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CLINICAL RESEARCH

Prospective association of sugar-sweetened and artificially sweetened beverage intake with risk of hypertension

Étude prospective d'une association entre les aliments ou les boissons avec édulcorants de synthèse et le risque d'hypertension artérielle

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KEYWORDS
Sweetened beverage;
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Hypertension;
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Summary
Background. — Several observational studies have suggested that high consumption of sugar-sweetened beverages (SSBs) and artificially sweetened beverages (ASBs) is associated with increased blood pressure, but this relationship has not been investigated comprehensively.
Aims. — To quantitatively examine the association between sugar-sweetened and artificially sweetened beverage intake and risk of hypertension.
Methods. — We performed a systematic review and meta-analysis of eligible prospective cohort studies, identified by searching PubMed, Embase and Web of Science databases up to May 2015. Pooled relative risks (RRs) with 95% confidence intervals (CIs) were calculated using a random-effects model, and generalized least-squares trend estimation was used to assess dose-response relationships.
Results. — Six studies (246,822 subjects and 80,628 incident cases of hypertension) were identified for the meta-analysis of SSBs and hypertension. The pooled RR of hypertension in the highest category of SSB consumption (≥ 1 serving/day, mean) compared with the lowest category of SSB (< 0.6 serving/month, mean) was 1.12 (95% CI: 1.07, 1.17). In a dose-response

Abbreviations: ASB, artificially sweetened beverage; BMI, body mass index; CHD, coronary heart disease; CI, confidence interval; RR, relative risk; SSB, sugar-sweetened beverage.

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analysis, a 1 serving/day increase in SSB intake was associated with an 8% increased risk of hypertension (RR: 1.08, 95% CI: 1.06, 1.11). Four studies (227,254 subjects and 78,177 incident cases of hypertension) were included in the meta-analysis of ASBs and hypertension. The pooled RRs were 1.14 (95% CI: 1.10, 1.18) for highest versus lowest analysis and 1.09 (95% CI: 1.06, 1.11) for every additional 1 serving/day increase in ASB consumption. The positive association did not vary significantly by sex, duration of follow-up or adjustment for body mass index.
Conclusions. — Our findings indicate that high SSB and ASB consumption is associated with an increased risk of hypertension.

MOTS CLÉS
Boissons avec édulcorants de synthèse ;
Pression artérielle ;
HTA ;
Étude de cohorte ;
Méta-analyse

Résumé
Justification. — Plusieurs études observationnelles ont suggéré qu'une consommation excessive de boissons sucrées avec édulcorants de synthèse serait associée à une augmentation de la pression artérielle mais cette association n'a jamais été investiguée de façon systématique.
Objectif. — Examiner l'association entre ces boissons sucrées de façon artificielle par édulcorants et le risque d'hypertension artérielle.
Méthode. — Une revue systématique et méta-analyse des études de cohortes prospectives a été identifiée à partir d'une recherche sur les moteurs, PubMed, Embase et Web of Science jusqu'en mai 2015. Le risque relatif avec IC 95 % a été calculé à l'aide d'un modèle de randomisation, et les estimations des risques relatifs ont été effectuées.
Résultats. — Six études (246 822 patients et 80 628 cas incidents d'HTA) ont été identifiées pour cette méta-analyse. Le risque relatif d'HTA dans la catégorie la plus élevée de consommation de boissons avec édulcorants (< 0,6 boisson par mois, en moyenne) était de 1,12 (IC 95 % : 1,07—1,17). L'analyse de dose-réponse indique que l'augmentation de la consommation d'une boisson sucrée avec édulcorants par jour est associée à une augmentation de 8 % du risque d'HTA (risque relatif : 1,08, IC 95 % : 1,06—1,11). Quatre études (227 254 patients et 78 177 cas incidents d'HTA) ont été prises en compte dans la méta-analyse. Le risque relatif global est de 1,14 (IC 95 % : 1,10—1,18) pour l'analyse de la consommation la plus élevée d'une boisson sucrée avec édulcorants par rapport à la plus faible est de 1,09 (IC 95 % : 1,06—1,11) pour chaque prise supplémentaire d'une boisson par jour. L'association n'est pas influencée par le sexe, la durée de suivi ou après l'ajustement sur l'indice de masse corporelle.
Conclusion. — Ces résultats indiquent qu'une consommation excessive de boissons avec édulcorants est associée à une augmentation du risque d'HTA.

Background

Approximately 80 million people, accounting for ~33% of adults in the USA aged ≥ 20 years, have hypertension, based on a recent report from the American Heart Association, and the prevalence of hypertension is still increasing [1]. The number of adults with hypertension has been predicted to increase by about 60% by 2025, worldwide [2]. High blood pressure or hypertension is associated with increased risk of mortality from cardiovascular diseases, such as coronary artery disease, congestive heart failure and myocardial infarction, and risk of other diseases, including kidney disease [1,3]; it is therefore very important to identify lifestyle factors that can reduce the risk of hypertension. There are some established risk factors for hypertension, including obesity, low levels of physical activity and high sodium intake [4].

Sugar-sweetened beverages (SSBs) are the primary sources of added sugar, and include carbonated (soft) drinks and fruit drinks with added sugar. SSBs containing sweeteners, such as sucrose or high fructose corn syrup, provide a liquid form of energy, and thus are less likely to affect satiety than isoenergetic foods [5—7]. Much of the research into SSB intake has focused on weight gain and obesity [8]. SSBs may also have a direct impact on increased blood pressure, independent of weight gain. Artificially sweetened beverages (ASBs), which include sugar alternatives such as aspartame and saccharin, have emerged as alternatives to SSB, and their consumption is increasing, but the health effects of ASBs have not been well studied [9]. Several prospective cohort studies have been conducted to determine the association between SSB and ASB intake and risk of hypertension [10—15], but to our knowledge, the prospective association of long-term SSB and ASB intake with risk of hypertension has