65-year-old Woman with Hypoglycemia

Celeste C. Thomas

May 23, 2013

History of Present Illness

- History of alcohol abuse, chronic back pain (on opioids), depression and T2DM
- Diabetes regimen:
  - Metformin: 500 mg PO BID
  - Pioglitazone: 30 mg PO daily
  - Sitagliptin: 100 mg PO daily
  - Insulin glargine: 12 units subcutaneous QHS
  - Insulin lispro: 2 units for every 50 mg/dL over 150

History of Present Illness

- Patient resides at nursing home
- Nursing staff checks capillary blood glucose levels at 6AM and 4PM
- Insulin lispro is administered before breakfast and dinner based on blood glucose levels
- Patient does not self-administer insulin or oral medications

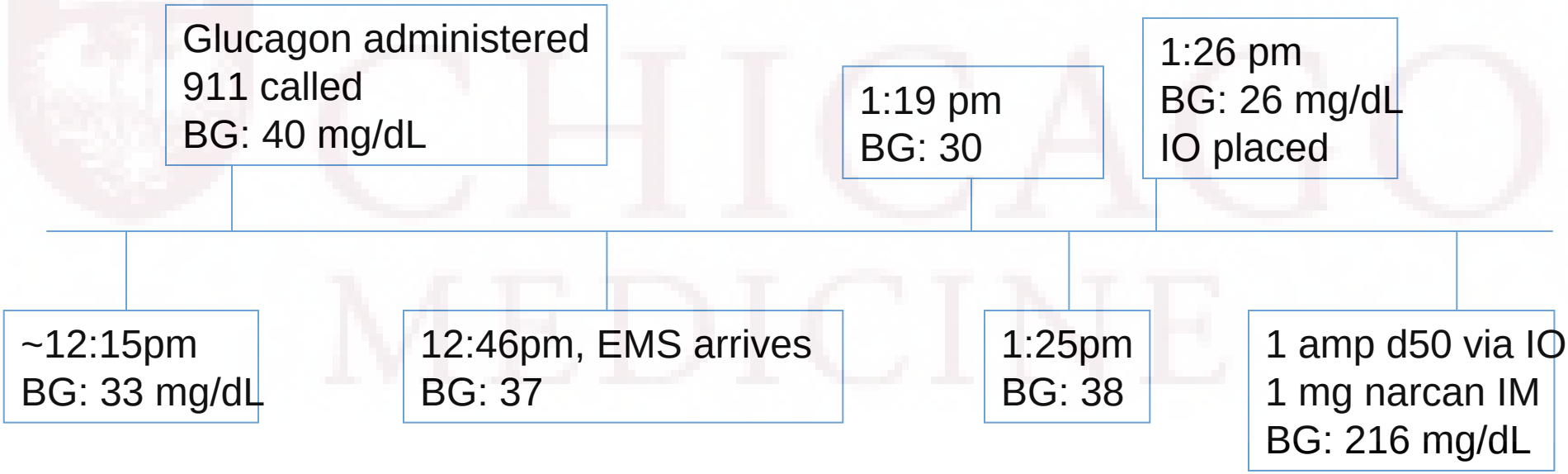
History of Present Illness

- Per RN at SNF
  - patient had been eating well, sometimes double portions
  - Fasting blood sugars: 90s – 120s mg/dL
  - Blood glucose greater than 150 mg/dL, rare

Day of Admission

- Per RN at NH, fasting blood glucose was 205 mg/dL
- Pt was administered 4 units of insulin lispro prior to breakfast (approximately 8AM)
- Pt found minimally responsive in room prior to lunch, blood glucose 33 mg/dL
- Little to no breakfast had been eaten

Timeline per EMS/EMR Records



History of Present Illness

- Patient became more responsive – stated name, moving 4 extremities but not following simple commands
- 2 minutes of tonic-clonic activity resolved → 2 mg of ativan → intubated for airway protection
- Head CT: chronic white matter disease
- Admitted to NeuroICU, loaded on dilatin, LP unremarkable

“The blood sugar fell below 0.045 in thirteen and of these convulsions were present in eleven.”

Banting FG, Best CH, Macleod JJR, Noble EC*: The effect of pancreatic extract (insulin) on normal rabbits. Am J Physiol 62:162–176, 1922*

Endocrine Consult

- Hypoglycemia and Ketosis

Conversation with Patient's Mother

- Last spoke with patient three days prior to admission
- Patient had fallen and was reporting hip pain
- She didn't know if patient had been drinking but thought – maybe she had
- She hadn't seen patient in some time and didn't know if she'd been losing weight

RN at Nursing Home

- They didn’t know she’d been drinking until putting her things together after transfer to hospital – found three empty vodka bottles
- Though residing at nursing home, patients come and go, could have bought alcohol
- Didn’t know about weight loss
- Thought patient had been ordering food, sometimes double portions

Patient's Pastor

- Patient attended church almost every Sunday
- Was visibly intoxicated at church the previous Sunday
- Did not show the Sunday before admission

History

- Depression
- T2DM
- HTN (hypertension)
- HLD (hyperlipidemia)
- ETOH abuse
- Mother thinks she has had a seizure before, cannot recall circumstances
- Stroke in past per patient's mother
- Pancreatitis in past per patient's mother

History

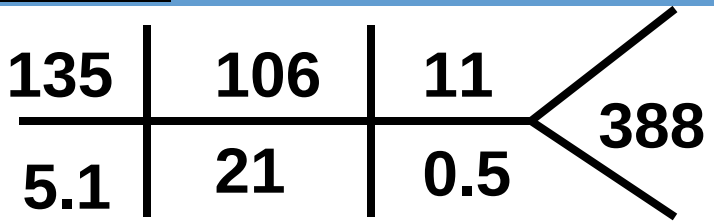
- **Prior to Admission Medications**
  - insulin glargine 12 units
  - insulin lispro sliding scale with 2 units of insulin for every 50 mg/dL over 150
  - metformin 500 mg PO BID
  - pioglitazone 30 mg daily
  - sitagliptin 100 mg daily.
  - fentanyl patch 50mcg/hr/1 patch q3days
  - Asa 81 mg daily
  - vit b12 1000mcg qday
  - Thiamine 100mg qday
  - atorvastatin 10mg qhs
  - mirtazapine 15mg qday
  - Ca carb 1250mg qday
  - Gabapentin 600 tid.
  - Vit d 50000 qweek
  - Losartan
- **Allergies**
  - Penicillin
- **Social History:**
  - Lives at nursing home
  - Has 4 sons
  - Known ethanol abuse/likely dependence
- **Family History:**
  - Sister with T2DM

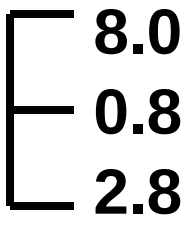
Physical Exam

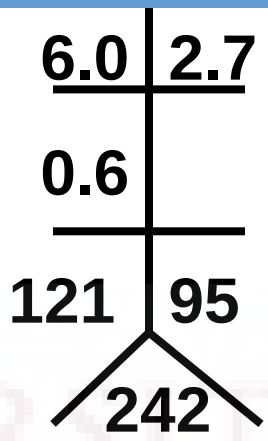
- BP 113/77 | Pulse 117 | Temp(Src) 37.3 °C (99.1 °F) (Tympanic) | Resp 19 | Wt 51.2 kg (112 lb 14 oz) | SpO2 100%
- **Weight: 51 kg [05/08/13 1326]**

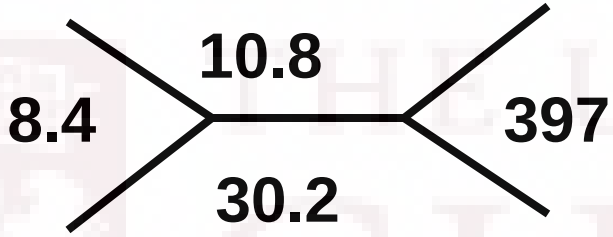
- Constitutional: lying in bed post extubation, moves all extremities to loud voice, cachetic
- Neck: supple
- Cardiovascular: tachy rate, no extra heart sounds
- Pulmonary/Chest: exam limited, good movement on anterior exam
- Abdomen: bowel sounds present, soft, no grimace with palpation
- Musculoskeletal: moving all extremities, 1+ edema, IO in right tibia
- Neurological: drowsy but able to name self, month and year.
- Skin: warm, dry
- Psychiatric: not agitated

Admission



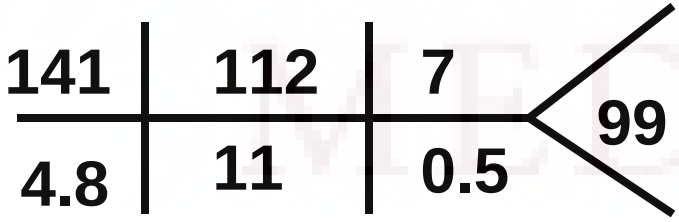


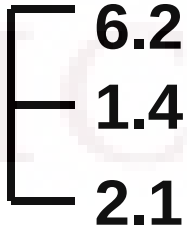


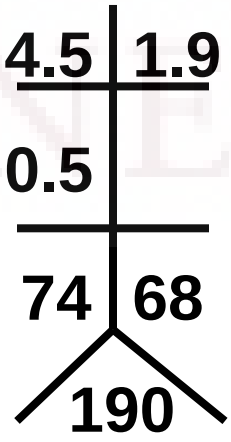


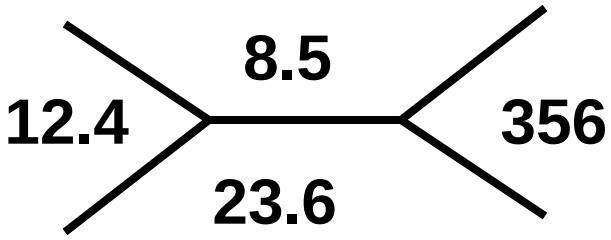
TSH 1.89
EtOH: <25
Lactic acid: 4.5
Urine Tox: +Opioids

Day of Consult









Lactic Acid: 0.5
B-OHButyrate: 6.02
A1c 5.7%
INR 1.6

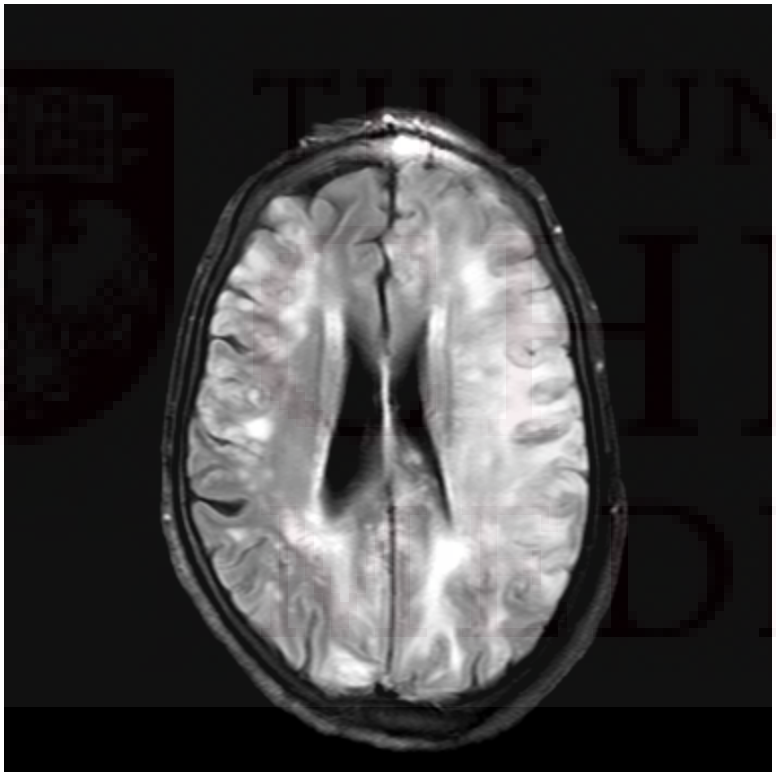
Assessment and Recommendations

- Hypoglycemia: poor PO intake and insulin use, possible recent alcohol use
  - Dextrose infusion until enteral nutrition, patient is receiving thiamine
- Ketonemia: likely secondary to ethanol ketosis and starvation ketosis
  - Dextrose and correction scale insulin with ISF of 50
- Seizures: hypoglycemia, alcohol withdrawal possibly contributing
  - Dextrose as above
  - CIWA protocol

Course

- Extubated, Responsive
- Second Tonic-Clonic Seizure
- Reintubated
- Comatose
- Subclinical Status Epilepticus on EEG
- MRI

MRI Brain



- Marked extensive restricted diffusion, edema, mass effect
- Nonspecific
- Differential
  - Profound hypoperfusion injury
  - Global hypoxic ischemic injury
  - Primary arteritis of CNS
  - Hypoglycemia (coma in diabetic on therapy)
  - Excitotoxic change of prolonged status epilepticus

Complications of Hypoglycemia

- Hypoglycemia Unawareness
- Fear of Hypoglycemia → poor glycemic control
- Myocardial Ischemia/Infarction
- Dysrhythmias
- Cerebral Ischemia
- Stroke
- Dementia
- Death

How often does this happen?

- T1D Exchange Clinic Network:
  - more than 25,000 individuals
  - Analysis of severe hypoglycemia (seizure or loss of consciousness) in the prior 12 months via questionnaire
  - Data available for included 9930 participants in the aged 2 to less than 26 years with T1DM for greater than 2 years

Pediatr Diabetes. 2013 Mar 8. doi: 10.1111/pedi.12030.

Results from Exchange Study

- 6.2% of the 9930 experienced one or more episodes of severe hypoglycemia (SH)
- SH was more common in participants 2 to less than 6 yr old than in the older age groups ($p = 0.005$)
  - 9.6% in 2 to <6 yr
  - 5.2% in 6 to <13 yr
  - 6.3% in 13 to <18 yr
  - 6.9% in 18 to <26 yr
- After adjusting for age
  - SH was more common in participants who were non-Hispanic black ($p < 0.001$)
  - Longer duration of diabetes ($p < 0.001$)
  - Used multiple daily injections (MDI) for insulin delivery (compared with pump users, $p < 0.001$)

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JDRF CGM Study

Table 3. Hypoglycemia and Other Adverse Events, According to Age.*

Variable	Age Group								
	≥25 Yr			15–24 Yr			8–14 Yr		
	Continuous-Monitoring Group (N=52)	Control Group (N=46)	P Value†	Continuous-Monitoring Group (N=57)	Control Group (N=53)	P Value†	Continuous-Monitoring Group (N=56)	Control Group (N=58)	P Value†
Severe hypoglycemic event‡									
No. per patient — no. of patients (%)									
0 events	47 (90)	42 (91)		54 (95)	48 (91)		52 (93)	52 (90)	
1 event	3 (6)	3 (7)		1 (2)	4 (8)		3 (5)	5 (9)	
2 events	1 (2)	0		2 (4)	1 (2)		1 (2)	1 (2)	
3 events	0	1 (2)		0	0		0	0	
6 events	1 (2)	0		0	0		0	0	
Patients with ≥1 event — no. of patients (%)	5 (10)	4 (9)	1.0	3 (5)	5 (9)	0.48	4 (7)	6 (10)	0.74
Events per 100 person-yr — no.	43.4§	26.3	0.66	17.9	23.9	0.64	17.9	24.4	0.64
Severe hypoglycemic episode with seizure or coma¶									
No. per patient — no. of patients (%)									
0 events	51 (98)	45 (98)		56 (98)	50 (94)		56 (100)	58 (100)	
1 event	0	1 (2)		1 (2)	3 (6)		0	0	
6 events	1 (2)	0		0	0		0	0	
Patients with ≥1 event — no. of patients (%)	1 (2)	1 (2)	1.0	1 (2)	3 (6)	0.35	0	0	NA
Events per 100 person-yr — no.	23.7§	4.4	0.85	3.6	11.9	0.14	0	0	NA

N Engl J Med. 2008 Oct 2;359(14):1464-76.