

## Journal Club Synopsis

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Host: Glenn Burns, M.D.

### **What are the positive and negative effects of energy drinks on clinicians?**

#### **Clinical Scenario:**

You are the solo resident covering the ICU and it is now about 4 am and you have yet to see the inside of the call room as you have been busy saving the lives of some of the finest drug addicts and nursing home superheroes. As you crack open yet another energy drink you recall a recent email about how Red Bull and Rockstar have supposedly been killing people. So now you start to have second thoughts about your current drink of choice. Is there any benefit to me drinking this or is this stuff really bad for me? What negative effects will it have? Should I exchange it for a cup of coffee or just skip it all together and just try to finish my shift and get home without hurting anyone or falling asleep at the wheel? Putting off your daily progress notes you hit the Internet to ask the same questions we tried to explore for JC. What are the clinical effects both positive and negative of energy drinks and are they directly related to the caffeine (like coffee) or does the “energy blend” actually have an effect as well?

#### **Introduction:**

**Seifert et al, Health effects of Energy Drinks on Children, Adolescents, and Young Adults, Pediatrics 2011;127:511.**

Energy drinks are becoming increasingly popular among Americans of all ages, and currently an increasing number of products are coming out onto the market containing varying levels of caffeine as well as other supplements. There is also currently very little known about the true contents of these beverages, and as a “supplement” they are very poorly regulated.

#### **Article 1:**

**Positive effects of Red Bull® Energy Drink on driving performance during prolonged driving. Mets MA, Ketzer S, Blom C, van Gerven MH, van Willigenburg GM, Olivier B, Verster JC. Psychopharmacology (Berl). 2011 Apr;214(3):737-45.**

This article was a double-blinded placebo-controlled crossover study which evaluated 24 volunteers in a driving simulator. The volunteers were evaluated after 2 hours of driving, and then were evaluated for 2 additional hours with 2 separate sets of conditions: Red Bull energy drink without the active ingredients, or Red Bull energy drink. A third group was evaluated driving 4 hours straight through with no intervention. Evaluators compared a computer generated value for standard deviation of lateral position (SDLP – basically how much the driver swerved), variations in speed and subjective sleepiness of drivers. This study did find that volunteers who had received the energy drink had improved SDLP, and perceived sleepiness in comparison to those who received the placebo version.

Discussion: Group discussion about this article did point out the glaring point that this article is potentially biased as it is supported and partially funded by the Red Bull energy drink company. However, the group did recognize that there may be some value to the data that these researchers found,

in that there likely is some positive effect on alertness both subjectively felt by the person consuming an energy drink, as well as alertness as objectified by the person's actions. This study does indicate that consumption of an energy drink likely to improve performance in those people who perform tasks requiring persistent attentiveness for long periods of time. This study does not give much of a look into the possible negative side effects of the consumption of energy drinks, nor does it evaluate the benefits of the individual components of the drink, determining which of the "energy blend" is truly beneficial to the consumer, or if this may be potentially harmful as well.

#### **Article 2:**

**International Society of Sports Nutrition position stand: energy drinks. J Int Soc Sports Nutr. 2013 Jan 3;10(1):Campbell B, Wilborn C, La Bounty P, Taylor L, Nelson MT, Greenwood M, Ziegenfuss TN, Lopez HL, Hoffman JR, Stout JR, Schmitz S, Collins R, Kalman DS, Antonio J, Kreider RB.**

This article is more of a background article and position statement as made by the International Society of Sports Nutrition (ISSN) after a critical appraisal of current literature on the safety and efficacy of energy drinks (ED) and energy shots (ES). The ISSN did find that current research indicates that the active ingredients in ED and ES is caffeine and carbohydrate, and that consumption of this combination 10-60 minutes before exercise may improve performance. They also report that a low calorie ED when used properly may be helpful as an ergogenic and possible weight loss aid. However, some EDs are very high in calories and one must consider this in a person's daily energy intake. This must also be considered and caution must be taken when those with pre-existing cardiovascular, metabolic, hepatorenal, and neurologic diseases consider taking in these products as their contents are poorly regulated.

Discussion: Group discussion noted that it is good to have an exposure to what current guidelines are being made in response to the energy drink trend among Americans as the number of these products continues to increase and to have poor regulation in the US. However, the group did point out that the amount of objective data supporting these guidelines is not plentiful. The ISSN makes recommendations that do appear reasonable and are a general rule of thumb for providers; however, more studies would be helpful to determine the true risks and benefits of consuming these products.

#### **Article 3:**

**Energy drinks: what is all the hype? The dangers of energy drink consumption. Rath M. J Am Acad Nurse Pract. 2012 Feb;24(2):70-6.**

This particular article used a data search over multiple sources to evaluate current literature on the possible harmful influences of energy drink consumption on health, academic performance and personal adjustments. These researchers did find that when energy drinks are consumed in moderation, their risks are relatively low. However, at this time energy drink consumption is on the rise with teens and young adults, and it is becoming common practice to mix energy drinks and alcohol, both of which may have significant risks to those participating in these practices. These authors note that severe side effects such as seizures, cardiac arrhythmias, mania and death have been reported following consumption of excessive amounts of caffeine.

Discussion: Group discussion did note that this was a somewhat poorly written article, with little supportive evidence on the potential side effects/negative aspects of consumption of energy drinks. The group did note that this paper did provide a systematic approach to the different organ systems affected by energy drinks and those groups potentially at higher risk for worsened side effects such as those consuming large quantities, those consuming drinks with alcohol, pregnant and lactating women, and those with any underlying medical condition. Ultimately this article continues to show that there is little as far as objective literature among respected medical journals showing any potential risk or benefit of energy drink consumption.

**Bottom Line:** There is very little objective data available about the content, risks and benefits of energy drinks. Currently the United States views these products as “supplements” and therefore regulation of the content of these products is also very poor. Consuming appropriate amounts of these beverages may have some benefit on alertness performing prolonged tasks, and athletic performance. However, providers should be aware of the potential risks to include caffeine overdose, arrhythmia, seizure, or death when these beverages are consumed in large quantities, in conjunction with other substances or by those with co-existing medical problems.