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Case Report

Association of hypertension with consumption of energy drinks in an adolescent male

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ABSTRACT

Use of energy drinks has dramatically increased in recent times. Athletes, teenagers and students being the most common population who consume it. Users believe that they are a source of instant energy but are unaware of its high Caffeine content resulting in severe adverse effects on health. We reported the case of a young boy who presented with palpitations and high blood pressure after a recent start of energy drink consumption. He had been consuming 'monster' energy drink on regular basis as his annual sports meet was round the corner and he had to practise for hours for an upcoming football match. His medical examination revealed Sinus tachycardia and high blood pressure on more than 3 occasions. Rest of the physical examination and lab workup was within normal limits. His pulse and blood pressure returned to normal range after discontinuing 'monster' energy drink usage and he was counselled on adverse effects of such products. Several studies have reported numerous health hazards including cardiac effects associated with energy drinks. Labels should be made on these drinks and Caffeine content should be mentioned along with adverse effects on health. Caution for use in children and pregnant or expecting patients should also be mentioned.

Keywords: Energy drinks, Caffeine, Sinus tachycardia, High blood pressure

INTRODUCTION

Since the debut of Red Bull, the current worldwide leader of energy drinks, which was introduced in Austria in 1987 and in United States in 1997, the energy drink market has grown tremendously. Consumption of energy drinks is a common practice among college and high school students and athletes.[1]

People are usually not aware of the combined effects of Caffeine with other products in energy drinks, nor are aware of the amount of Caffeine in various brands. These drinks are attractive especially for our male teenage population and are easily available at local shops, big grocery stores, gas stations, clubs and even food courts of shopping malls.

The advertisement of these energy drinks includes famous athletic personalities who promote the drink and teenage children are allured by the product. Although it is a source of instant high energy if consumed in excess quantity can lead to severe adverse outcomes that no teenager would have thought of. Different brands of energy drinks available India include Monster, Red bull, Prime hydration, prime sports drink, Gatorade, Ocean seven etc. Children and adolescents who are not regular Caffeine users are prone to Caffeine intoxication due to absence of pharmacological tolerance.[2]

CASE REPORT

We reported the case of 16-year-old boy, who presented to the emergency of SGT University hospital Gurugram, Delhi NCR India with complaints of palpitations off and

on for last one week. On arriving he had a blood pressure of 150/95. On earlier visits to a local primary care doctor, his blood pressure readings were in the range of 140-160/80-100 mmHg. The boy blood pressure was raised on more than 3 occasions on the same day of arrival. Previously his blood pressures had always been normal. His history revealed that he had consumed about 80-100 cans of 'monster' energy drink in the past 2 weeks, an average of 3 cans per day while training for a football match for annual sports meet in his school. His rest of the history was unremarkable. Examination revealed a regular pulse of 110/min and B.P of 150/95 mmHg. There was no radio femoral delay or renal bruit. Rest of the general and systemic exam was unremarkable. His labs were ordered to rule out secondary causes of hypertension. CBC, FBS, Lipids, Cr, Na+, K+, UDR, TSH, VMA levels and ECG were all within normal range. He was advised to abstain from energy drinks use and to monitor his blood pressure. His readings returned to normal and palpitations got resolved within 2 weeks of discontinuing energy drinks' usage.

DISCUSSION

'Energy drinks' are beverages that contain caffeine, taurine, ginseng, guarana, vitamins, herbal supplements, and sugar. They are merchandised for high energy, performance, and concentration. The market for energy drinks is rapidly growing and the annual worldwide energy drink consumption is increasing day by day. According to a self-report survey, energy drinks are consumed by 30 to 50% adolescents and young adults. They are available in around 140 countries in the world including India.[3] Globally, young adults especially students and athletes are primary targets of campaigns carried out by energy drink companies. They are frequently consumed by athletes prior to competitions with a view to improve their performance.[4] They are also consumed by a large number of students especially while studying for Exams to cope with stress and increase concentration.

In a survey of 496 college students conducted in Central Atlantic region of Unites States, 51% reported consuming at least one energy drink in one month. It was found that 67% used it for reducing sleep, 65% used it for enhancing energy, and 54% used it with alcohol at parties 'to look cool'. Out of all, 22% reported having headaches after it and 19% had palpitations.[5]

Our case, was also a student who had consumed the energy drink 'monster' for enhancing his athletic performance. Ingredients of the energy drink 'monster' and many other energy drinks include- carbonated water, glucose syrup, sucrose, acidity regulators like citric acid and sodium citrate, taurine (400 mg/100 ml) preservatives like sorbic acid, benzoic acid, artificial sweeteners (sucralose), vitamins (B3, B6, B12) glucuronolactone (2 mg/100 ml) inositol (2 mg/100 ml), guarana and caffeine (0.03%). Caffeine is the main active ingredient in energy drinks and its concentration is almost 3 times more compared to that in cola drinks but it can go up to 5 times, because of added products like guarana. Guarana is a plant that contains caffeine, theobromine and theophylline which are chrono tropes and inotropes respectively.[6] Doses of caffeine found in energy drinks can range from 80 to 300 mg in a 240 ml ounce serving. Some brands are sold in 500 ml or 700 ml sized cans and bottles, which increases the chances of caffeine consumption.[7] The FDA presently regulates the amount of caffeine in soft drinks to a specific maximal dosage and also requires warning instructions to be written on over the counter stimulant medications as well as sot aerated drinks like cola, but energy drinks are not subjected to the same regulations although they contain much higher caffeine content. The product 'monster' which our case consumed is the 250 ml (single serving) bottle that does have ingredients label but no health warning or adverse effects mentioned.

Caffeine intoxication is a documented clinical syndrome included in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) and the WHOs International Classification of Diseases (ICD-10).[8] Excessive caffeine consumption has been found to have injurious health consequences. A pilot study conducted on 18-45 years old healthy, normotensive, non-smoking subjects found that single day energy drink supplementation increased mean 24-hour and daytime blood pressure compared to caffeinated beverages like coffee alone that does not cause a rise in blood pressure if used in moderate quantity of 2 cups a day.[9] A similar study conducted on 15 individuals of 18-40 years age group showed that consumption of 2 cans of energy drinks daily for one-week increased heart rate by 5-7 beats per minute and systolic blood pressure increased by 10 mmHg.[10] This is because apart from caffeine energy drinks contains Guarana that leads to excess caffeine levels and therefore the adverse outcomes.

The above 2 studies show that excessive energy drink consumption can lead to hypertension and tachycardia as seen in our case. Cardiac arrest was also reported in a 28 year old athlete who had consumed excessive amount of energy drinks containing caffeine.[11] 3 cases of new onset seizures were reported in adults associated with tachycardia and systolic hypertension which did not re occur after the patients remained abstinent from energy drinks for a few months.[12] A double blind study conducted on 13 endurance trained participants showed that original RED BULL drink containing taurine increases cardiac contractility.[13]

Since caffeine is also a diuretic and these energy drinks are usually consumed by children and adolescence before sports event, the combined effect of sweating and diuresis can lead to severe dehydration.[14] In India also, numerous children and adolescent athletes consume energy drinks before and after sport activities to boost their energy. Majority of them are totally unaware of their ingredients and their harmful effects as there is no clear health warning over them. Moreover, the advertisement of energy drinks only focusses on the increased energy that it provides and

also hire known athletes like cricket players of the national cricket team to increase their marketing. Producers of energy drinks usually target young adults who are easily lured to consume energy drinks after watching numerous appealing marketing advertisements on television, in newspapers and magazines.[15]

Our case was also totally unaware that 'monster' had high caffeine levels and harmful adverse effects on health. Regulation of energy drinks, including content labelling and health warnings has differed across countries. USA has the laxest regulatory requirements, and is also the largest market for these products. The absence of regulations has resulted in aggressive marketing of energy drinks.

CONCLUSION

There are numerous false perceptions in the society about the positive benefits and harmful effects of energy drinks. There is a strong need to create awareness through health education regarding these drinks especially among children as they are exposed to an ever-increasing range and easily accessible energy drinks market. There is also a strong need of legislation regarding mandatory labelling of exact caffeine content of these drinks and with strong health warning regarding potential health risks. These health warnings must also be included in TV commercials and print media advertisements.

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