intake and urine output were evenly balanced. Significant hypoxia while on ventilatory support and 100% FiO₂, along with bilateral alveolar infiltrates on chest x-ray and normal pulmonary capillary wedge pressure, led us to believe that she had developed ARDS.

The cause of ARDS in propranolol overdose is not known, however, it might have been secondary to hypotension or aspiration during CPR. To our knowledge, the only other reported case which had noncardiogenic pulmonary edema was published by Amundson and Brodine. Our patient received a broad spectrum of antibiotics along with other supportive measures for hemodynamic status and volume-controlled ventilation (positive end-expiratory pressure was 10 cm). Gradually, she made a full recovery, and her chest x-ray has become normal.

In the light of recent literature, treatment of propranolol overdose poisoning includes gastric lavage, activated charcoal through nasogastric tube, cardiovascular monitoring in the intensive care unit, hemodynamic support by glucagon bolus injection and infusion, and unusually high doses of isoprenaline intravenous infusion along with a temporary pacemaker insertion.
been suggested that a temporary pacemaker should be inserted in every patient with a significant propranolol overdose since asystole and circulatory collapse can occur without warning.10

Our case as well as the case report of Amundson and Brodine illustrate that, although pulmonary edema may occur due to the negative inotropic effects of propranolol on the heart and bradycardia, in some patients (even though a rarity) noncardiogenic pulmonary edema may occur also and therefore we should be aware of it in order to treat it effectively. However, the mechanism of ARDS in propranolol overdose is not well understood and needs further investigation.

References


