

A Tale of 2 Women: 51 yo F and 61 yo females admitted with hypoglycemia

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SB- HISTORY of PRESENT ILLNESS

- 51 year old non-diabetic female
- Had episode of loss of consciousness (LOC) at home on New Years Day
- Paramedics → critical low BS, given D50 x 1 amp
- Mental status improved with this
- No history of past episodes, seizures, LOC in the past
- She has no history of diabetes
- No diabetes or autoimmune disease in family
- No nausea, vomiting, fevers, chills

SB- HISTORY of PRESENT ILLNESS

- In the ED, she became acutely confused, diaphoretic and was again found to have a blood glucose of <30 mg/dL so was given another amp of dextrose and was started on IVF w/ dextrose.
- Endorsed not eating well the last week and having one alcoholic beverage at a New Year's Eve party.
- History of heroin abuse in the past but is in a methadone program and reports abstinence
- Admitted to the intensive care unit for monitoring

SB- Other Past Medical History

■ Past Medical History

ADHD

Heroin addiction (past)

■ Social History

Smokes half pack/day

Smokes marijuana daily

■ Family History

Paternal grandfather: Heart Disease

Paternal grandmother: Blood Clots

Brother: Depression/Anxiety

■ Medications

Methadone 20 mg daily

15 minutes later...

- Paged by same ICU resident saying....

“Remember that last lady we just spoke about, I am basically calling the exact same consult on someone else ...”

SL- HISTORY of PRESENT ILLNESS

- 61 year old admitted with altered mental status and found to have severe hypoglycemia.
- Snorted heroin, smoked cocaine and consumed substantial alcohol 1 day prior to admission on NYE
- No history of weight loss, appetite change, seizures, nausea or vomiting.
- Has never been on anti-hyperglycemic agents.
- 2 prior episodes of hypoglycemia in the past requiring hospitalization, she did not know the trigger.

SL- Other Past Medical History

■ Past Medical History

Asthma

Heroin/Cocaine addiction

■ Social History

Smokes a pack every 5 days

Drinks 2-3 shots of gin/3-4
beers daily

Snorts heroin/smokes
cocaine

■ Family History

No history of diabetes

No history of hypoglycemia

■ Medications

Albuterol

Symbicort

Amlodipine

- Since both of these women were seen and examined consecutively the next morning I will just present their data next to each other for comparison sake

Review of systems

SB

- **GENERAL:** **10 lb unintentional weight loss.** No fevers or chills.
- **HEENT:** Normal vision.
- **CV:** No chest pain, no palpitations.
- **Pulm:** No dyspnea.
- **GI:** No N/V/D/C/ab pain.
- **MSK:** No joint pain.
- **Skin:** No rash.
- **Neuro:** No headaches.
- **Endo:** **Hypoglycemia.**
- **Psych:** **history of substance abuse- in remission.**

SL

- **GENERAL:** No weight loss. No fevers or chills.
- **HEENT:** Normal vision.
- **CV:** No chest pain, no palpitations.
- **Pulm:** No dyspnea.
- **GI:** No N/V/D/C/ab pain.
- **MSK:** No joint pain.
- **Skin:** No rash.
- **Neuro:** No headaches.
- **Endo:** **Hypoglycemia- 2 prior episodes.**
- **Psych:** **history of substance abuse.**

Physical Exam

SB

- 35.8, 72, 105/59 , 98%, BMI 20.25
- **Gen:** no distress
- **HEENT:** no pharyngeal erythema. Normal VF. PERRLA.
- **Neck:** no thyromegaly, no nodules.
- **CV:** regular rate and rhythm.
- **Pulm:** clear to auscultation
- **GI:** soft, non-tender/non-distended abdomen.
- **MSK:** normal range of motion.
- **Neuro:** alert and oriented
- **Psych:** normal mood.

SL

- 36.0, 82, 131/82, 22, 99%, BMI 19.7
- **Gen:** no distress
- **HEENT:** no pharyngeal erythema.
- **Neck:** no thyromegaly, no nodules.
- **CV:** regular rate and rhythm.
- **Pulm:** clear to auscultation
- **GI:** soft, non-tender/non-distended abdomen.
- **MSK:** normal range of motion.
- **Neuro:** alert and oriented
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Initial Labs

SB

135	104	13	37
3.7	24	1.2	
			Ca 8.5
5.5	3.1	Phos 2.6	
0.4	44	Mg 2.1	
60	30		

SL

141	107	21	31
4.0	25	0.9	
6.9	4.0	Ca 9.0	
0.1	57	Phos 3.4	
33	16	Mg 2.2	

Differential Diagnosis Hypoglycemia

- Ill or Medicated
 - Drugs- insulin, insulin secretagogues, EtOH
 - Critical illness- hepatic/renal/cardiac failure, sepsis
 - Hormone deficiency- cortisol, glucagon/EPI
 - Non-islet cell tumor
- Seemingly well
 - Endogenous hyperinsulinism
 - Insulinoma
 - Functional B-cell disorder (nesidioblastosis, post-RYGB)
 - Insulin antibody-mediated
 - Insulin secretagogue
 - Accidental/surreptitious

Differential Diagnosis Hypoglycemia

- Fasting Hypoglycemia
 - Drugs- insulin, insulin secretagogues, EtOH
 - Critical illness- hepatic/renal/cardiac failure, sepsis
 - Hormone deficiency- cortisol, glucagon/EPI
 - Non-islet cell tumor
 - Disorders of infancy- congenital hyperinsulinism, enzyme deficiencies
- Reactive Hypoglycemia
 - Endogenous hyperinsulinism
 - Insulinoma
 - Functional B-cell disorder (nesidioblastosis, post-RYGB)
 - Insulin antibody-mediated
 - Insulin secretagogue
 - Hereditary fructose intolerance, galactosemia
 - Accidental/surreptitious

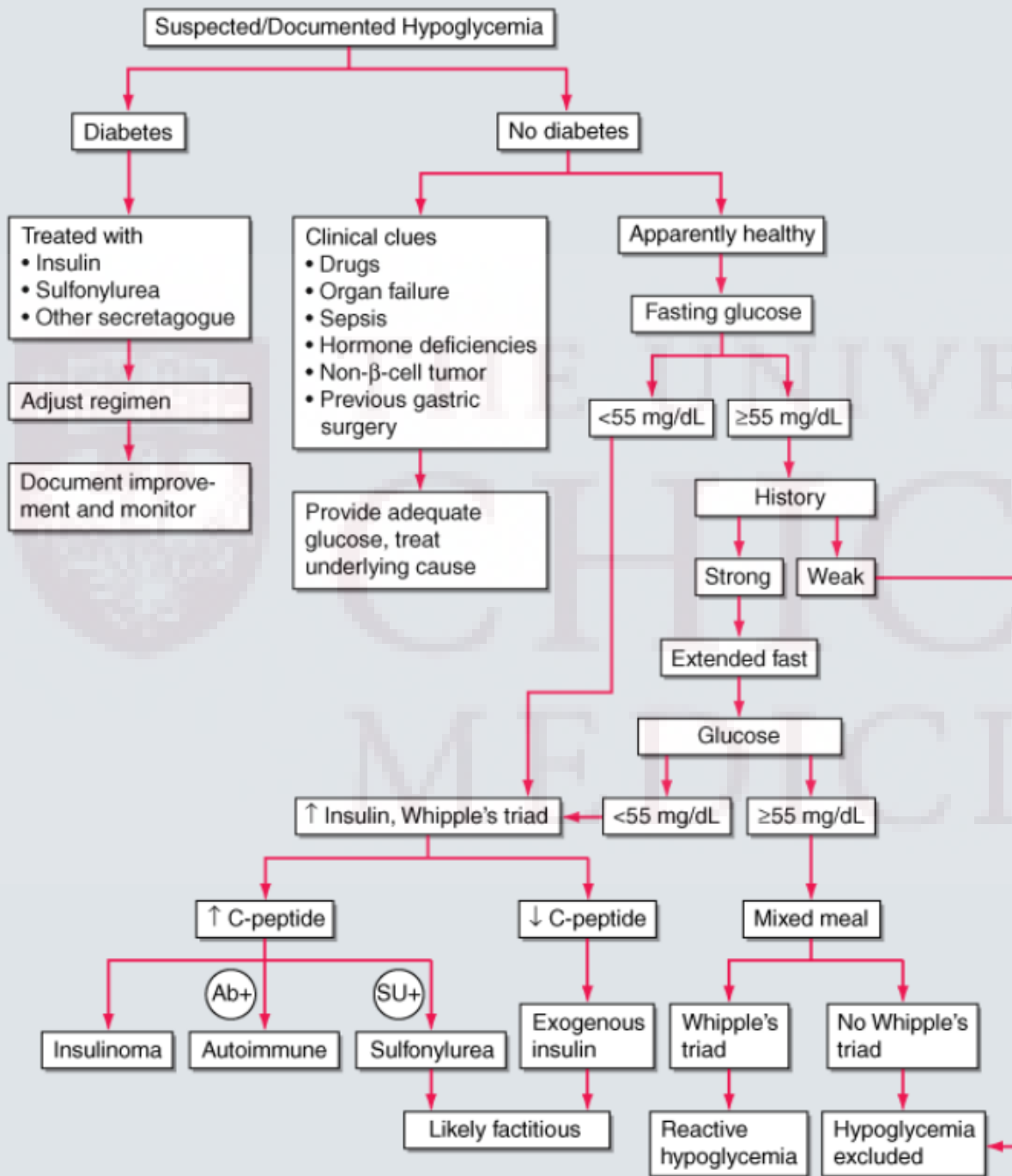
Obtaining a Critical Sample

- In cases of unknown etiology, this should distinguish hypoglycemia caused by endogenous (or exogenous) insulin use from other mechanisms
- Plasma glucose, insulin, c-peptide, proinsulin, B-hydroxybutyrate, cortisol, insulin antibodies, sulfonylurea screen

Clinical Questions

- Review algorithm for hypoglycemia in non-DM

ALGORITHM APPROACH TO PATIENT



Critical diagnostic findings when glucose < 55 mg/dL

- Insulin 3 U/mL (18 pmol/L)
- Cpeptide 0.6 ng/mL
- Proinsulin 5 pmol/L

Critical Labs

	Case 1: SB	Case 2: SL
Serum Glucose (60-109 mg/dL)	37	31
Insulin (<28.5 uIU/mL) → (<3.0)	57.1	22.1
C-peptide (0.3-2.3 pmol/mL) → (<0.6)	1.58	1.23
Proinsulin (3-20 pmol/L) → (<5.0)	39	78
Insulin Ab (0.00-0.02 nmol/L)	Negative	Negative
Ketones (<0.3 mmol/L)	<0.10	<0.10
Cortisol (6.8-26 mcg/dL)	1.0	23.2
HbA1c (3.9-6.1%)	5.1	5.3
Urine toxicology Screen	+ for opiates	+ for opiates, + for cocaine

Further history

- Asked SL if anyone else from the party became sick with similar symptoms, she endorsed that her neighbor (SB) was also admitted to a hospital with the same symptoms. (She had no idea which one)
- BOTH of them had snorted heroin that was laced with other medications on NYE, no IV drug use.
- The person who sold them the heroin admitted to cutting the drug with what was thought to be “Dormin” an over the counter sleep-aid containing Benadryl
- Anecdotally helps to reduce withdrawal symptoms.

Critical Labs

	Case 1: SB	Case 2: SL
Serum Glucose (60-109 mg/dL)	40	31
Insulin (<28.5 uIU/mL) → (<3.0)	57.1	22.1
C-peptide (0.3-2.35 pmol/mL) → (<0.6)	1.58	1.23
Proinsulin (3-20 pmol/L) → (<5.0)	39	78
Insulin Ab (0.00-0.02 nmol/L)	Negative	Negative
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HbA1c (3.9-6.1%)	5.1	5.3
Urine toxicology Screen	+ for opiates	+ for opiates, + for cocaine
Sulfonylurea Screen (Neg< 3ng/mL)	+ for Glipizide	+ for Glipizide

Assessment/Plan

- Neither required treatment with octreotide or glucagon.
- After 24 hours in the MICU neither subject had another episode of hypoglycemia.
- Diagnosis: hypoglycemia induced by snorting heroin contaminated with glipizide
- Both women were informed of their test results
- SB had incidental hypocortisolemia, further work-up revealed concomitant secondary adrenal insufficiency.

SB- Pituitary Assessment

- Cortisol 1.0 (ACTH 5.4), 2.8 (7.6) on repeat
 - Cosyntropin stim was attempted but there was a problem with the timing in relation to her last dose of hydrocortisone
- TSH of 1.08 (RR 0.3-4.0)
- Free T₄ of 0.56 (RR 0.9-1.7)
- Prolactin < 1.0 ng/mL (RR 4.8-23.3)
- IGF-1 of <25 ng/mL (RR 87-238)
- FSH 4.9, LH 5.4, Estradiol 130 (perimenopause)

SB- Incidental Hypocortisolemia

- Denied a history of corticosteroid use and did not appear adrenally insufficient on exam.
- Infused brain MRI was obtained and revealed no pituitary lesion, however, there was a 5 mm x 5 mm anterior communicating artery aneurysm causing mass effect on the optic chiasm thought to be contributing to hypopituitarism.
- Patient endorsed being told she had a brain aneurysm at 4 yo. Never followed up because she didn't have symptoms.

Discharge plan

- Neurointerventional radiology service saw her and discussed 3 options- conservative management, endovascular surgery and open surgical clipping.
- Discharge medications
 - Hydrocortisone 20 mg/10 mg daily
 - Levothyroxine 50 mcg daily
- Recommended she have her pituitary labs re-drawn in 2 weeks after holding her PM dose of hydrocortisone but unfortunately after she was discharged she has not been contact-able.

Clinical Questions

- Review algorithm for hypoglycemia in non-DM
- Should we be worried about a new epidemic?

“Cheese”: New Face of Heroin



Black Tar Heroin

+



Tylenol PM or generic

=



“Cheese”

- Enhance illicit drug effect
- More conducive for snorting
- Increase profits by increasing volume of drug sold

Glyburide ~ Street Valium

- 57 yo non-diabetic man with a history of benzodiazepine abuse who was unresponsive after a witnessed collapse
- Fingerstick glucose of 41 mg/dL. 1 amp of D50 and 1 mg glucagon were given.
- Urine drug screen was positive for cocaine, benzodiazepines, opiates, and methadone.
- 48 yo non-diabetic woman found unresponsive.
- Unmeasurable “low” fingerstick glucose. After one amp of D50 and 2 mg naloxone, GCS improved to 7, repeat fingerstick glucose was 68 mg/dL.
- She endorsed ingesting 2 tablets of “street Valium.”
- Urine drug screen and serum alcohol were negative.

Hypoglycemic effect of sulfonylureas mimics clinical sedation achieved with benzos

Clinical Questions

- Review algorithm for hypoglycemia in non-DM
- Should we be worried about a new epidemic?
- Have there been other cases of SU poisoning by inhalation?

Hypoglycemia by Inhalation

The radon concentrations are not distributed evenly over the village but show a clustering of very high radon concentrations in an area situated between two rivers (area A, median $c_a = 1868$ Bq/m³). Geologically, this area is an alluvial fan of a giant rock slide of granitic gneisses. The radon concentration in the rest of Umhausen is lower by a factor of 10 (area B, median $c_a = 182$ Bq/m³). Areas A and B have roughly equal numbers of inhabitants. The lifetime radon exposure were calculated according to BEIR IV.³ The median lifetime radon exposure is 242 working-level-months (WLM) in area A, 23 WLM in area B, and 111 WLM in the total area of Umhausen:

	WLM*	Obs/exp*	95% CI
Total area	111 (110–149)	3.85 (3.66)	2.9–5.1
Area A	242 (210–325)	6.17 (6.23)	4.4–8.4
Area B	23 (<110)	1.43 (3.07)	0.7–2.7

*Data shown as WLM and as observed/expected ratio of lung cancer deaths in Umhausen 1970–91 as age-and-sex standardised ratio (with data for uranium miners in italic type, 95% CI not available).

The high lifetime exposure in area A coincides with a clustering of observed lung cancer deaths. The lifetime radon exposure of 242 WLM in area A is comparable to the category 210–329 WLM for uranium miners in West Bohemia. Equally high domestic lifetime radon exposures are rarely found. They permit a comparison between the ratio of observed to expected deaths from lung cancer in Umhausen and among uranium miners in West Bohemia (area A 6.17, uranium miners 6.23). The agreement between the figures is surprisingly high. The lifetime exposure in area B is only moderately increased at 23 WLM and is comparable with the category less than 110 WLM for uranium miners. Smoking habits and alcohol consumption were not considered in either study.

Can data on radon exposure and cancer risks in uranium

Hypoglycaemia by Inhalation

SIR—Drug poisoning can happen in unexpected ways. A 33-year-old man was brought to the emergency room in coma. He had previously been well, except for chronic otitis media. The day before admission he developed an unsteady gait with slight alterations in mood and behaviour. He was taken to another hospital where a diagnosis of vertigo due to otitis media was made, and he was discharged on oral antibiotics. The next morning the patient could not be roused. In the emergency room he appeared deeply comatose: his eyes were closed and he did not react to noxious stimuli. Plantar cutaneous reflexes were abnormal, pupils were equal and reacted slowly to light. Temperature was normal, blood pressure was 120/80 mm Hg, heart rate 100 beats per min, and respiratory rate 10 per min. Blood glucose, measured as part of a routine, was 1.3 mmol/L. 50 mL of glucose 33% was given, with slight improvement in the neurological picture. There was no personal or family history of diabetes and the relatives denied any access to hypoglycaemic drugs. The patient had never had psychiatric problems or previous admissions for the same symptoms, making the diagnosis of Münchausen's syndrome unlikely. The patient recovered but needed further glucose infusions for recurring hypoglycaemia and remained somewhat confused for the next 48 h. An electroencephalogram showed subcortical non-specific alterations. Computed tomography (CT) of the head was normal. Plasma insulin levels were normal. Pancreatic echography and CT scan were also normal. Further information about the patient was sought. He worked at a pharmaceutical firm processing chlorthalidone and nifed-

Obtaining the Critical sample

We can now add on to hypoglycemia labs to any Mint Green or Red top tube

- Insulin
- C-Peptide
- Beta-hydroxybutyrate
- Cortisol

Can NOT add on Proinsulin.

Call 773-702-1318 (Dr Leung with ?s/problems)

Take Home Points

- Importance of the critical sample— how to obtain this sample retroactively
- Hypoglycemia might be multifactorial
- History is critical in these cases

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