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Pharmacist's Letter
Hospital

Guide Safe Use of High-Dose Insulin in Med Overdoses

We're getting questions about **high-dose insulin euglycemia (HIE) therapy for beta-blocker or calcium channel blocker (CCB) overdose**.

These top the list of CV meds that cause fatal poisonings in the US.

Begin monitoring and supportive care...IV fluids for hypotension, atropine for bradycardia, etc. And call poison control (800-222-1222) for guidance about gastric decontamination and further management.

Glucagon may boost heart rate temporarily. Try an IV glucagon bolus with a beta-blocker overdose...followed by infusion if heart rate or BP respond. But don't rely on glucagon with a CCB overdose...data are mixed.

With beta-blocker or CCB overdose, generally give IV calcium to temporarily improve BP and contractility.

Then start pressors if needed to support BP and cardiac output. For example, choose norepinephrine if low BP is the primary concern.

If pressors aren't enough, anticipate adding HIE therapy...insulin has inotropic effects when given at roughly 10 times the normal dose.

For example, give regular insulin 1 unit/kg as an IV bolus...PLUS 50 mL of dextrose 50% if glucose is less than 200 mg/dL.

Then start an insulin infusion at 0.5 unit/kg/hour...plus dextrose 10% (D10W) at 0.5 g/kg/hour.

Titrate insulin every 15 to 30 minutes...to target a heart rate above 50 bpm and mean arterial pressure above 65 mm Hg. And adjust dextrose to maintain glucose between 125 and 250 mg/dL.

Be aware, insulin rates up to 10 units/kg/hour may be needed. Concentrate fluids...since high volumes may be needed. For example, consider dextrose 20% (D20W) once a central line is available...and a more concentrated insulin drip if your hospital allows it.

Monitor closely, paying special attention to glucose and potassium.

For example, check glucose every 30 minutes and electrolytes every 1 hour while titrating insulin. Once patients are on a stable infusion rate, check glucose hourly and electrolytes every 2 hours.

Expect to wean insulin by 1 unit/kg/hour after CV toxicity resolves, such as once pressors are stopped.

Once the insulin infusion is stopped, continue close glucose monitoring for about 24 hours. The dextrose infusion will likely need to continue...since insulin can accumulate and effects may persist for hours.

For refractory shock, work with poison control to evaluate other options...such as IV lipid rescue or methylene blue.

Help reduce errors and avoid treatment delays by standardizing HIE therapy in order sets, protocols, and smart pump libraries.

Get our resource, *Drugs for Selected Medication Overdoses and Poisonings*, for more guidance.

Key References:

-Goldfine CE, Troger A, Erickson TB, Chai PR. Beta-blocker and calcium-channel blocker toxicity: current evidence on evaluation and management. Eur Heart J Acute Cardiovasc Care. 2024 Feb 16;13(2):247-253.

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-Palatnick W, Jelic T. Calcium channel blocker and beta blocker overdose, and digoxin toxicity management. Emerg Med Pract. 2020 Sep 15;22(Suppl 9):1-42.
-Krenz JR, Kaakeh Y. An Overview of Hyperinsulinemic-Euglycemic Therapy in Calcium Channel Blocker and -blocker Overdose. Pharmacotherapy. 2018 Nov;38(11):1130-1142.
-St-Onge M, Anseeuw K, Cantrell FL, et al. Experts consensus recommendations for the management of calcium channel blocker poisoning in adults. Crit Care Med. 2017;45(3):e306-e315.

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