



YALE INSULIN DRIP PROTOCOL



The following insulin drip protocol is intended for use in hyperglycemic adult patients in an ICU setting, but is not specifically tailored for those individuals with diabetic emergencies, such as diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar states (HHS). When these diagnoses are being considered, or if $BG \geq 500$ mg/dL, an MD should be consulted for specific orders. Also, please notify an MD if the response to the insulin drip is unusual/unexpected, or if any situation arises that is not adequately addressed by these guidelines.

Initiating An Insulin Drip

- 1) **INSULIN INFUSION:** Mix 1 U Regular Human Insulin per 1 cc 0.9 % NaCl. Administer via infusion pump (in increments of 0.5 U/hr).
- 2) **PRIMING:** Flush 50 cc of Insulin/NS drip through all IV tubing, before infusion begins (to saturate the insulin binding sites in the tubing)
- 3) **TARGET BLOOD GLUCOSE (BG) LEVELS: 100-139 mg/dL**
- 4) **BOLUS & INITIAL INSULIN DRIP RATE:** Divide initial BG level (mg/dL) by 100, then round to nearest 0.5 U for bolus AND initial drip rate

Examples: 1) Initial BG = 325 mg/dL: $325 \div 100 = 3.25$, rounded \uparrow to 3.5: IV bolus 3.5 U + start drip @ 3.5 U/hr.

2) Initial BG = 174 mg/dL: $174 \div 100 = 1.74$, rounded \downarrow to 1.5: IV bolus 1.5 U + start drip @ 1.5 U/hr.

Fingerstick (FS) Blood Glucose Monitoring

- 1) Check FS hourly until stable (= 3 consecutive values in target range)
- 2) Then check FS q 2 hours; once stable x 12-24 hours, FS checks can be spaced to q 4 hours if:
 - a) No significant change in clinical condition AND
 - b) No significant change in nutritional intake
- 3) If ANY of the following occur, consider the temporary resumption of hourly FS monitoring, until BG is again stable (= 2-3 consecutive BG values in target range).
 - a) Any change in insulin drip rate (i.e. BG out of target range)
 - b) Significant changes in clinical condition
 - c) Initiation or cessation of pressor therapy
 - d) Initiation or cessation of renal replacement therapy (hemodialysis, CVVH, etc.)
 - e) Initiation, cessation, or rate change of nutritional support (TPN, PPN, tube feedings, etc.)

Changing the Insulin Drip Rate

If BG < 50 mg/dL:

D/C INSULIN DRIP

Give 1 Amp (25 g) D50 IV; recheck BG q 15 minutes

\Rightarrow When $BG \geq 100$ mg/dL, wait 1 hour, then restart insulin drip at 50% of original rate

If BG 50-74 mg/dL:

D/C INSULIN DRIP

If symptomatic (or unable to assess), give 1 Amp (25 g) D50 IV; recheck BG q 15 minutes

If asymptomatic, give 1/2 Amp (12.5 g) D50 IV or 8 ounces Juice; recheck BG q 15-30 minutes

\Rightarrow When $BG \geq 100$ mg/dL, wait 1 hour, then restart drip at 75% of original rate

Changing the Insulin Drip Rate (cont'd.)

If BG \geq 75 mg/dL:

STEP 1: Determine the CURRENT BG LEVEL - identifies a COLUMN in the table:

BG 75-99 mg/dL	BG 100-139 mg/dL	BG 140-199 mg/dL	BG \geq 200 mg/dL
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STEP 2: Determine the RATE OF CHANGE from the prior BG level - identifies a CELL in the table - Then move right for **INSTRUCTIONS:**

[*Note: If the last BG was measured 2-4 hrs before the current BG, calculate the hourly rate of change. Example: If the BG at 2PM was 150 mg/dL and the BG at 4PM is now 120 mg/dL, the total change over 2 hours is -30 mg/dL; however, the hourly change is $-30 \text{ mg/dL} \div 2 \text{ hours} = -15 \text{ mg/dL/hr}$.*]

BG 75-99 mg/dL	BG 100-139 mg/dL	BG 140-199 mg/dL	BG \geq 200 mg/dL	INSTRUCTIONS*
		BG \uparrow by > 50 mg/dL/hr	BG \uparrow	\uparrow DRIP by "2 Δ "
	BG \uparrow by > 25 mg/dL/hr	BG \uparrow by 1-50 mg/dL/hr OR BG UNCHANGED	BG UNCHANGED OR BG \downarrow by 1-25 mg/dL/hr	\uparrow DRIP by " Δ "
BG \uparrow	BG \uparrow by 1-25 mg/dL/hr, BG UNCHANGED, OR BG \downarrow by 1-25 mg/dL/hr	BG \downarrow by 1-50 mg/dL/hr	BG \downarrow by 26-75 mg/dL/hr	NO DRIP CHANGE
BG UNCHANGED OR BG \downarrow by 1-25 mg/dL/hr	BG \downarrow by 26-50 mg/dL/hr	BG \downarrow by 51-75 mg/dL/hr	BG \downarrow by 76-100 mg/dL/hr	\downarrow DRIP by " Δ "
BG \downarrow by > 25 mg/dL/hr <i>see below**</i>	BG \downarrow by > 50 mg/dL/hr	BG \downarrow by > 75 mg/dL/hr	BG \downarrow by > 100 mg/dL/hr	HOLD DRIP x 30 min, then \downarrow DRIP by "2 Δ "

**D/C INSULIN DRIP; $\sqrt{\text{BG}}$
q 30 min; when BG \geq 100 mg/dl,
restart drip @75% of original rate.

***CHANGES IN DRIP RATE (" Δ ") are determined by the current drip rate:**

Current Drip Rate (U/hr)	Δ = Rate Change (U/hr)	2 Δ = 2X Rate Change (U/hr)
< 3.0	0.5	1
3.0 - 6.0	1	2
6.5 - 9.5	1.5	3
10 - 14.5	2	4
15 - 19.5	3	6
20 - 24.5	4	8
≥ 25	≥ 5	10 (Consult MD)