

Case Report

Verapamil and Acebutolol Overdose Results in Asystole: Intra-Aortic Balloon Pump Provides Mechanical Support

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Abstract

This is a case report of a 17-year-old woman who was in severe cardiogenic shock with intermittent consciousness due to an overdose of acebutolol and verapamil when paramedics arrived at her house. Two and one-half hours of CPR were required because she failed to respond to high doses of positive inotropes or to glucagon. A

temporary pacemaker and intra-aortic balloon pump were used to provide hemodynamic support and hemoperfusion was used in an attempt to decrease serum levels of the cardiac-depressing drugs. This patient soon experienced complete recovery without sequelae.

Introduction

There have been numerous case reports of patients suffering from myocardial depression and AV block, including complete heart block, during concomitant therapy with beta-adrenergic blockers and calcium ion antagonists (1). Patients surviving beta-blocker overdoses have often been found to respond to glucagon, although responses to atropine, isoproterenol and other beta and alpha agonists also have been reported (1).

We report a case in which a patient experienced severe cardiogenic shock secondary to an inadvertent overdose of acebutolol and verapamil. She was unresponsive to pharmacologic intervention and two and one-half hours of CPR, after which an intra-aortic balloon pump and temporary pacemaker were used to provide hemodynamic support. Subsequent hemoperfusion was used in an attempt to decrease the life-threatening serum levels of the drugs.

Case Report

This is a case report of a 17-year-old woman, 5 ft 6 in tall, weighing 124 lbs, who had a history of paroxysmal atrial tachycardia (PAT). After a routine check-up with her family physician, she was hospitalized for further evaluation of her dysrhythmia. After electrophysiologic testing failed to pre-

cipitate a pathological arrhythmia, her scheduled medications of acetutolol 400 mg capsules and verapamil 240 mg sustained-release caplets were discontinued until her return for further evaluation.

On the morning of her admission to the emergency room, she felt a prodrome for her PAT. Feeling it beneficial, she took an unknown number of the acebutolol capsules and approximately two of the verapamil caplets before attending school. At school she experienced a syncopal episode and was taken home. She became progressively less responsive and eventually unconscious. Paramedics were summoned. When they arrived they found the patient sitting upright and able to converse but feeling very weak and lightheaded. Her heart rate was 10 beats per minute (BPM) and her blood pressure was undetectable. The paramedics injected IV epinephrine 1 mg and IV atropine 1 mg and began an IV isoproterenol drip of 0.5 ug/kg/min, but still her condition worsened. She was then intubated and CPR was initiated before transporting her to the emergency room.

Upon her arrival in the emergency room, the patient was

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asystolic and pulseless. CPR was continued while a nasogastric tube was inserted followed by the administration of activated charcoal. She was then given 2 grams of calcium chloride and the isoproterenol drip was increased to full flow. A temporary transvenous pacemaker set at a rate of 70 BPM was inserted. She remained essentially pulseless despite adequate ventricular pacing. The patient was then given multiple doses of intravenous glucagon without effect. An amrinone infusion was started. Subsequently, a blood pressure of 40-50 mmHg was detectable. Despite full therapeutic doses of positive inotropic agents, her myocardial contractility continued to be effectively blocked by the drug overdose.

Two and one-half hours after her admission to the emergency room, the patient was transported to the cardiac catheterization laboratory where a Datascope 9.5 French intra-aortic balloon catheter^a was inserted via the left femoral artery, and counterpulsation was begun at a ratio of 1:1. This was effective in increasing her blood pressure to approximately 60 mmHg, and although she remained relatively unconscious, she was able to respond to her name. A Swan-Ganz catheter was then advanced into the pulmonary artery via the right femoral vein. At this point, her cardiac output was 2.92 l/min with a cardiac index of 1.8 l/min/m², and her systemic vascular resistance was 1,233 dynes/sec/cm⁵. One and one-half hours later, the patient was transported to the open heart recovery unit but continued to exhibit severe suppression of both myocardial automaticity and contractility. Approximately 50 minutes later, hemoperfusion was begun utilizing a Cobe Century II dialysis machine^b and a Gambro Adsorba 300C hemoperfusion cartridge^c. This was to attempt to decrease her serum levels of acebutolol and verapamil. Laboratory results later showed that her serum verapamil level prior to hemoperfusion was 831 ug/l (therapeutic level 100-600 ug/l), and her serum norverapamil (20% cardiac activity of verapamil) level was 520 ug/l. Acebutolol levels were not ordered by her cardiologist. The patient was hemoperfused for approximately five hours during which time her blood pressure and cardiac output remained quite low. During this time however, she regained consciousness and developed a functional sinus rhythm of 79 BPM which persisted after pacing was discontinued.

Over the course of her second day of admission, the patient's cardiac output rose to 4.8 l/min with an index of 3.31 l/min/m², and urine output, which was initially quite poor, increased significantly. Twenty-six hours after her admission, counterpulsation was discontinued. Twelve hours later, she was extubated and transferred to a progressive care unit. There, she regained a fully stable hemodynamic and cognitive status on her third day of admission. Subsequent serial

echocardiograms revealed a return of normal contractility to her left and right heart.

Seven days after her admission, this patient was discharged from the hospital in a hemodynamically stable condition with no detectable dysrhythmia.

Summary

This case supports the contention that prolonged mechanical support may be the only effective mode of therapy for patients suffering from cardiac-depressing overdoses that are unresponsive to pharmacological therapy (1). This support may entail prolonged CPR, for hours if necessary, and intra-aortic balloon counterpulsation along with electronic pacing. Indeed, the intra-aortic balloon pump plays a role in the support of patients suffering from cardiogenic shock due to any potentially reversible condition when pharmacological therapy is inadequate. And although no post-hemoperfusion serum drug levels were ordered in this case, hemoperfusion may possibly be effective in decreasing serum levels of some drugs or drug metabolites. Verapamil, however, has not been found to be removed from blood by hemoperfusion (2).

References

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b Cobe Laboratories, Lakewood CO 80215

c Gambro Inc., Barrington IL