Potential Severe Hypoglycemia Associated with Energy Drinks in a Diabetic Patient: A Case Study

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Introduction

This is the case of J.H., a 32-year-old white male with a history of insulin-dependent diabetes mellitus who experienced severe hypoglycemia and coma after a generous consumption of energy drinks. Immediately following his brief coma, he asked his friend to take him to our office where he presented with a cough and chest congestion of 5 to 6 days duration. Although he presented to us complaining of a cough and chest congestion, his physical exam revealed that there was more to the story. The fact that one of his eyes appeared smaller than the other and he had an elevated HR of 138 (HR of 196 measured by the paramedics, normal HR ranged from 74 to 128 in previous visits) prompted us to ask more questions, to which he finally opened up about his life-threatening experience.

The clinical features of the episode are viewed in terms of the relationships between excessive energy drink consumption and its safety of use in patients with insulin-dependent diabetes mellitus. A search of the clinical literature revealed no other literature describing this consequence from energy drink consumption by diabetic patients. There have been reports of serious side effects following the consumption of large amounts of carbohydrates, especially simple carbohydrates: bloodstream levels of glucose rapidly increase causing a sudden high spike in sugar, which triggers the pancreas to secrete increased amounts of the hormone insulin. Simple carbohydrates readily pass into the cells in the presence of insulin. Thus, insulin lowers the excess glucose from the bloodstream by transporting it to the cells, where it is used for energy. The entrance of glucose in the cell also requires potassium and thus administering high doses of simple sugars can produce hypokalemia which adds to the side effects associated with the energy drinks. Excess insulin remaining in the bloodstream causes blood sugar to drop below normal levels, resulting in a “sugar crash” or hypoglycemia. Symptoms of hypoglycemia include blurry vision, palpitations, diaphoresis and confusion, and may lead to fainting, seizures, or even coma.

Patients like J.H. who have insulin-dependent diabetes are unable to produce the hormone insulin and must inject themselves with insulin daily. Low blood glucose in people on insulin may be due to other factors such as meals or snacks that are too small, delayed, or skipped; an increase in physical activity, or alcoholic beverages.

Established adverse effects of energy drinks resulting from the sympathomimetics include tachycardia, increased blood pressure, palpitations, anxiety, insomnia, nervousness, headache, cardiac arrest, and even death. The risk of experiencing these unwanted effects may be increased in patients with comorbid conditions. For example, it is recommended that patients with hypertension and cardiac arrhythmias avoid consumption of energy drinks because they may exacerbate these conditions.

J.H.’s case brings our attention to the possibility that tachycardia, a common adverse effect of energy drink consumption, may be linked with low blood sugar, which may warrant avoidance of these products by patients with diabetes. Tachycardia indirectly causes a drop in blood sugar because an increase in heart rate causes calories to burn up more rapidly, and as a result blood sugar may drop significantly. This is especially dangerous in diabetic patients whose blood sugar must be tightly controlled by insulin because insulin itself may cause blood sugar levels to drop, in turn causing tachycardia, which may be the start of a disastrous cycle.

Energy drink consumption and its adverse effects are more widely researched in the non-diabetic population. This case is worth studying because it reflects a possible imminent danger to diabetic patients who consume energy drinks.

Biographic Information:

a. Age: 32
b. Race: White
c. Sex: Male
d. Occupation: Fast food restaurant manager
e. Chief Complaint: Loss of consciousness due to hypoglycemia
f. Course/frequency/duration: Unconscious for approximately 15 minutes

History of Present Illness:

10/2/12 — J.H. woke up at 3:00 p.m., took a shower, and took BG level, measuring 170. Did not eat but instead had two 16 oz Monster Rehab Energy Drinks on his way to work. JH worked from 5:00 p.m. to 9:30 p.m. without incident then at approximately 9:30 p.m. he completely “blackened out” for 15 minutes until the paramedics arrived on the scene. According to a co-worker, JH was closing out one of his cashiers, when he began confabulating — his co-worker could not make sense of anything he was saying. He proceeded to
stagger around the dining room, then he paused and stood by the window staring blankly into space, finally he came back around the counter to the cash register, again speaking gibberish when all of a sudden he fell to the floor.

Paramedics were called and arrived on scene 15 minutes later. The paramedics measured his blood sugar at 34 and gave him glucose tablets. J.H. responded rapidly and paramedics determined it was not necessary to take him to the hospital.

Prior Health History

7/18/11 — J.H’s labs show elevated HgbA1C signifying uncontrolled diabetes. He reported difficulty sleeping due to stress from his job as a retail fast food manager. He stated he did not eat breakfast nor drink enough water throughout the day. His BP = 99/63, HR = 100 at the office. His A1C is elevated at 7.9 (6/13/11). Assessment: Type 1 DM—OOC, asthma, situational anxiety, hx of renal calculi. Plan: Add protein shake in AM, IV in 1-2 months with blood glucose log, UA.

2/8/12 — J.H. came in for follow-up visit. Diabetes still not controlled. He reports increased stress due to the recent firing of assistant manager and his diet still lacks breakfast and water. He does not regularly exercise. His BP = 120/70, HR = 74, within normal range.

4/16/12 — J.H. came in for another follow-up. No change since previous visit—diabetes is still not controlled, stress from job increased. He still does not eat breakfast or drink enough water. Refuses nutrition education counseling. BP = 160/60, HR = 128, elevated most likely due to increase in stress.

10/3/12 — J.H. presented with chest congestion x 3-6 days and later reported LOC at work in the AM. BS = 34 (taken by paramedics). BP = 141/85 and HR = 138 elevated (taken at office visit), most likely due to stress from incident. Given labs, HgbA1C = 8.9 (8/13/12). Smoker — 1 pack per day. Spiro FVC = 60% of predicted. Medications: albuterol inhaler. Assessment: PNA, uncontrolled Type 1 DM, Asthma. No energy drinks, off work. Z-pak, Keflex 500 mg PO QID x 10 days, Prednisone 10 mg tapered 6, 5, 4, 3, 2, 1 and follow-up office visit in 1 week.

Diagnostics:

Labs were taken on 6/13/11, 10/31/11 and 8/13/12.

6/13/11 abnormalities:
- HgbA1C = 7.9 (elevated)

10/31/11 abnormalities:
- MCHC = 35.4 (slightly elevated)
- RDW = 14.9 (slightly elevated)
- Glucose = 68 (slightly low)
- Cl = 108 (slightly elevated)
- Albumin = 5.1 (slightly elevated)
- All other labs WNLs

8/13/12 abnormalities:
- Glucose = 121 (slightly elevated)
- AST = 36 (slightly elevated)
- HgbA1C = 8.9 (elevated)
- All other labs WNLs
- Spirometry was performed on 10/3/12
- Spiro FVC = 64% predicted (low)

Assessment:
- Uncontrolled non-compliant insulin dependent diabetic
- Asthmatic smoker
- Situational anxiety with increased occupational stress

Treatment:
- No energy drinks
- Time off work
- Start Z-pak — 5 day
- Start Keflex 500 mg PO QID x 10 days
- Start Prednisone 10 mg tapered 6, 5, 4, 3, 2, 1
- Continue Lantus 28 – 32 units a day AM, Humulin R 2 units’ prn per 50mg/dl over goal
- Blood glucose goals: 70 – 130 mg/dl before meals, <180 mg/dl 2 hours after starting a meal, HgbA1C < 7

Discussion and Conclusion:


Ingredients in Monster Rehab Rojo Tea Energy Drink: Glucose, Taurine, Citric Acid, Sodium Citrate, Tea Black Extract, Panax Ginseng

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Root Extract, Flavor(s) Natural, Magnesium Lactate, Monopotassium Phosphate, Calcium Lactate, Caffeine, Sucrose, Coconut Water Concentrated, Milk Thistle Extract, Nicotinamide (Vitamin b3), Sodium Chloride, Pantothenic Acid, Quercetin, L-Carnitine L-Tartrate, Gluconolactone, Guarana Seed Extract, Inositol, Acesulfame Potassium, Acai Extract, Goji Berries Extract, Mangosteen Extract, Pyridoxine Hydrochloride (B6), Cyanocobalamin.

Energy drinks have been gaining a lot of press these days growing in popularity with teenagers and young adults. It is important to question the overall safety of these beverages. Studies have shown that the combination of energy drink and alcohol consumption is more dangerous than alcohol consumption alone. Studies have also shown that energy drink consumption does not improve exercise performance, and in fact may cause more harm than benefit. However, almost all studies done on energy drinks have involved small sample sizes of young, healthy individuals in whom we are not likely to see short-term ill effects, leaving important questions unanswered. For example, “what are the long-term effects of energy drink consumption?” and “what about energy drink consumption in patients with comorbid diseases such as insulin-dependent diabetes?” This case in particular focuses our attention on the dangers of energy drink consumption and patients with insulin-dependent diabetes.

Several ingredients (caffeine, herbal stimulants, sugars, etc.) in energy drinks can increase heart rate, in turn burning up energy (calories) to the point of losing consciousness. Additionally, it may be important to point out the fact that excess caffeine, which is a diuretic, can also cause dehydration, which can also lead to loss of consciousness in compromised populations.

We propose further investigation into the possible adverse consequences of energy drinks in insulin dependent diabetics.

References: