

**AHD: Diabetes**

**Learner Guide**

September 26, 2019

**Agenda:**

1:00 – 1:10	Welcome Experts, brief Theory burst
1:10 – 2:00	Case: Hospital Days 1-3
2:00 – 2:25	Theory burst, Diabetes Now and Expert questions
2:25 – 2:30	Break
2:30 – 3:15	Case: Hospital Days 4-5
3:15 – 3:30	Wrap up, final questions

**Case: Hospital Day 1**

Mr. Shugar is a 56 y/o M who presents to the ED with spreading redness and pain of his left leg for the past 3 days after scraping his ankle accidentally while working on his car. Two days ago, he went to urgent care and received antibiotics. Since then, the redness has worsened despite taking the medication as directed. Yesterday, he developed a fever to 101F, so he decided to come to the ED.

**PMHx:** reports hx of HTN, COPD, but hasn't been to doctor in long time

**Meds:** Cephalexin 500 mg TID

**SocHx:** smokes 1ppd, no EtOH, works as mechanic.

**Physical Exam:**

**Vitals:** T 101.4 HR 90 BP 128/76 RR 14 Pulse ox 97% Room Air **Wt: 220lb (100kg)**

**General:** Overall well appearing, no acute distress, obese

**Cardiac:** Normal S1, S2 with regular rate and rhythm. No murmurs

**Pulm:** Lungs clear to auscultation b/l

**Extremities:** Erythema and warmth of the L lateral lower extremity streaking towards knee. No fluctuance. Tender to palpation only in the area of erythema/warmth. No edema.

**Labs from the ED:**

Na 135, K 4.2, CL 102, CO2 22, BUN 14, Cr 1.1, glucose 240

WBC 11.2, Hgb 13.2, Hct 39.2, Platelets 354

CRP 4.6, ESR 32

**Imaging:**

**Doppler US:** Negative for DVT

**X-ray Left Tib/Fib:** Negative for fracture, soft tissue swelling noted

1. You notice the patient is hyperglycemic on his renal panel. What other questions would you like to ask him?  
What factors may contribute to hyperglycemia in this patient?

*The patient tells you that he's never been told he has high blood sugars, but diabetes is prevalent in his family. And now that you mention it, he does urinate pretty frequently. He drinks a few liters of soda each day to mitigate his thirst...*

2. What is the next step in the evaluation of his hyperglycemia? What do you include in your inpatient admission orders?

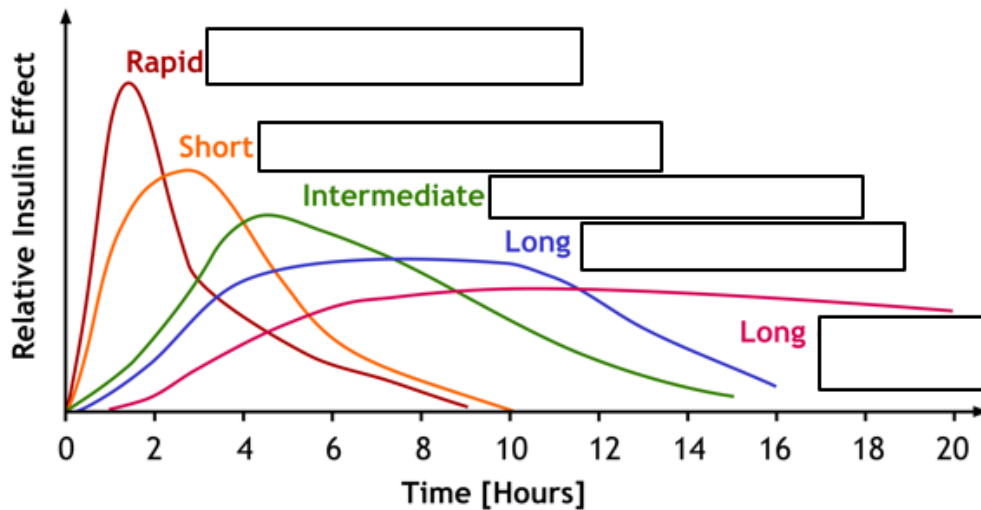
*You finish your admission orders and H&P, starting the patient on Vancomycin for a concerning cellulitis that did not improve with Keflex. But you forgot to put in your sign out to night float to follow up on his sugars.*

Hospital Day 2:

The next morning as you pre-chart on Mr. Shuger, you notice the following in his labs:

HbA1c 8.6 POC gluc 5pm 242 POC gluc 9pm 274 Serum gluc 6am 210

3. You decide it's time to improve his glycemic control. How do you initiate treatment for this insulin-naïve patient? What medications do you choose and why?



4. Could you use sliding scale insulin as main treatment? What about oral agents since he is insulin-naïve?

5. How would your regimen change if Mr. Shuger was a known diabetic on insulin therapy at home?

6. What are the goals for glycemic control? Why is this important? Please look at Recommendation 15.4 and 15.5.



You initiate insulin treatment with Lantus 25units qHS, Lispro 8units with meals and a low dose sliding scale with meals. Unfortunately, Ms. Shuger is reporting worsening pain and swelling of his leg, and you notice progression of the erythema of his leg, with increased induration and concern for fluctuance. You consult general surgery to evaluate the patient for likely abscess formation. Their note is not in by the time you leave, so you sign this out to cross-cover to follow up surgery recommendations.

**Hospital Day 3:**

You are pre-rounding the next morning when night float tells you that surgery left their recommendations late last night to make the patient NPO for OR the next morning. You quickly review Mr. Shuger's labs:

<b>Yesterday:</b>		<b>Today:</b>	
Serum glucose 6am	210	Renal panel: Na 140 K 4.0 Cl 105 HCO3 23 BUN 25 Cr 1.4	
POC glucose 9am	245	Glu 60	
POC glucose 12pm	194		
POC glucose 5pm	175	CBC: WBC 13.4 Hgb 13.1 Hct 39 PLT 345	
POC glucose 9pm	153		

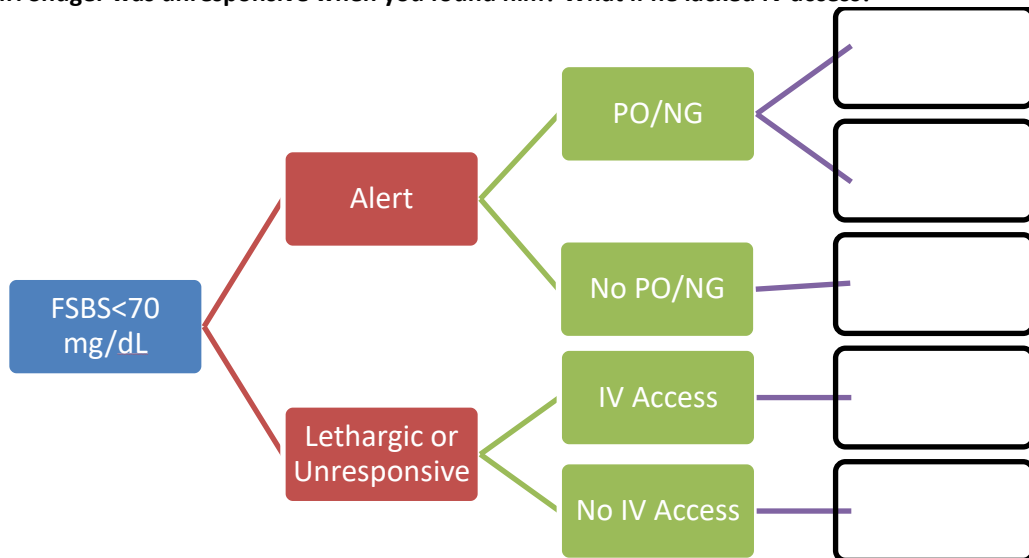
7. Calculate how much insulin the patient received yesterday based on your orders (assume no changes were made to the regimen you ordered because this was not in your sign out).

Blood glucose	Low dose SSI (<40units insulin/day)		Medium dose SSI (40-80units insulin/day)		High dose SSI (>80units insulin/day)	
	AC	HS	AC	HS	AC	HS
100-149	0	0	0	0	0	0
150-199	1	0	1	0	2	0
200-249	2	1	3	2	4	2
250-299	3	2	5	3	7	5
300-349	4	3	7	5	10	7
>350	5	4	8	7	12	10

*You quickly go to see Mr. Shuger. He is sitting on the edge of the bed, and does not look well. He says he is feeling dizzy and sweaty, which he thinks he may be nervous due to his upcoming procedure. He says he didn't eat dinner last night because the surgeons told him not to.*

8. You check a POC glucose and it reads 60. What are risk factors for hypoglycemia in the hospital setting? How do you manage this?

9. What if Mr. Shuger was unresponsive when you found him? What if he lacked IV access?



10. How would you have changed his insulin regimen if you knew he was going to be NPO for surgery?

## !BREAK! Time with experts

(Hospital Day 4)

*You treated Mr. Shuger's hypoglycemia appropriately with glucose tabs and he was shortly whisked away to the OR. He underwent successful debridement of his leg abscess, the initial cultures of which are growing GPC in clusters.*

*The following morning, you are pre-charting on Mr. Sugar. The labs include:*

**Yesterday:**

*Serum glucose 6am 59  
 POC glucose 12pm 151  
 POC glucose 6pm 241  
 POC glucose 12pm 302*

**Today:**

*Renal panel: Na 133 K 3.9 Cl 93 HCO3 18 BUN 25 Cre 1.4  
 Glu 455  
 CBC: WBC 11.2 Hgb 13.7 Hct 39 PLT 345  
 VBG: pH 7.21 pCO2 33*

*You rush to see him. He reports the surgery went well, and that he was very hungry afterward so he ate a lot. But now he feels poorly, with some nausea and abdominal discomfort. You happen to notice his IV beeping with D5 NS running at 125cc/hr.*

11. Define the metabolic derangement. What are possible reasons for this?

12. How do you know this is DKA and not HHS?

	DKA	HHS
Glucose		
Arterial pH		
Serum Bicarb		
Urine or serum ketone		
Anion Gap		
Effective serum osmolality		

13. What are the 4 key components in the management of DKA? Why are these the key components? Go to figure 2 on page 19.



*You initiate therapy with 10units Regular insulin IV and transfer Mr. Shuger to StepDown to initiate IV insulin infusion and fluids. Over the next several hours, the anion gap slowly downtrends to normal. He also notes he starts feeling better, his abdominal pain is resolved, and he is hungry.*

14. How do you transition Mr. Shuger off of the insulin infusion?

*You resume basal-bolus dosing with Lispro 8units qAC and Lantus 25units qHS, then turn off the insulin infusion 2hours later. You make sure to change his POC glucose checks back to qACHS and review the plan with his nurse before leaving for the night.*

(Hospital Day 5)

*You come in to pre-round and hope that Mr. Shuger will have a good day today. Here are his labs:*

Yesterday:

POC glucose 5pm143

POC glucose 9pm175

Today:

Renal panel: Na 141 K 3.8 Cl 101 HCO3 24 BUN 16 Cre 1.1

Glu 195

CBC: WBC 9.2 Hgb 13.9 Hct 39.1 PLT 355

15. How do you feel about Mr. Shuger's glycemic control? What would you adjust, if anything, in his regimen?

16. Mr. Shuger tells you he is feeling better and is eager to leave the hospital. How do plan for his discharge? What medication(s) do you send to his pharmacy? What is the appropriate follow up?