

Getting Glucose to GOAL In the Hospital – Frontline Nursing Training



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Getting Glucose to GOAL In the Hospital

Objectives:

- ✦ Discuss the importance of inpatient glucose control.
- ✦ Describe the goals of care
- ✦ Describe basal bolus insulin therapy
- ✦ Discuss appropriate insulin therapy considerations for a variety of situations.

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Glucose Management and Hospitalized Patients



In hospitalized patients with critical illness, hyperglycemia is a signal that warrants our attention.

Hospitals and Hyperglycemia What's the Big Deal?

- ✱ Hyperglycemia is associated with increased morbidity and mortality in hospital settings.
 - Acute Myocardial Infarction
 - Stroke
 - Cardiac Surgery
 - Infection
 - Longer lengths of stay



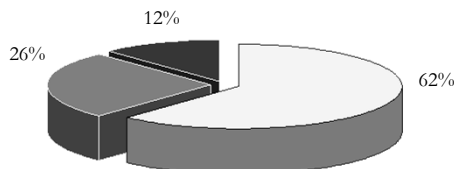
Stress response and hyperglycemia

- ✱ Decreased WBC's
- ✱ Catabolism
- ✱ Abnormal inflammatory response
- ✱ Endothelial cell dysfunction
- ✱ Increased clotting, blood viscosity
- ✱ Tissue breakdown
- ✱ Inflammatory changes
- ✱ Increased blood pressure, pulse

Leads to: Longer lengths of stay, complications, death

Diabetes Care, v. 27, #2, Feb 2004

Hyperglycemia*: A Common Comorbidity in Medical-Surgical Patients in a Community Hospital



- ☐ Normoglycemia
- ☐ Known Diabetes
- ☐ New Hyperglycemia

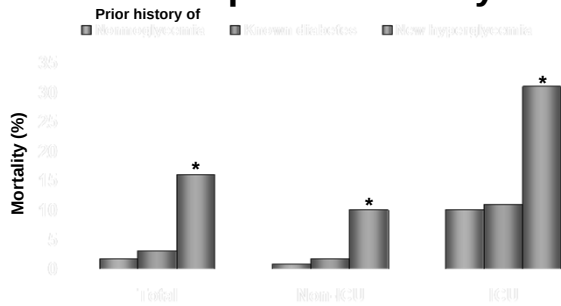
n = 2,020

* Hyperglycemia: Fasting BG $\geq$ 126 mg/dl or Random BG $\geq$ 200 mg/dl X 2

Umponree G et al, J Clin Endocrinol Metab 87:978, 2002

Umponree et al

Effect of Hyperglycemia on Hospital Mortality



*P<.01 compared with normoglycemia and known diabetes.

Umpierrez GE et al. J Clin Endocrinol Metab. 2002;87:978-982.

Blood Glucose Above Normal = Trouble

Pre Diabetes

- Fasting Glucose = 100-125mg/dl
- A1c 5.7 – 6.4%

Diabetes

- Fasting Glucose = 126 mg/dl +
- Random Glucose = 200 mg/dl +
- A1c 6.5% +



Any blood glucose above 140 requires treatment
Umpierrez et al

A1c and Estimated Avg Glucose (eAG) 2008

A1c (%)	eAG
5	97
6	126
7	154
8	183
9	212
10	240
11	269
12	298

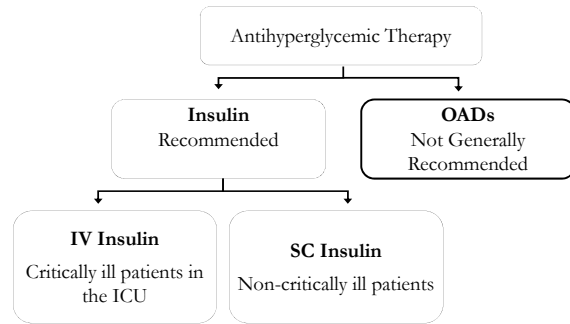
Order teaching tool kit free at diabetes.org



$eAG = 28.7 \times A1c - 46.7 \sim 29 \text{ pts per } 1\%$

Translating the A1c Assay Into Estimated Average Glucose Values – ADAG Study
Diabetes Care: 31, #8, August 2008

Recommendations for Managing Patients With Diabetes in the Hospital Setting



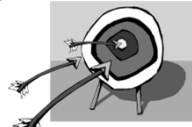
1. ACE/ADA Task Force on Inpatient Diabetes. *Diabetes Care*. 2006 & 2009
2. *Diabetes Care*. 2009;31(suppl 1):S1-S110.

Umpierrez et al

Management of Hyperglycemia and Diabetes

* Non-ICU

- Basal/bolus therapy (MDI)
 - NPH and Regular insulin
 - Long-acting and rapid-acting insulin
 - Premixed insulin



* ICU and Critical Care

- Insulin Drips
- Basal /Bolus

ADA / AACE Goals and Treatments For Hospitalized Patients

Critically Ill pts

- Start insulin therapy no later than BG 180
- Once insulin started, glucose goal 140-180
- Insulin drip preferred treatment

Non Critically Ill patients

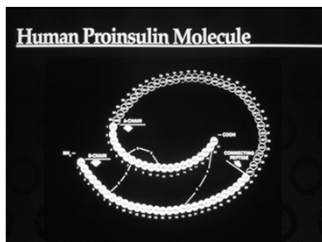
- Blood glucose goals:
 - Premeal <140
 - Post meal <180
- Basal /bolus Insulin preferred treatment

Consensus: Inpt Hyperglycemia, *Endocr Pract*. 2009;15 (No.4)

Insulin – the Ultimate Hormone Replacement Therapy

Objectives:

- Discuss the actions of different insulins
- Describe using pattern management as an insulin adjustment tool



The Miracle of Insulin



Patient J.L., December 15, 1922



February 15, 1923

Type 1 in Hospital

- ✦ 43 yr old admitted to evaluate angina.
- ✦ Morning blood sugar is 142.
- ✦ You walk in with his insulin dose.
- ✦ The patient says, "I will bottom out if I take that much insulin."
- ✦ "That dose won't touch my blood sugar"



What do you say?

Life Study – Mrs. Jones

Mrs. Jones is 62 years old, a little heavy and complains of feeling tired and urinating several times a night. She is admitted with a urinary tract Infection. Her WBC is 12.3, glucose 237. She is hypertensive with a history of gestational diabetes. No ketones in urine.

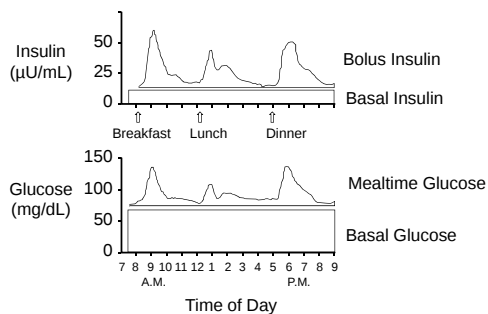
- ★ What risk factors and signs of diabetes does she have?
- ★ What type of diabetes does she have?

Life Study – Mrs. Jones

- ★ How would we manage her BG in hospital?



Physiologic Insulin Secretion: 24-Hour Profile



Insulin Action Teams

* Bolus: lowers after meal glucose levels

- Rapid Acting
 - Aspart, Lispro, Glulisine
- Short Acting
 - Regular



* Basal: controls glucose between meals, hs

- Intermediate
 - NPH
- Long Acting
 - Detemir (Levemir)
 - Glargine (Lantus)



Analog* Insulin Clarification

* If you see

- Humulin
 - Made by Lilly
 - Can be regular, NPH, 70/30 etc.
- Novolin
 - Made by Novo Nordisk
 - Can be regular, NPH, 70/30 etc.

* If you see

- Humalog (Lispro)
 - Made by Lilly
 - Rapid acting Analog
 - May also appear as Humalog 70/30.
- Novolog (Aspart)
 - Made by Novo Nordisk
 - Rapid acting Analog
 - May also appear as Novolog 70/30
- Apidra (Glulisine)

***Analog = insulin created by recombinant dna therapy .**

Bolus Insulins ($\frac{1}{2}$ of total daily dose ÷ meals)

Name	Onset	Peak Action
* Lispro (Humalog)	5-15 min	0.5 -1.5 hrs
* Aspart (NovoLog)		
* Glulisine (Apidra)		
* Regular	30 -60 min	2 - 3 hrs

Bolus Insulin Summary

- ★ Regular, Novolog, Humalog, Apidra,
- ★ Starts working fast (15-30 mins)
- ★ Gets out fast (3-6 hours)
- ★ Post meal BG reflects effectiveness
- ★ Should comprise about ½ total daily dose
- ★ Covers food or hyperglycemia.



■ 1 unit

- Covers ≈ 10 -15 gms of carb
- Lowers BG ≈ 30 – 50 points

Bolus Insulin Timing

- ★ How is the effectiveness of bolus insulin determined?
 - Before next meal blood glucose
- ★ Inpt Glucose goals (ADA) – may be modified by provider/pt
 - 1-2 hours post meal <180
 - Before next meal – 70 - 140



Bolus – Insulin Sliding Scale

Starts at 150, 2 units for every 50 mg/dl >150

	Break	Lunch	Dinner	HS
Day 1	94 no insulin	212 4 uR	148 no insulin	254 6 uR
Day 2	243 4uR	254 6 uR	201 4uR	199 2 uR
Day 3	189 2uR	243 4uR	162 2uR	244 4uR
Day 4	194 2uR	287 6uR	144 none	272 6uR

Bolus Basics

- ✧ Carbohydrate/ Prandial Coverage
 - Match the insulin to the carbohydrates
 - 1 unit for 15 gms - Common starting point
- ✧ Correction Bolus - targets hyperglycemia
 - 1 unit for every 30-50 points over target
- ✧ Adjust ratios depending on sensitivity and response



Carbohydrate Ratio How does that work?

Rapid/Fast Acting Insulin

✧ Dinner (60 gms cho)

- Lemon Chicken
- 1 cup rice pilaf (45 gms cho)
- Asparagus
- Dinner Roll (15 gms cho)

Blood Glucose
165mg/dl

<u>Serving Size</u>	<u>Gms CHO</u>	<u>Insulin</u>
1	15 gms cho	1 unit
2	30 gms cho	2 units
3	45 gms cho	3 units
4	60 gms cho	4 units

Carbohydrate Needs for Most Adults

	<u>Grams</u>	<u>Servings</u>
Each Meal	45-60 gm	3 - 4
Snacks	15-30 gm	1- 2



RDA 130 gm carbohydrate per day

Carb counting- starch

Each Food has:
80 Calories
15 grams carb

1 slice bread

- 1/2 cup cooked beans
- 1 small ear of corn or 1/2 cup corn
- 1/3 cup cooked pasta
- 3/4 cup cold cereal
- 1 small potato
- 1/2 English muffin
- 5-6 small crackers
- 1 small tortilla
- 1/3 cup cooked rice

Carb counting- fruit

Each Food has:
60 Calories
15 grams carb

1 slice bread

- 1 small fresh fruit
- 1/2 cup fruit juice
- 1/2 banana
- 1/2 cup unsweetened apple sauce
- 1 cup melon
- 1 1/4 cup strawberries
- 2 tbsp raisins
- 1/4 cup dried fruit
- 17 small grapes

Carb counting- milk

Each Food has:
90-150 calories
12-15 grams carb

1 slice bread

- 1 packet diet hot cocoa
- 8 oz buttermilk
- 6 oz plain yogurt
- 6 oz light fruit yogurt
- 8 oz soy milk
- 8 oz milk

Now What?

- ★ Nurse had an emergency and pt already ate lunch?



- ★ Nurse administered insulin and pt only ate a few bites of turkey and drank non sugar tea?

- ★ You just gave 3 units of Novolog and patient needs to go to OR NOW!

Now that we covered food, what about BG > 150?

- ★ That's where the Correction Bolus comes into play.



General Correction Bolus

Rapid/Fast Acting Insulin (1 unit:50 mg/dl>150)

70 or less	Subtract 1 unit
71-150 mg/dl	0 units
151-200 mg/dl	1 unit
201-250 mg/dl	2 units
251-300 mg/dl	3 units
301-350 mg/dl	4 units
351-400 mg/dl	5 units

Basal Insulins

($\frac{1}{2}$ of total daily dose)

Intermediate Acting	Peak Action	Duration
* NPH	4-10 hrs	10-16

Long Acting	Peak Action	Duration
* Detemir (Levemir)	No peak	6 - 24 hrs
* Glargine (Lantus)	No peak	20- 24 hrs

Fasting BG reflects efficacy of basal

Basal Insulin Summary

- * NPH, Levemir, Lantus
- * Covers in between meals, through night
- * Starts working slow (4 hours)
- * Stays in long (12-24 hours)
 - NPH 12 hrs
 - Levemir, Lantus 20-24 hrs
- * Fasting blood glucose reflects effectiveness



Combination SQ Insulin

Insulin Type	Onset	Duration
Humalog Mix		
75/25: 75% NPL, 25% lispro	5-15 min	10-16 hrs
50/50: 50% NPL, 50% lispro		
NovoLog Mix	5-15 min	10-16 hrs
70/30: 70% NPA, 30% aspart		
NPH + Reg Combo		
70/30: 70%N /30%R	30 – 60 min	10-16 hrs
50/50: 50%N /50%R		

Considerations:

- Pre-mixed, difficult to fine tune therapy

Insulin Therapy Components

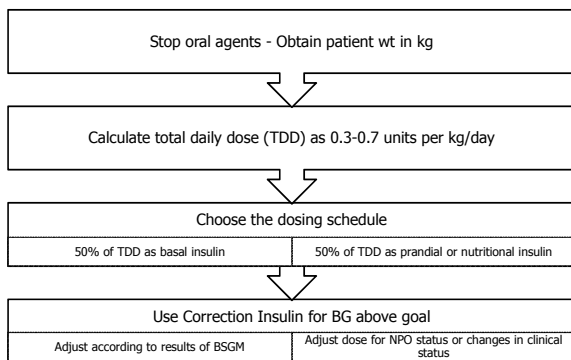
- ✧ Basal insulin – long acting insulin covers between meals and through night
- ✧ Prandial or meal insulin – a bolus insulin that covers food, IV dextrose, enteral nutrition, TPN or other nutritional supplements
- ✧ Correction insulin – bolus insulin dosed to correct for hyperglycemia that occurs despite use of basal and nutritional insulin
 - Usually given before meals w/ prandial insulin

How Much Insulin Does a Patient Need?

- ✧ It depends, based on:
 - Body weight
 - Overwt, normal wt, or thin
 - Frail, elderly
 - Eating status
 - Normal, poor intake or NPO
 - Renal or hepatic insufficiency
 - Type of Diabetes
 - Current meds; steroids, insulin, oral dm agents
 - Infected or Septic



Initiating Insulin in Hospital

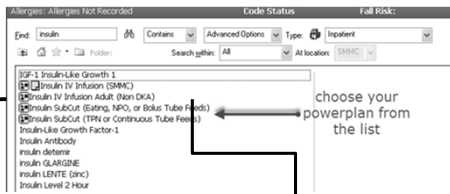


Provider Assessments

- * **Nutritional Status**
 - Eating, NPO, or Bolus Tube Feeds
 - TPN or Continuous Tube Feeds
- * **Insulin Sensitivity**
 - Resistant
 - Sensitive
 - Usual/Moderate



Using the New Insulin Power Plans-



Patients that require intermittent insulin are grouped together. This includes orders that are appropriate for NPO patients

Patients that have a continuous supply of nutrition are grouped together

Cerner PowerPlans Proposed

- * Provider picks the correct PowerPlan based on the patient's nutritional status.
 - Insulin SubCut (Eating, NPO, or Bolus Tube Feeds).
 - Insulin Subcut (TPN or Continuous Tube Feeds).
- * Each PowerPlan has sections for each insulin sensitivity state
 - Sensitive
 - Usual/Moderate
 - Resistant



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INSULIN SENSITIVITY

SENSITIVE: 0.3u/kg/day

- ★ Total Daily Dose of insulin < 40 units/day, frail, thin, elderly, eating < 50%, with hepatic or renal insufficiency (CrCl < 30 ml/min)

MODERATE/USUAL: 0.5 u/kg/day

- ★ Total Daily Dose of Insulin 40-80 units/day, average wt, good PO intake, DM Type 1

RESISTANT: 0.7 u/kg/day Total Daily Dose of Insulin > 80 units/day, obese, on steroids, or septic



Determining Sensitivity

Index	Medication List	Comment	Details
1	SENSITIVE Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	
2	MODERATE/USUAL Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	
3	RESISTANT Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	
4	MODERATE/USUAL Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	
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19	RESISTANT Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	
20	MODERATE/USUAL Insulin Sensitivity	***If blood glucose is greater than 180 mg/dl make sure that BASAL Insulin is on board***	

Determine patients sensitivity, the guidelines are in these notes

Inpt Study – Mrs. Jones



Mrs. Jones is 62 years old, a little heavy and complains of feeling tired and urinating several times a night. She is admitted with a urinary tract Infection. Her WBC is 12.3, glucose 237. She is hypertensive with a history of gestational diabetes. No ketones in urine. A1c 8.9%

- ★ What insulin dose would we start Mrs. Jones on?

Insulin Dose – Mrs. Jones

✱ Moderate

■ Why?

- Average weight, good oral intake



Basal/Bolus Insulin Dosing Strategy

50/50 Rule

- ✱ 0.3-1.0 units/kg day
- ✱ Basal = 50% of total
 - Glargine at HS
 - NPH or Detemir BID
- ✱ Bolus = 50% of total
 - usually divided into 3 meals

Example

- ✱ Wt 50kg x 0.5 = 25 units of insulin/day
- ✱ Basal dose: 13 units
 - Glargine 13 units at HS
 - NPH/Detemir 6u BID
- ✱ Bolus dose: 12 units
 - 4 units NovoLog, Apidra Humalog each meal

Basal/Bolus Insulin Dosing Strategy 0.5u/kg

50/50 Rule

- ✱ 0.3-1.0 units/kg day
- ✱ Basal = 50% of total
 - Glargine at HS
 - NPH or Detemir BID
- ✱ Bolus = 50% of total
 - usually divided into 3 meals

Example – You Try

- ✱ Wt 60 kg x 0.5 = ____ units of insulin/day
- ✱ Basal dose: ____ units
 - Glargine ____ units HS
 - NPH/Detemir ____ BID
- ✱ Bolus dose: ____ units
 - ____units NovoLog, Apidra Humalog each meal

Basal/Bolus Insulin Dosing Strategy 0.5u/kg

50/50 Rule

✦ 0.3-1.0 units/kg day

✦ Basal = 50% of total

- Glargine at HS
- NPH or Detemir BID

✦ Bolus = 50% of total

- usually divided into 3 meals

Example – You Try

✦ Wt 60 kg x 0.5 = 30
units of insulin/day

✦ Basal dose: 15 units

- Glargine 15 units HS
- NPH/Detemir 7 BID

✦ Bolus dose: 15 units

5 units NovoLog, Apidra
Humalog, Reg each meal

PowerChart Insulin Calculator

Calculating Prandial Dose

Correctional Scale

[illegible]

Basal Bolus

[illegible]

Custom Scale

You can still 'add to phase' the order for the insulin sliding scale tool (with the calculator) if you want to build a customized correctional scale

The screenshot shows the AWS IAM console 'Groups' page. On the right, the 'Groups' list contains 'aws-logs-2019-08-01'. A red arrow points to the 'Details' link for this group. On the left, the 'Details' pane shows the group's permissions, including 'AmazonLogsFullAccess' and 'AWSXRayRecorderFullAccess'.

[illegible]

Usual Correction Bolus

Rapid/Fast Acting Insulin

70 or less	Treat for hypo, hold dose
71-150 mg/dl	0 units
151-200 mg/dl	1 unit
201-250 mg/dl	4 units
251-300 mg/dl	6 units
301-350 mg/dl	8 units
351-400 mg/dl	10 units



Mrs. Jones - Pattern 5 unit meal bolus + Correction 15 unit Lantus hs

	Break	Lunch	Dinner	HS
Day 1	admit	219	243	219
Day 2	129	197	184	195 - NPO
Day 3	67	gone	119 clear liquids	104
Day 4	73	81	119	d/c

Preparation for Surgery

- ✦ Try to schedule surgery in am, resume meds/insulin when eating and stable.
- ✦ Oral medications: In am, hold all diabetes oral medications
- ✦ Basal Insulin: Night before
 - type 2s, give 50% of usual am basal dose for
 - type 1s give up to 100% of basal dose.
- ✦ Bolus insulin: may need mild insulin bolus coverage for type 1 and type 2's
- ✦ Have D5 or D10 IV bags available in case of hypo

BG Running Low?

★ Possible Causes

- Too much insulin
 - Premeal bolus
 - HS basal
- Glucose toxicity improving
- Infection improving
- Stopped/lowered steroids
- Poor kidney function
- Skipped meal, poor PO intake
- Not eating enough carbs



Hypoglycemia Symptoms



- | | |
|---|--|
| <ul style="list-style-type: none"> ★ Autonomic <ul style="list-style-type: none"> ■ Anxiety ■ Palpitations ■ Sweating ■ Tingling ■ Trembling ■ Hypoglycemic Unawareness | <ul style="list-style-type: none"> ■ Neuroglycopenia <ul style="list-style-type: none"> ↓ Irritability ↓ Drowsiness ↓ Dizziness ↓ Blurred Vision ↓ Difficulty with speech ↓ Confusion ↓ Feeling faint |
|---|--|

BG Too Low? Insulin Adjustment Guidelines



- ★ Before meal Blood glucose <70?
 - Implement hypoglycemia protocol
 - Evaluate cause and make needed adjustments
 - Missed meal?
 - Too much insulin?
- ★ Morning blood glucose < 90?
 - Decrease evening Lantus by 10%
- ★ Evaluate trends, provide feedback

HS Correction Bolus for ALL levels – Prevents HS Hypo

Rapid/Fast Acting Insulin

Less than 70	Treat for hypo, hold dose
71-150 mg/dl	0 units
151-200 mg/dl	1 unit
201-250 mg/dl	2 units
251-300 mg/dl	3 units
301-350 mg/dl	4 units
351-400 mg/dl	5 units



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Treatment of Hypoglycemia

- ✱ If BG **70**mg/dl or less and pt is eating:
 - 15 gms of carb (gel, glucose tabs)
- ✱ If BG **70**mg/dl or less, pt is NOT eating
 - D50 if IV access
 - Glucagon if no IV access
- ✱ Recheck BG every 15 minutes
- ✱ Hold next correction insulin dose
- ✱ Give next meal insulin and Lantus Dose

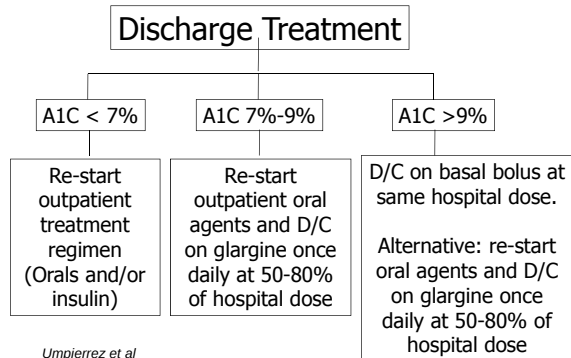


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- ✱ Mrs. Jones is improved and ready to go home.
- ✱ What glucose management strategies for home?
- ✱ Her A1c = 8.9%

Discharge insulin Algorithm



Discharge Teaching



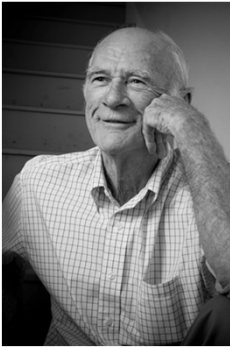
- ✧ What supplies will she need?
- ✧ What top 3 things do we need to teach her?
- ✧ What resources can we provide?
- ✧ What referrals?

Top 4 Discharge Questions

1. Can patient perform self blood glucose monitoring? Do they need meter?
2. Can pt safely take meds / insulin?
3. Does the pt know how to treat hypo and hyper glycemia?
4. Does the patient know what to do on sick days?



Mr. R has Pneumonia How Much Insulin Needed?



- * Creatinine 1.6
- * 76 years old
- * Not very hungry
- * BMI 22
- * Weighs 70kg
- * Glucotrol 5mg at home
- * A1c 7.2%

Basal/Bolus Insulin Dosing Strategy 0.3u/kg

50/50 Rule

- * 0.3-1.0 units/kg day
- * Basal = 50% of total
 - Glargine at HS
 - NPH or Detemir BID
- * Bolus = 50% of total
 - divided into 3 meals

Example – You Try

- * Wt 70kg x 0.3 = ____ units of insulin/day
- * Basal dose: ____ units
 - Glargine ____ units HS or
 - NPH/Detemir ____u BID
- * Bolus dose: ____ units
 - ____ NovoLog, Apidra
 - Humalog Reg w/meal

Basal/Bolus Insulin Dosing Strategy 0.3u/kg

50/50 Rule

- * 0.3-1.0 units/kg day
- * Basal = 50% of total
 - Glargine at HS
 - NPH or Detemir BID
- * Bolus = 50% of total
 - divided into 3 meals

Example – You Try

- * Wt 70kg x 0.3 = 21 units of insulin/day
- * Basal dose: 11 units
 - Glargine 11 units HS or
 - NPH/Detemir 5u BID
- * Bolus dose: 10 units
 - 3 NovoLog, Apidra
 - Humalog Reg w/meal

Sensitive Correction Bolus

Rapid/Fast Acting Insulin

70 or less	Treat for hypo, hold dose
71-150 mg/dl	0 units
151-200 mg/dl	1 unit
201-250 mg/dl	2 units
251-300 mg/dl	3 units
301-350 mg/dl	4 units
351-400 mg/dl	6 units



3 days poor intake, pt started on Tube Feeding



- ★ If on continuous tube feeding, how would this change his insulin regimen?
- ★ If on intermittent tube feeding, how would this change his insulin regimen?
- ★ If patients tube feeding is interrupted, what precautions would you take?

Glycemic Management of the Patient Receiving Enteral Nutrition

Continuous enteral nutrition (EN)

- Basal insulin: 50% of daily dose twice daily
- Prandial bolus insulin: 50% given q6h

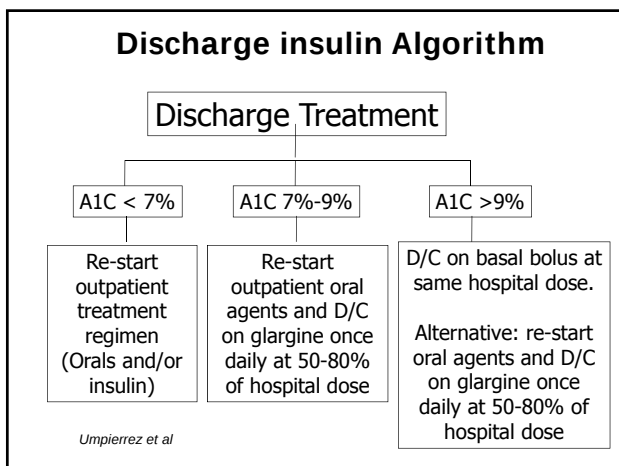
Cycled enteral nutrition

- Combination basal/bolus insulin (ie 70/30) given at the start of each tube feeding
- Bolus insulin administered q4 to 6 hours for duration of EN administration
- Correctional insulin given for BG above goal

Bolus enteral nutrition

- Rapid acting analog or short acting insulin given prior to each bolus

Mr. R- Pattern 3 unit meal bolus + Correction 11u Lantus hs				
	Break	Lunch	Dinner	HS
Day 1		admit	381	198
Day 2	98	127	69	98 RN Held Lantus
Day 3	137	67	72 tube feeding 4 times a day	207
Day 6	142	129 NG Tube pulled	Pt feels funny BG 63	184



**Mr. R after 9 days
feeling better. Eating again,
regaining strength. DC today.**



- ✦ What glucose mgmt strategy?
- ✦ What supplies will he need?
- ✦ What top 3 things do we need to teach him?
- ✦ What resources and referrals?

Top 4 Discharge Questions

1. Can patient perform self blood glucose monitoring? Do they need meter?
2. Can pt safely take meds / insulin?
3. Does the pt know how to treat hypo and hyper glycemia?
4. Does the patient know what to do on sick days?



How Much Insulin Needed?

Mr. K



- ✱ Waistline 46"
- ✱ Creat 0.9
- ✱ Infected Foot Ulcer
- ✱ Asthma
- ✱ Meds
 - Metformin
 - Exenatide (ran out)
 - Actos (worried about ankles swelling)
- ✱ A1c 10.8%

Basal/Bolus Insulin Dosing Strategy 0.7u/kg

50/50 Rule

- ✱ 0.3-1.0 units/kg day
- ✱ Basal = 50% of total
 - Glargine at HS
 - NPH or Detemir BID
- ✱ Bolus = 50% of total
 - divided into 3 meals

Example – You Try

- ✱ Wt 100 kg x 0.7 = ____ units of insulin/day
- ✱ Basal dose: ____ units
 - Glargine ____ units HS
 - NPH/Detemir ____ BID
- ✱ Bolus dose: ____ units
 - ____units NovoLog, Apidra Humalog each meal

Basal/Bolus Insulin Dosing Strategy 0.7u/kg

50/50 Rule

✱ 0.3-1.0 units/kg day

✱ Basal = 50% of total

- Glargine at HS
- NPH or Detemir BID

✱ Bolus = 50% of total

- divided into 3 meals

Example – You Try

✱ Wt 100 kg x 0.7 = 70
units of insulin/day

✱ Basal dose: 35 units

- Glargine 35 units HS
- NPH/Detemir 17 BID

✱ Bolus dose: 35 units

11 units NovoLog, Apidra
Humalog each meal

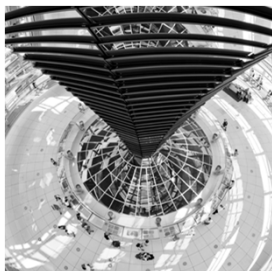
Resistant Correction Bolus

Rapid/Fast Acting Insulin

70 or less	Treat for hypo, hold dose
71-150 mg/dl	0 units
151-200 mg/dl	3 unit
201-250 mg/dl	6 units
251-300 mg/dl	9 units
301-350 mg/dl	12 units
351-400 mg/dl	15 units

 Dignity Health
Formerly Catholic Healthcare West

Started on Prednisone 60mg qd for Asthma



✱ Blood glucose
levels running
300-500.

BG Running High?



★ Possible Causes

- Glucose Toxic
- Infection
- Started on steroids
- Physical stress
- Insulin dose too low

BG Too High? Insulin Adjustment Guidelines



★ Meal Blood glucose too high?

- If BG increases by 50 points from meal A to meal B
- Increase meal A rapid acting insulin dose by 1 unit

★ Morning blood glucose > 140?

- Increase evening Lantus by 10% every second day

★ If 2 consecutive BG > 200, call MD

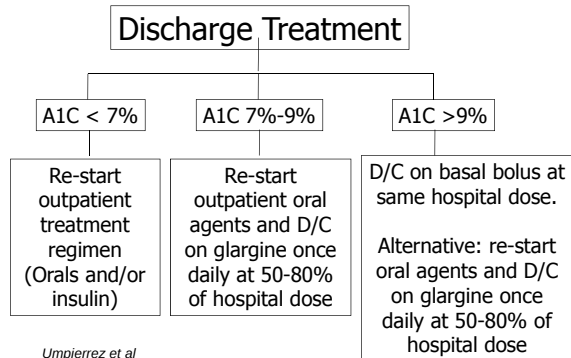
 **Dignity Health.**
Formerly Catholic Healthcare West

Mr. K BG Levels Too High Insulin Drip Started



- 100 units insulin in 100 cc NS Bag
- ★ 1 cc = 1unit of insulin
- ★ Started on Algorithm 2 – at 7.5 units /hr for BG of 347

Discharge insulin Algorithm



What Glucose Mgmt Strategy for Discharge?



- ✱ Waistline 46"
- ✱ Infected Foot Ulcer
- ✱ Asthma (on pred)
- ✱ Meds
 - Metformin
 - Exenatide (ran out)
 - Actos (worried about ankles swelling)
- ✱ A1c 10.8%

MR K. Stable, ready for discharge.

- ✱ What is your biggest concern?
- ✱ What supplies will he need?
- ✱ What top 3 things do we need to teach him?
- ✱ What resources and referrals?



Top 4 Discharge Questions

1. Can patient perform self blood glucose monitoring? Do they need meter?
2. Can pt safely take meds / insulin?
3. Does the pt know how to treat hypo and hyper glycemia?
4. Does the patient know what to do on sick days?