


# The Pain of Staying Alert: A Case Report and Literature Review on Energy Drink–Induced Acute Pancreatitis

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## Abstract

Energy drink consumption has increased over the past decade. It is associated with several common side effects including diarrhea, heartburn, and dyspepsia. Energy drinks have been proposed as a rare but potential cause of acute pancreatitis. This paper investigates a unique case of energy drink–induced pancreatitis and further explores current literature on this topic. This study stresses the importance of asking all patients presenting with acute pancreatitis about their daily energy drink consumption, especially if the cause is unknown.

## Keywords

acute pancreatitis, pancreas, energy drinks

## Introduction

Acute pancreatitis is a leading cause of gastrointestinal hospitalizations in the United States.<sup>1</sup> The 2 most common causes of acute pancreatitis are alcohol and gallstones. Although other causes including medications, post-endoscopic retrograde cholangiopancreatography, hypertriglyceridemia, and trauma are also well-known factors causing acute pancreatitis, approximately 20% cases are idiopathic.<sup>2</sup> The mortality rate of patients with severe pancreatitis is up to 30%, with recurrence occurring in 20% of the population.<sup>3,4</sup> Thus, determining the cause to prevent recurrent pancreatitis is imperative.

One rare but reported cause of acute pancreatitis is energy drink consumption. Consumption of energy drinks has increased significantly in the past 10 years.<sup>5</sup> Thus, the potential association of pancreatitis and energy drink consumption should be explored. This paper presents a case of energy drink–associated pancreatitis and examines prior literature published on this topic.

## Case Presentation

A 29-year-old male with no known past medical history presented to the emergency room with nausea, vomiting, and epigastric pain since the morning of admission. The pain woke him up from his sleep and was described as a sharp, 10/10 intensity pain that radiates to his back. He had 4 bouts of nonbilious, nonbloody vomiting since the onset of the

pain. He denied any associated fever, chills, shortness of breath, or cough. His admission vitals were blood pressure of 123/76 mm Hg, heart rate of 84 beats per minute, temperature of 98.6°F, respiratory rate of 12 breaths per minute, and body mass index of 20. Superficial and deep palpation of the epigastric abdominal region was significantly tender; however, no rebound tenderness or rigidity was noted. The patient denied any history of alcohol use, recreational drug use, or abdominal trauma. He also denied any family history of pancreatitis, cancer, or autoimmune conditions. The patient admitted to consuming 5 to 6 energy drinks daily. One day prior to hospital admission, our patient drank 7 16-ounce energy drinks.

## Investigations

His laboratory results were significant for a lipase of 3122 U/L, AST 115, ALT 110 and normal alkaline phosphatase. A chest X-ray and electrocardiogram were both unremarkable. Considering the elevated lipase and epigastric pain, a

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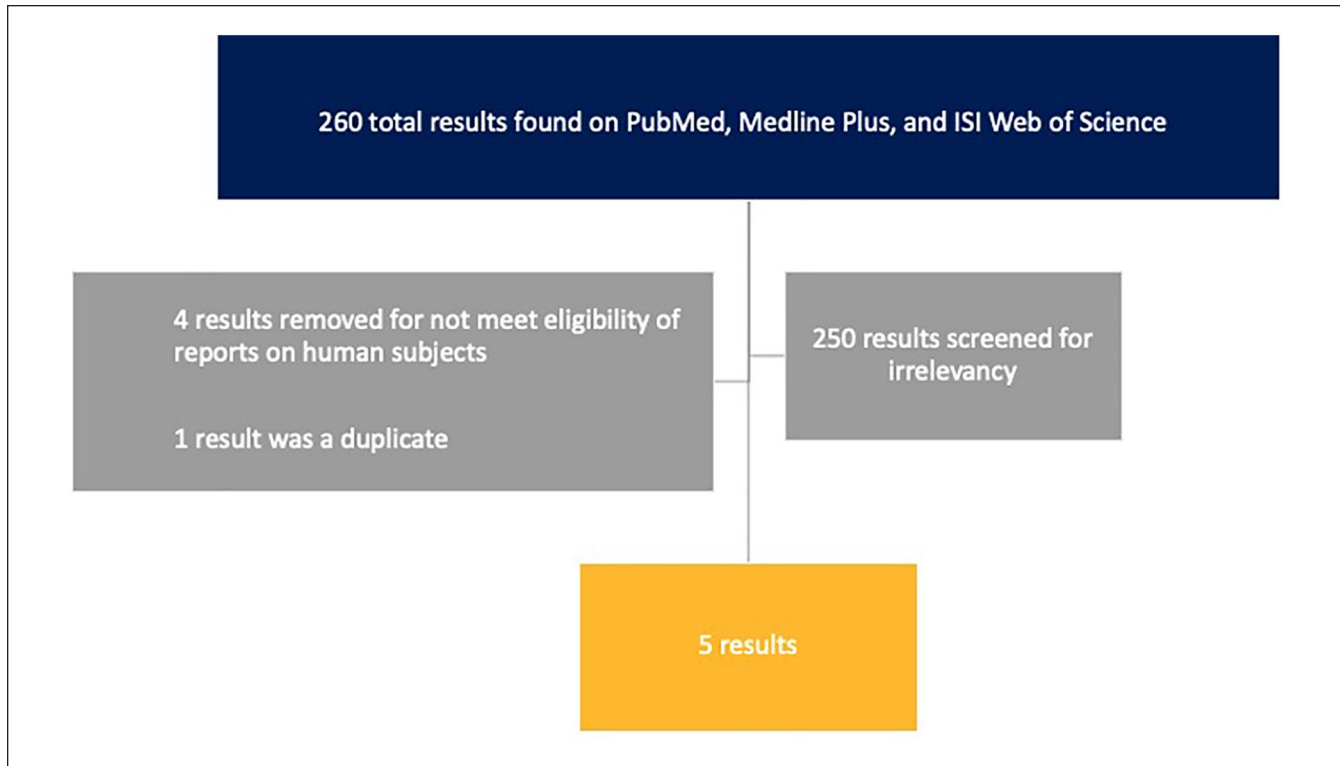
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**Figure 1.** Results for the method of article selection.

diagnosis of acute pancreatitis was made. An abdominal ultrasound (US) revealed pancreatitis without cholelithiasis or choledocholithiasis. A computed tomography abdomen scan confirmed the U.S. findings.

Further workup to determine the cause of his pancreatitis, including a triglyceride panel, immunoglobulin-4, alcohol levels, and urine toxicology were all unremarkable. Further genetic workup for mutations was also negative. Excessive energy drink consumption is deemed to be the cause of acute pancreatitis.

## Treatment and Outcome

The patient was started on intravenous (IV) fluids in the emergency room with as needed pain and antiemetic medications. The following day, the patient was able to tolerate a diet. On the third day of admission, the patient was asymptomatic and hemodynamically stable. At 4-week, 3-month, and 2-year follow-ups, the patient stated he had stopped drinking energy drinks and had not had any recurrent episodes.

## Literature Search

A literature review from 1951 to 2021 through PubMed, Medline, and ISI Web of Sciences was conducted. The following search terms were used: pancreas, pancreatic,

pancreatitis, acute pancreatitis AND energy drink, energy drinks, Red Bull, Monster OR Bang energy. Only articles with abstracts or full-text access journals were included in this study.

A total of 260 article results were identified. One author read through the titles and abstracts to determine if the articles presented patients with acute pancreatitis secondary to energy drinks. Inclusion and exclusion criteria to evaluate the research articles were applied. Inclusion criteria included papers reporting energy drinks associated with acute pancreatitis. Exclusion criteria included irrelevant or duplicate papers and papers without full texts available (Figure 1).

After applying these criteria, a total of 5 papers were selected (Table 1). Publications reported cases of energy drink-associated pancreatitis. Shmelev<sup>6</sup> reported a patient with 2 episodes of pancreatitis. This patient was in his 40s and had consumed Rockstar energy drinks prior to developing acute pancreatitis. Ibrahim et al<sup>7</sup> presented a case of a 46-year-old male with a history of diabetes mellitus (DM) who developed pancreatitis after he drank 3 to 4 16-oz cans of energy drinks. The computed tomography (CT) abdomen scan confirmed acute pancreatitis. This patient did not have any recurrent episodes after the cessation of energy drink consumption. Al-Tamimi et al<sup>2</sup> reported a 19-year-old male with 10 hospitalizations of acute pancreatitis. The patient drank a Red Bull and a Full Throttle every day. After the patient was counseled on discontinuing energy drinks, he did

**Table 1.** Cases of Previously Reported Energy Drink Induced Acute Pancreatitis.

First author and reference	Age/sex	Energy drink (if applicable)	Onset	Outcome	Recurrence
Shmelev <sup>6</sup>	40s/M	Rockstar	N/A	N/A	Two episodes of interstitial edematous pancreatitis after 2 separate times of drinking Rockstar
Uwaifo <sup>8</sup>	46/M	Monster	After daily consumption of 2-3 16-oz cans for the past 4 months	Stopping intake of beverage resolved symptoms	N/A
Ibrahim et al <sup>7</sup>	46/M	Unknown	After daily consumption of 3-4 16-oz cans for the past 2 weeks	N/A	N/A
Al-Tamimi et al <sup>2</sup>	19/M	Full Throttle and Red Bull	N/A	Conservative management led to full recovery	None at 7-month follow-up
Versha et al <sup>9</sup>	27/M	Unknown	After daily consumption of 6 16-oz cans	N/A	N/A

not have any recurrent episodes at the 7-month follow-up. Uwaifo<sup>8</sup> reported a patient presenting with irritant gastritis, pancreatitis, and toxic hepatitis. The patient was in his 40s and had a history of DM. He reported drinking 2 to 3 daily energy drinks, and his symptoms ceased after discontinuing them. Versha et al<sup>9</sup> presented a case report of a 19-year-old male with a history of cholecystitis and cholecystectomy with an episode of acute pancreatitis. He consumed 6 energy drinks every day. His workup included a magnetic resonance cholangiopancreatography (MRCP), which showed no microlithiasis or abnormalities in the ampulla.

## Discussion

Energy drinks consumption has been increasing over the years. Well known side effects of energy drinks include tachycardia, anxiety, stomach irritation, and dehydration; however, energy drink-induced acute pancreatitis is not well studied. There are reported cases of acute pancreatitis secondary to energy drink consumption. The annual incidence of pancreatitis in the United States is up to 35 per 100,000 population with a recurrence in 30 of these patients.<sup>10</sup> Determining the cause of the acute pancreatitis will prevent recurrence and minimize risk of morbidity and mortality.<sup>11</sup>

The increased consumption of energy drinks is concerning. Companies have added multiple supplements and stimulants to energy drinks with common ingredients being ginseng, taurine, and guarana.<sup>12</sup> These supplements are classified as dietary supplements rather than medications, decreasing U.S. Food and Drug Administration (FDA) regulations on these drinks.<sup>13</sup>

Our reported patient was in his 20s without a history of alcohol use. His US and CT imaging was negative for biliary causes of pancreatitis. Furthermore, a thorough set of labs ruled out other causes of pancreatitis with energy drink consumption, remaining the most likely cause of acute

pancreatitis. Our literature review examined similar cases. One case report examined 10 recurrent episodes of pancreatitis. These episodes were all associated with the consumption of energy drinks.

In a previous study, Ayoub and ElBeshbeishy<sup>14</sup> concluded energy drinks cause significant destruction to the pancreatic acini in albino rats. In addition, energy drinks were shown to cause an imbalance in the pancreatic antioxidants in albino rats. Qassim et al<sup>15</sup> further supported this claim in his study exploring the effect of Red Bull in rats. Rats exposed to the energy drink were noted to have necrosis with mononuclear and degenerative changes of the Islets of Langerhans cells.<sup>15</sup> Another study by Haroun et al<sup>16</sup> demonstrated significant distortion of the pancreatic acinar and islet cytoarchitecture in rats ingested with energy drinks. These studies depict an underlying biological relationship between energy drinks and acute pancreatitis and further suggest an alteration of the pancreatic tissue upon exposure to energy drinks.

We recognize the limitations to our paper. There are a limited number of case reports published on this topic. Some of the cited case reports included confounding variables such as comorbidities and genetic mutations. However, there were no reported episodes of recurrence after energy drink cessation.

As these drinks continue to gain popularity and become more widely accessible and used, it is essential for them to be further studied and considered as a possible cause of acute pancreatitis. More case reports and possibly large population prospective studies are needed to further examine the relationship between energy drink-induced pancreatitis.

## Authors' Note

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### Ethics Approval

Our institution does not require ethical approval for reporting individual cases or case series.

### Informed Consent

Verbal informed consent was obtained from the patient for their anonymized information to be published in this article.

### References

1. Wu BU, Banks PA. Clinical management of patients with acute pancreatitis. *Gastroenterology*. 2013;144:1272-1281.
2. Al-Tamimi A, Kassim T, Chandra S. Recurrent acute pancreatitis with energy drinks consumption: rare but definite association. *Am J Gastroenterol*. 2018;113:S828.
3. Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. *Gastroenterology*. 2013;144(6):1252-1261.
4. Quinlan JD. Acute pancreatitis. *Am Fam Physician*. 2014;90:632-639.
5. Ruiz LD, Scherr RE. Risk of energy drink consumption to adolescent health. *Am J Lifestyle Med*. 2018;13:22-25.
6. Shmelev A. Energetic etiologies of acute pancreatitis: a report of five cases. *World J Gastrointest Pathophysiol*. 2015;6:243.
7. Ibrahim AM, Ali M, Al-Bast B, Bhandari B, Kulkarni A. Energy drink consumption resulting in severe hypertriglyceridemia, hyperglycemia, and acute pancreatitis. *J Am Coll Cardiol*. 2019;73:2752.
8. Uwaifo GI. Beware energy drinks: a case of a toxic triad syndrome in a diabetic patient with nonalcoholic fatty liver disease. *Am J Med Sci*. 2019;358(4):304-311.
9. Versha F, Young R, Ajumobi A. A rare cause of acute pancreatitis: 1328. *Am J Gastroenterol*. 2018;113:S762.
10. Talley NJ, Richard Locke G, Saito YA. *GI Epidemiology*. Oxford, England: Blackwell Publishing Ltd; 2007.
11. Lee JK. Review of idiopathic pancreatitis. *World J Gastroenterol*. 2007;13:6296.
12. Sanchis-Gomar F, Pareja-Galeano H, Cervellin G, Lippi G, Earnest CP. Energy drink overconsumption in adolescents: implications for arrhythmias and other cardiovascular events. *Can J Cardiol*. 2015;31(5):572-575.
13. Reissig CJ, Strain EC, Griffiths RR. Caffeinated energy drinks—a growing problem. *Drug Alcohol Depend*. 2009;99:1-10.
14. Ayuob N, ElBeshbeishy R. Impact of an energy drink on the structure of stomach and pancreas of albino rat: can omega-3 provide a protection? *PLoS One*. 2016;11(2):e0149191. doi:10.1371/journal.pone.0149191.
15. Qassim AH, Alsammak MA, Ayoob AA. Histopathological changes in kidney and pancreas induced by energy drinks in adult male rats. *Iraqi J Vet Sci*. 2021;36:111-116.
16. Haroun H, Mohamed E, El Shahat AER, Labib H, Atef M. Adverse effects of energy drink on rat pancreas and the therapeutic role of each of bone marrow mesenchymal stem cells and Nigella Sativa oil. *Folia Morphol (Warsz)*. 2020;79(2):272-279.