



# Poison HOTLINE

Partnership between Iowa Health System and  
University of Iowa Hospitals and Clinics

June 2010



*Did you know .....*

Chlorine gas is irritating to the eyes, nose and upper airways; large inhalations can cause pulmonary edema or ARDS. Chlorine gas exposures called to the poison center frequently involve people who have mixed chlorine bleach with an acidic cleaner, or have used chlorine-based products to chlorinate a swimming pool.

To stay safe, know which products contain chlorine bleach and read the label before using the product. When working with pool chemicals, use personal protective equipment and stay in a well-ventilated area.

[www.iowapoisson.org](http://www.iowapoisson.org).

## High-Dose Insulin for Calcium Channel Blocker Overdoses

Severe calcium channel blocker (CCB) overdoses can be difficult to treat, and the hypotension and bradycardia may be refractory to high-dose vasopressors. Along with vasodilation, negative inotropism, negative chronotropism and slowing of cardiac conduction, there are several significant metabolic changes caused by CCB overdoses. High-dose insulin can be beneficial in treating both the hemodynamic and metabolic effects of a severe CCB overdose.

### Metabolic Changes in CCB Overdose

- Cardiac myocytes, which normally use free fatty acids as their energy source, become dependent on carbohydrates for energy.
- Myocardial uptake of free fatty acids is impaired.
- Calcium-mediated insulin release from the pancreas is inhibited.
- Whole-body insulin resistance occurs.

### Physiological Effects of High-Dose Insulin Therapy

Large doses of regular insulin (initial dosing: bolus of 1 Unit/kg followed by an infusion of 0.5 Unit/kg/hr) are used to treat the heart's metabolic problems.

#### Significant improvement in cardiac contractility

- Increases in coronary artery blood flow, LV systolic elastance, diastolic relaxation, and intra-cellular calcium concentrations.
- The heart's mechanical efficiency is increased by high-dose insulin but decreased by glucagon and catecholamines.

#### Significant improvement in cardiac metabolics

- Increased cardiac glucose uptake and utilization, increased cardiac oxygen delivery, and a four-fold increase in myocardial oxygen utilization.
- The improved heart function is caused by insulin's direct effect on myocardial metabolism, not increased catecholamine concentrations.

### Take Home Points

- In severe CCB overdoses, high-dose insulin is used to treat the heart's metabolic problems, not the patient's blood sugar.
- Dextrose infusions are titrated to prevent hypoglycemia.

**POISON**  
**Help**  
**1-800-222-1222**

The logo for Poison Help. It features the word "POISON" in a bold, black, sans-serif font at the top. Below it, the word "Help" is written in a large, bold, black, sans-serif font. To the right of the "Help" text is a red pill bottle with a white skull and crossbones symbol on its label. Below the "Help" text and the pill bottle is the phone number "1-800-222-1222" in a bold, black, sans-serif font.

Post and share this edition of **Poison Hotline** with your colleagues. Send comments or questions to Poison Hotline, 712-234-8775 (fax) or [nobleff@ihs.org](mailto:nobleff@ihs.org). To subscribe or unsubscribe from this distribution list, contact the Iowa Poison Center education office at 712-279-3717. Read past issues of **Poison Hotline** at [www.iowapoisson.org](http://www.iowapoisson.org).