

Case of the Month
April 2008

NJPIES received a call from an Emergency Department requesting assistance in managing an adult male patient who accidentally received 700 units of intravenous regular insulin, instead of 10 units. The insulin was being used to treat an elevated potassium level due to rhabdomyolysis, which was the result of a crush wound. The patient's blood glucose level was also elevated, at 360mg/dL. Prior to consulting NJPIES, the patient was sedated and was given 1 mg of glucagon. He was also started on dextrose 50% in water (D₅₀W) boluses every thirty minutes around the clock.

A poison specialist from NJPIES recommended that the D₅₀W boluses should be replaced with an infusion of dextrose 10% in water, because the patient was not hypoglycemic. Additionally, excessive administration of dextrose to a non-diabetic individual would only stimulate further release of insulin.

Two hours later, the patient was transferred to the Intensive Care Unit. His blood glucose was 218mg/dL on the dextrose infusion. After another five hours, the patient was awake, alert, and oriented, and all of his vital signs were normal. His blood glucose was down to 94mg/dL. Approximately twelve hours later, the dextrose infusion was discontinued and the patient was placed on a normal saline infusion. He had a normal blood glucose of 114mg/dL. His potassium level was also within the normal range, at 4.5mEq/L. Finally, about twelve hours afterwards, the patient's blood glucose was 120mg/dL and his fluids were changed to dextrose 5% in water with normal saline. He was ready to be discharged the following morning.

An overdose of subcutaneous or intramuscular insulin can result in prolonged hypoglycemia. This may be due to a "depot" effect, resulting in delayed release of the insulin from adipose tissue. It may also be a result of tissue compression at the injection site, which can lead to decreased perfusion and a delay in insulin absorption.¹ Thus, a 10% dextrose infusion should be initiated and titrated to a blood glucose level of 100 to 150mg/dL, in order to avoid mental status changes. Potassium, magnesium, and phosphorous levels should also be monitored and these electrolytes should be supplemented as necessary. Blood glucose should be monitored every one to two hours.²

Hypoglycemia due to intravenous insulin, on the other hand, is very fleeting. This is because the half life of IV insulin is only about seven minutes.³ Even in an overdose, saturation of insulin receptors prevents excessive hypoglycemia from taking place, so aggressive long-term management is usually unnecessary. Blood glucose should be monitored for at least thirty minutes⁴ and the patient should be treated with oral intake if possible.

Finally, glucagon is not a first-line agent for the treatment of hypoglycemia. It should be considered only when intravenous access cannot be obtained. This is because it has a delayed onset of action and may not be of value in patients with inadequate glycogen stores.⁵

References:

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3. Unger J, Marcus AO. Glucose control in the hospitalized patient. *Emerg Med* 2004;36(9):12-8.
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5. Thoma ME, Glauser J, Genuth S. Persistent hypoglycemia and hyperinsulinemia: caution in using glucagon. *Am J Emerg Med* 1996 Jan;14(1):99-101.