Common Questions and Answers in the Management of Hypertension

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Does Consumption of High-Caffeine Energy Drinks Affect Blood Pressure?

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At a recent primary care symposium following a hypertension talk the question arose as to whether the use of energy drinks with high-caffeine content have an effect on blood pressure (BP).

Caffeine is the most widely consumed active pharmacologic substance in the world.[1] Caffeine is consumed in coffee, tea, and soft drinks. A typical 7-oz cup of coffee has about 125 mg of caffeine. The "natural energy" drinks, which are increasingly popular among teenagers and young adults, have just about the same amount of caffeine (≈115 mg/8 oz). The long-term effects of these energy drinks have not specifically been studied, but caffeine intake in other situations has been the subject of clinical investigation; there's bad news and good news.

Caffeine causes a pressor response due to increased sympathetic activity and antagonism of endogenous adenosine.[2] Caffeine can acutely raise BP by as much as 10 mm Hg in patients who are infrequently exposed, although the average response is an increase of about 4–5/3 mm Hg when evaluated with ambulatory BP monitoring.[3] The effects of caffeine appear to be more pronounced in persons who are at risk for hypertension, such as individuals with a family history of hypertension or obesity.[4] Although there is often less or no effect of caffeine on BP in habitual coffee drinkers, this is not always true; some people do not develop a tolerance to the BP effects of caffeine.[5]

The effects of long-term caffeine ingestion have been studied; so far the news is pretty good. The overall risk of cardiovascular disease does not appear to be increased in those who drink caffeinated beverages.[6,7] In the Nurses' Health Study (NHS),[8] daily intake of 6 or more cups of coffee or black tea was not associated with an increased risk of hypertension. Balancing this and more relevant to our question is that the risk of incident hypertension was increased in relation to intake of caffeinated cola beverages, regardless of whether it was diet or sugared.[8] The investigators in this study hypothesized that this may be due to some compound other than caffeine in the beverages.

In the case of energy drinks, the jury is still out. Since the effects of caffeine on BP are seen 4–5 hours postingestion, it is reasonable to suggest that people who use these products consider monitoring their BP with a home BP device.

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References

1 Rall TW. The methylxanthines. In: Hardman J, ed. *Goodman and Gilman's Pharmacological Basis of Therapeutics*. 9th ed. New York, NY: McGraw-Hill; 1993:1663.
2 Ammon HP. Biochemical mechanism of caffeine tolerance. *Arch Pharm (Weinheim)*. 1991;324:261–267.
3 Rakic V, Burke V, Beilin LJ. Effects of coffee on ambulatory blood pressure in older men and women: a randomized controlled trial. *Hypertension*. 1999;33:869–873.
4 Pincomb GA, Lovallo WR, McKey BS, et al. Acute blood pressure elevations of caffeine in men with borderline systemic hypertension. *Am J Cardiol*. 1996;77:270–274.
5 Noordzij M, Uiterwaal CS, Arends LR, et al. Blood pressure response to chronic intake of coffee and caffeine: a

meta-analysis of randomized controlled trials. *J Hypertens*. 2005;23:921–928.
6 Frishman WH, Del Vecchio A, Sanal S, et al. Cardiovascular manifestations of substance abuse: part 2: alcohol, amphetamines, heroin, cannabis, and caffeine. *Heart Dis*. 2003;5:253–271.
7 Kleemola P, Jousilahti P, Pietinen P, et al. Coffee consumption and the risk of coronary heart disease and death. *Arch Intern Med*. 2000;160:3393–3400.
8 Winkelmayer WC, Stampfer MJ, Willett WC, et al. Habitual caffeine intake and the risk of hypertension in women. *JAMA*. 2005;294:2330–2335.