Managing the U-500 Patient as a Surgical Inpatient
Tyler Fischback
Pharmacy Specialist
St. Clare Hospital

I have no conflicts of interest to disclose

The Case

• DM is a 37 y.o. developmentally delayed T2DM admitted for placement of a VP shunt
• 128 kg
• U-500 patient, 250 units QAM, 350 units QPM
• Orals: pioglitazone 30 mg daily, glipizide 10 mg BID
• A1c is 7.5 (Fairly frequent hypoglycemia)
• Patient drinks 7 liters of Cola/day (~0.75 kg CHO)
Day of Surgery

- Took ½ of AM dose (125 units)
- No intraoperative steroids or insulin administered
- Post-op glucose is 152 mg/dL
- Surgeon orders for all the patients home medications to start postoperatively (glipizide, pioglitazone, U-500)

What’s a Pharmacist To Do?

- A. Surgeon’s order is perfect. Continue all oral antidiabetics and U-500 insulin (350 units starting tonight). Enter order, move to the next one
- B. Surgeon is crazy. This patient will require far more insulin due to the stress of surgery. Call Dr. and advise 25% increase in insulin dose.
- C. Surgeon is crazy. It would be unsafe to use home dose of U-500 insulin tonight. Call surgeon and ask if the pharmacist can create a treatment plan for glucose management

What’s a Pharmacist To Do?

- Hold orals, Reduce dose of U-500, monitor closely and make adjustments regularly
- Convert to a conservative Basal-bolus regimen based on patients TDD. 50% long-acting, 50% prandial and correctional
- Insulin gtt per hospital protocol
- Something else?
What Did the Pharmacist Do?

- Insulin gtt per hospital protocol
- Prandial insulin (lispro) 5 units/15 grams CHO
- Converted to Basal-bolus regimen POD 1 after ~18 hours on the insulin gtt
- Insulin regimen adjusted regularly until discharge POD 3

How Did the Patient Do?

- FSBG ranged from 137-227 on gtt. (trending higher POD 1)
- Gtt rate ranged from 2-8 units/hr
- Pt received 51 units of Novolog for prandial coverage and ~65 units from the gtt
- Converted to conservative Basal-bolus regimen that was titrated frequently to target BG 100-180 mg/dL

Let's Do Some Calculations

- TDD = 600 units
  - >200 units/day considered candidate for U-500
- 600 + 128 kg = 4.7 units/kg
  - >2 units/kg considered severe insulin resistance
- Rule of 1800 (How much 1 unit of insulin will lower BG)
  - 1800 ÷ 600 (TDD) = 3 mg/dL
- Doug's Prandial (How many units should be given for every 15 units of CHO)
  - 600 (TDD) ÷ 24 = 25 units/15 grams CHO
Insulin gtt: Pros and Cons

- Great for patients that are NPO, on continuous tube feeds or 24 hour TPN
- Not as great for patients that are eating (Post-open heart, Our U-500 patient etc.)
- Reactive: Rate is changed in response to blood glucose readings
  Vs.
- Proactive: Prandial insulin to compensate for carbs eaten

U-500

- U-500 at 100 unit dose: Tmax 8 hours, Cmax 72% of U-100, t1/2 4.4 hours
- U-100 at 100 unit dose: Tmax 3 hours, higher Cmax, t1/2 3.3 hours
- So, U-500 is actually kinetically similar to NPH insulin
  - Lower peaks than U-100 and longer duration of action
- If used in hospital, extreme safety measures should be taken

U-500 Safety

- Verify dose with patient
  - Have them show you how they draw it up
- Pharmacist, MD, Nurse education and communication
- Express dose in terms of units and volume
  - Ex. 100 units, 0.2 ml, looks like 20 units on U-100 syringe
- Consider dose reduction if changes in diet are expected (how good is your hospital food? Outside food?)
- Consider conversion to basal-bolus regimen if possible
THANK YOU!
QUESTIONS?

References