

Infusion of 70% Dextrose to Minimize Risk of Fluid Overload in High Dose Insulin Therapy: A Case Series

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Background: Patients receiving high dose insulin (HDI) are often on multiple infusions and at high risk for pulmonary edema. Concentrating infusions minimizes this risk. A 70% stock solution of dextrose (D70) is often used to compound dextrose solutions, however reports of direct infusion of D70 are lacking.

Hypothesis: Infusion of D70 as part of HDI is safe, feasible, and may reduce the total volume of fluid infused.

Methods: This is a two-patient case series.

Results:

A 25-year-old woman presented in respiratory failure secondary to iatrogenic opioid and sedative overdose and aspiration from elective procedural sedation. She received 4 liters of crystalloid and IV metoprolol for physiologic tachycardia. On emergency department arrival, she was hypotensive (74/41 mmHg), and hypoxic (83%) with a pulse of 83 beats/min. Bedside echo revealed poor contractility and pulmonary edema, thus HDI was initiated given the proximal beta-blocker with relative bradycardia in the setting of hypotension. She stabilized after an HDI bolus of 59 units; D70 was infused for 3 hours. The patient was discharged on day 3 without sequelae.

A 44-year-old woman presented to a rural hospital comatose with a suspected overdose of carbamazepine and atenolol. She was intubated and started on the following infusions; HDI 31 units/hr (0.2 units/kg/hour), dopamine 20 mcg/kg/min, and norepinephrine 0.2 mcg/kg/min. Upon tertiary center arrival she was in pulmonary edema with the following vital signs; 67/45 mmHg, 93 beats/min, and SpO₂ 84%. HDI was titrated to 8.5 units/kg/hour. D70 was infused for 110 hours. She was discharged with a tracheostomy secondary to ARDS. At discharge she was alert and following commands.

Discussion: D70 has an osmolarity of 3535 mOsm/L. While high osmolarity solutions may cause phlebitis and thrombosis, risk is minimized if central venous access is used. The osmolarity of D70 is dwarfed by other medications used in critical care; for example 23.4% saline has an osmolarity of 8008 mOsm/L. D70 offers a significant concentration advantage. For example patient 2 received 4.2 liters of dextrose-containing fluid; if D10 had been used she would have received 30 additional liters.

Conclusion: Infusion of D70 as part of HDI appears safe and feasible.