



Diabetes Boot Camp – Class 4

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Insulin and Pattern Management
www.DiabetesEd.net

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Important Stuff

- ▶ Welcome to our 4th Boot Camp – This is the second half of Insulin and Pattern Management.
- ▶ The handout includes content for Boot Camp 4.
- ▶ I will stay after the program to answer questions
- ▶ The course will be recorded and available for viewing within 4 hours of completion of the session
- ▶ Login to the Online University to hear the recorded version, take the quiz and get your CE
- ▶ Please email us with any questions or concerns at susan@diabetesed.net

Basal Bolus – What Adjustments? Pt weighs 80kg

	Break	Lunch	Dinner	HS
Day 1	69 7H	79 5H	245 8H	190 22u Det
Day 2	81 7H	87 5H	170 8H	133 22u Det
Day 3	73 7H	94 5H	194 8H	110 22u Det
Day 4	62 7H	83 5H	211 8H	127 22u Det

Intensive Diabetes Therapy Insulin Dosing Strategy

50/50 Rule

▶ 0.5-1.0 units/kg day
(.5 units/kg most common)

- ▶ Basal = 50% of total
 - Glargine Q day
 - 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 Q day
 - NPH/Detemir 6u BID

- ▶ Bolus dose: 12 units
 - ▶ 4 units NovoLog, Apidra, Reg, Humalog each meal



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Intensive Diabetes Therapy Insulin Dosing Strategy

50/50 Rule

▶ 0.3-1.0 units/kg day
(.5 units/kg most common)

- ▶ Basal = 50% of total
 - Glargine Q day
 - NPH or Detemir BID

- Bolus = 50% of total
 - usually divided into 3 meals

Example – You Try

▶ Wt 80 kg x 0.5 = ____ units of insulin/day

- ▶ Basal dose: ____ units
 - Glargine ____ units QD
 - NPH/Detemir ____ BID

- ▶ Bolus dose: ____ units
 - ____ units NovoLog, Apidra Humalog each meal



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Basal Bolus – Using 50/50 Rule – Pt weighs 80kg

	Break	Lunch	Dinner	HS
Day 1	84 6H	89 7H	145 7H	190 20 u Det
Day 2	81 6H	97 7H	107 7H	133 20u Det
Day 3	79 6H	104 7H	124 7H	110 20u Det
Day 4	69 6H	103 7H	208 7H	193 20u Det

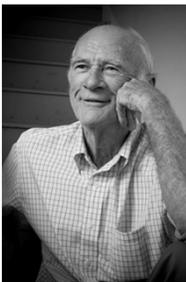
Poll Question 9

- ▶ Calvin takes 5 units reg before breakfast and dinner and 18 units of Lantus at HS. His am BG ranges from 143 to 172. What is best action?
- a. Increase dinner regular insulin to 6 units
- b. Decrease Lantus at HS by 2 units
- c. Increase Lantus dose at HS
- d. Evaluate him for somogyi effect



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Based on Mr R's clinical picture – In hospital How Much Insulin Needed?



- ▶ Creatinine 1.6
- ▶ 76 years old
- ▶ Not very hungry
- ▶ BMI 21
- ▶ Weighs 80kg
- ▶ Glucotrol 5mg at home
- ▶ A1c 7.2%



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Calculate Daily Insulin Needs

- ▶ Based on unique characteristics of pt, where would you start?
- ▶ Body wt in Kg x _____ = total daily dose
- ▶ May need more or less based on clinical presentation



←—————→
Less 0.3 u/kg 0.5u/kg More 1.0 u/kg

Thin, elderly, ↑ creat Heavy, infection, steroids



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Calculate Insulin Needs Basal/ insulin carb/ correct

- ▶ Body wt in Kg x 0.3
- ▶ 80kg x 0.3 = 24 units daily

- ▶ Basal = 12 units
- ▶ Bolus = 12 units / 3 meals = 4 units each meal
- ▶ What if he is nauseated?



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2nd Half – Special Basal Bolus Section

- ▶ Carb counting
- ▶ Prandial coverage
- ▶ Correcting for hyper and hypoglycemia



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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



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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

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

Poll Question 1

▶ 1 unit novolog for 10 gms of carb. Meal 1 cup rice, bbq steak, 1 c. skim milk, sm banana, SF ice tea. BG 68.

- a. 8 units
- b. 7.2 units
- c. 6.2 units
- d. 6.0 units



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Adjusting Bolus and Correction Doses Carbohydrate-to-Insulin Ratio

Based on three questions before meals:



1. How much carbohydrate am I going to eat?
2. What is my insulin dose for this amount of carbohydrate?
3. Should I lower the dose because I plan to be very active or have recently been active?



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Correction Bolus

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

Less than 70	Subtract 1 unit
70-150 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

Poll Question 2

▶ Bob's correction scale is 1 unit for every 30 above his target of 120. His BG is 270. How much correction insulin?

1. 4 units
2. 5 units
3. Needs to count carbs first
4. Depends on his activity level



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Type 1 and a Teen



- ▶ Cindy is trying to carb count and adjust her insulin, but is still having trouble. She weighs 60kg.
- ▶ What is her daily dose of insulin?
- ▶ What is her basal dose?
1. Pre meal target BG is 120
 2. Post meal goal < 180.
 3. Carb ratio: 1 unit for every 15 gms
 4. Hyperglycemic correction factor is one unit for every 55 above goal (she uses Humalog and 1700 rule)

1700 Rule
 $1700 / \text{TDD} = \text{insulin sensitivity}$
 $1700 / 30 = 56$
1 unit drops BG 56 points



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Correction Bolus for Cindy

Analog Insulin (1 unit:55 mg/dl>120)

Less than 70 mg/dl	Subtract 1 unit
70-119 mg/dl	0 units
120-175 mg/dl	1 unit
176-230 mg/dl	2 units
231-285 mg/dl	3 units
286-340 mg/dl	4 units
341-395 mg/dl	5 units



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Adjusting Cindy's Bolus Insulin With Ratios

BG before lunch 285, she plans to eat 45 gms of carbohydrate.

$285 - 120 = 165$ over target, $165 / 55 = 3$

$45 \text{gms} / 15 = 3$

- 3 units bolus insulin to correct to target
- 3 units bolus insulin to cover carbs in meal

Total adjusted dose: 6 units humalog insulin



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Adjusting Cindy's Bolus Insulin With Ratios - You Try

BG before lunch 230, plans to eat 60 gms of carbohydrate.

____ - 120 = ____ over target, ____ / 55 = ____ units

____ gms / ____ = ____ units ins for carbs

- ____ units insulin to correct for hyperglycemia
- ____ units insulin to cover carbs in meal

Total adjusted dose: ____ units humalog insulin



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How much Insulin Needed?

- ▶ Morning - BG 173
 - ▶ Breakfast – slice cold pizza, ½ c. applesauce
- ▶ Lunch BG 69
 - ▶ Menu- ham sandwich, pear, diet 7-up, mini snickers bar.
- ▶ 2 hours after lunch, BG 148 - ran track
- ▶ Before dinner - BG 98
 - ▶ Cheeseburger, small fries, chocolate chip cookie
- ▶ At bedtime, BG 173



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Cindy, 60kg, Carb (1u/15gms) Target 120 pre meal, Hyper 1 for 55

	Break	Lunch	Dinner	HS
Day 1	99	154	128	69
Pre meal BG	2uH	6uH	5uH	15 GI
Carb	30gms	75gms	60gms	15gm
Day 2	143 /184	122 /156	220 / 89	228
Pre/ post meal BG	3uH	4uH	5uH	15 GI
Carb	45gms	60gms	45gms	0gm

Poll question 3

- ▶ Paul has had type 1 diabetes for 40 years and injects insulin 4 times a day. Which of the following is important to assess?
 - a. Does he clean his needle before he reuses it?
 - b. Is he wiping his skin thoroughly with alcohol before injection?
 - c. Does he bend his needle before placing in trash?
 - d. Is he rotating sites?



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Insulin Teaching Keys

- ▶ Bolus insulin with meals
- ▶ Basal 1-2xs daily
- ▶ Abdomen preferred injection site
- ▶ Stay 1" away from previous site
- ▶ Don't re-use ultra fine syringes
- ▶ Keep unopened insulin in refrigerator
- ▶ Look for hyper
- ▶ Toss opened insulin vial after 28 days
- ▶ Proper disposal
- ▶ Review patients ability to withdraw and inject.
- ▶ Side effects include hypoglycemia/wt gain
- ▶ Insulin pens –
 - ▶ Prime needle to assure accurate insulin dose given
 - ▶ Hold needle in for 5 seconds after injection
 - ▶ Roll 70/30 pens



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Sharps Disposal: Product and Info



- ▶ Look in the Government section white pages for a household hazardous waste listing for your city or county.
- ▶ Call 1-800-CLEANUP (1-800-253-2687)
- ▶ Search for collection centers on the California Integrated Waste Management Board (CIWMB) Web site:
<http://www.ciwmb.ca.gov/HW/HealthCare/Collection/>



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Poll Question 4

- ▶ Mary takes 6 units lispro (Humalog) before dinner. Which BG result reflects that it was the right dose?
- Before breakfast BG of 97
 - 1 hr post dinner BG of 189
 - Before dinner blood glucose of 102
 - 2 hour post dinner BG of 178



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Poll Question 5

▶ Calvin takes 5 units reg at dinner and 18 units of NPH at HS. His am BG ranges from 63 to 72. What is best action?

- a. Decrease dinner regular to 4 units
- b. Encourage him to eat bedtime snack
- c. Decrease NPH insulin at HS
- d. Have him check a 2am BG



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Thank You



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