



Pharmacy Friday

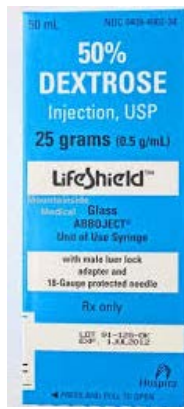
Brief pearls related to acute care pharmacology and evidence-based medicine

Other pearls found at:

- <https://sites.google.com/presby.edu/pharmacy-friday>



Hypoglycemia Treatment in the ED



Introduction

1. At least 400 million individuals currently suffer from diabetes mellitus, and millions are treated with insulin to control blood glucose
2. Insulin can cause hypoglycemia, a potentially severe, even life-threatening, complication that burdens insulin users each and every day.
3. Treatment options include oral glucose in alert and oriented patients, IV dextrose (D50W and D10W), and glucagon
4. Recently, there has been discussion of the efficacy and kinetics of glucagon as well as the safety of D50W, due to the hypertonic toxicity, rebound hypoglycemia, and overshooting glycemic targets after treatment.

Pharmacology			
Properties	Glucagon	D10W	D50W
Dose	1 mg, may repeat in 15 mins	10-25g (100-250 ml)	10- 25g (20-50 ml)
Administration	IM or IV push over 2-3 min	IV bolus ± infusion	IV bolus over 2-3 min
Formulation	IV solution	IV premix 1000 ml	IV syringe 50 ml
PK/PD	Onset: IV- 5-20 min IM ~30 min Duration: IV/IM 60-90 min	Onset: Immediate Duration: Blood glucose should be rechecked 30 mins	Onset: Immediate Duration: Blood glucose should be rechecked 30 mins
Adverse Effects	Nausea+ Vomiting, ↑ HR+↑ BP	Hyponatremia and hypokalemia, rebound hypoglycemia or hypoglycemia without monitoring	Injection site irritation, Extravasation with subsequent tissue necrosis, Thrombophlebitis, hypokalemia, rebound hypoglycemia or hyperglycemia without monitoring
Drug Interactions and warnings	Consider pretreating with anti-emetics due to high risk of vomiting	No major interactions	No major interactions
Location in GHS	CPR 2+3 and Trauma Main	CPR 2+3 and Trauma Main	CPR 2+3 and Trauma Main
Comments	No major concerns with injection site adverse effects	Osmolarity 500 mOsm/L when preferred for PIV is < 900 mOsm/L	Osmolarity 2500 mOsm/L when preferred for PIV is < 900 mOsm/L



Extravasation Management from D50W

IV site	Immediately remove the IV line and the arm elevated
Compress	Cold compresses should be placed over the site of extravasation for 15 to 30 minutes and repeated every 4 hours while elevating the arm
Antidote	Hyaluronidase injected subcutaneously 0.2 mL (150 U/1 mL) with a 25-gauge needle at 5 different sites along the leading edge of erythema.

Overview of Evidence

Hern, 2017	Observational EMS Protocol N=871	Single arm D10W 100 ml	<ul style="list-style-type: none"> The median time to second glucose testing was eight minutes after beginning the 100mL D10 infusion with median blood sugar 91 mg/dL 23.0% required an additional dose of IV D10W solution and 0.8% patients required a third dose
Boido, 2014	Meta-analysis	Glucagon Vs Dextrose	<ul style="list-style-type: none"> Comparing glucagon and dextrose, the OR was 0.53 (0.20–1.42); comparing IN and IM glucagon, the OR was 1.40 (0.18–10.93). Ineffectiveness of glucagon is unfrequent, not different from dextrose IN and IV/IM glucagon are similarly effective.
Moore, 2005	RCT N=51	5 g (50 ml) IV aliquots of D10W Vs 5 g (10 ml) IV aliquots of D50W	<ul style="list-style-type: none"> No statistically significant differences in median time to recovery (8 minutes), median post-treatment GCS, or # subjects experiencing a further hypoglycemic episodes. Used less D10W to achieve similar blood glucose level than D50W
Collier, 1987	Observational N=52	Glucagon 1 mg IV Vs D50W 25 g (50 ml)	<ul style="list-style-type: none"> D50W led to quicker elevation of blood sugar and regain of baseline consciousness compared to glucagon

References

1. Micromedex [Electronic version]. Greenwood Village, CO: Truven Health Analytics. Retrieved September 6, 2018, from <http://www.micromedexsolutions.com/>
2. Collier A et al. Diabetes Care. 1987 Nov-Dec;10(6):712-5.
3. Wiegand R et al. Am J Emerg Med. 2010 Feb;28(2):257.e1-2.
4. Boido A et al. Acta Diabetol (2015) 52:405–412
5. Kiefer MV et al. Prehosp Disaster Med. 2014 Apr;29(2):190-4.
6. Hern HG. Prehosp Emerg Care. 2017 Jan-Feb;21(1):63-67