



# Can Moderate Alcohol Consumption Reduce the Prevalence of Hypothyroidism? A Review of Three Recent Papers

Effraimidis G, et al.; Carle A, et al.;  
Pagadala MR, et al.

## Results

A total of 38 cases of overt hypothyroidism occurred during the 5-year follow-up period. At the beginning of the study, the proportion of patients who subsequently had become hypothyroid and who consumed more than 10 alcoholic drinks per week (3 of 38) was not significantly different from the proportion in the controls (11 of 76) (8.3% vs. 14.5%,  $P = 0.36$  by Student's t-test). Interestingly, in the year before hypothyroidism developed, the proportion of patients consuming more than 10 drinks per week fell (to 2 of 38) while the proportion rose in the controls (15 of 76) (5.3% vs. 19.7%,  $P < 0.05$ ). In the year that hypothyroidism appeared, "2.5" of 38 patients with hypothyroidism consumed more than 10 drinks per week versus 18 of 76 controls (6.7% [sic] vs. 23.7%,  $P < 0.05$ ). At baseline, the odds ratio (OR) of consuming 10 or more alcoholic drinks but still having hypothyroidism was 0.54 (95% CI, 0.14 to 2.06). The OR fell to 0.23 (95% CI, 0.05 to 1.04) in the year before the hypothyroidism developed and remained at 0.23 (95% CI, 0.05 to 1.06) in the year that hypothyroidism

appeared. If the group of patients who consumed no alcohol was separated from the group who consumed fewer than 10 drinks per week, no significant differences were found between cases and controls. (In a separate study on this cohort, alcohol consumption was not associated with de novo development of anti-TPO antibodies).

## Conclusions

At baseline, 3 of the 38 patients in whom hypothyroidism developed and 11 of the 76 subjects in whom it did not develop were moderate alcohol drinkers. The year before she had hypothyroidism, 1 of the 3 drinkers reduced her drinking below the moderate level, whereas in the 76 matched controls who did not become hypothyroid, the number of moderate alcohol consumers increased progressively. Although the findings suggest that moderate alcohol consumption may be protective, a single patient who stopped drinking and then had hypothyroidism may have had a substantial impact on the results.

## STUDY 2

Carle A, Pedersen IB, Knudsen N, Perrild H, Ovesen L, Rasmussen L, Jørgensen T, Laurberg P. Moderate alcohol consumption may protect against overt autoimmune hypothyroidism—a population-based case-control study. *Eur J Endocrinol*. July 16, 2012 [Epub ahead of print]. doi: 10.1530/EJE-12-0356.

## Methods

Continual monitoring of all thyroid-function tests done in two areas of Denmark permitted identification of some 600 new cases of spontaneous overt hypothyroidism out of some 500,000 individuals who were tested between 1997 and 2000. The incidence was higher in northern Copenhagen, where iodine intake was only mildly low, as compared with central Aalborg, where iodine intake was moderately low (2). For each of 140 patients with newly diagnosed hypothyroidism (apparently selected randomly), four euthyroid controls were identified, matched for sex, age and geographic region. Most of the controls for

female cases came from tightly selected age groups, and for the male cases controls came from a single age group (60 to 65), although additional controls outside these ages were also used. When a potential control subject was identified, a blood sample was drawn and TSH was tested to ensure it was normal. In addition to an estimation of alcohol intake, any history of smoking, previous diseases, education, and hypothyroidism in family members was obtained by questionnaire. The possible association of each variable with the development of hypothyroidism was assessed using conditional logistic-regression models.

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## Results

The average amount of alcohol consumed by the patients who eventually became hypothyroid was significantly less than the amount consumed by the controls (~36 g vs. ~60 g per week;  $P = 0.002$ ). After correcting for smoking, comorbid conditions, education, and family history of hypothyroidism (but not time of onset), multivariate regression analysis showed that mild and moderate consumption of alcohol was associated with a reduced risk for hypothyroidism spontaneously developing. In the 35 patients who reported no recent alcohol consumption, the OR for the development of hypothyroidism was twice (2.12; 95% CI, 1.31 to 3.4) that in patients who consumed 1 to 10 units of ethanol per week ( $n = 85$ ). The OR was even lower (0.47; 95% CI, 0.24 to 0.92) for those consuming 11 to 20 units of ethanol per week ( $n = 11$ ). In contrast, the OR for those consuming 21 or more units of ethanol per week ( $n = 9$ ) was the same as for those consuming

1 to 10 units (0.97; 95% CI, 0.44 to 2.11). Subgroup analysis revealed that abstainers were 2.17 (95% CI, 1.35 to 3.57) times more likely to have hypothyroidism develop than those who drank any alcohol. Alcohol consumption was not significantly protective in those over 60 years of age. No association was found with the type of alcohol consumed.

## Conclusions

During a time when iodine intake and the incidence of spontaneous hypothyroidism were increasing in this cohort (2), the level of alcohol consumed was negatively associated with the prevalence of hypothyroidism. It should be noted, however, that the dose-response curve became U-shaped for those who consumed more than 21 drinks per week. Alcohol is known to affect a variety of immune responses, but no clear-cut mechanism for its protective effects on autoimmune disorders such as rheumatoid arthritis has been identified.

## STUDY 3

Pagadala MR, Zein CO, Dasarathy S, Yerian LM, Lopez R, McCullough AJ. Prevalence of hypothyroidism in nonalcoholic fatty liver disease. *Dig Dis Sci* 2012;57:528-34. Epub December 20, 2011.

## Methods

Of 246 consecutive patients with biopsy-proven NAFLD seen in the hepatology outpatient clinic at the Cleveland Clinic, 233 could be matched with controls chosen from general medical outpatients who had no evidence of liver disease. Based on age, sex, race, and body-mass index, 197 patients could be matched to 2 controls, while the remaining 36 patients could be matched to only 1 control. Men consuming more than 14 drinks of ethanol per week, or women consuming more than 7 drinks per week and any patients with evidence of coexisting chronic liver disease were excluded.

## Results

Of the patients with NAFLD, 49 233 (21%) were taking L-T<sub>4</sub> and had a clinical diagnosis of hypothy-

roidism, while only 9.5% (41 430) of the matched controls had hypothyroidism. The mean TSH level in the patients with hypothyroidism and NAFLD was normal (3.1 mU/L), but was significantly higher than in the euthyroid NAFLD patients (2.0 mU/L,  $P < 0.01$ ). About 55% of the euthyroid patients with NAFLD consumed mild-to-moderate amounts of alcohol, whereas only 25% of the patients with hypothyroidism and NAFLD were mild-to-moderate alcohol consumers ( $P < 0.001$ ). Multivariate logistic-regression analysis showed that mild-to-moderate alcohol use was associated with a significantly lower prevalence of hypothyroidism (OR, 0.37; 95% CI, 0.18 to 0.77;  $P < 0.01$ ). The risk of hypothyroidism was slightly associated with body-mass index (OR 1.04; 95% CI, 1.002 to 4.6).

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## Conclusions

Hypothyroidism has been found to be more common in patients with fatty liver, and it is of particular interest that alcohol consumption can reduce the prevalence of fatty liver, which may be present in up

to 30% of the general population (3). The current paper indicates that moderate alcohol consumption also decreases the prevalence of hypothyroidism in patients whose fatty liver apparently does not reflect overconsumption of alcohol.

## ANALYSIS AND COMMENTARY ● ● ● ● ●

Although these studies have limitations and the numbers of subjects involved are relatively small, their conclusions support one another. No specific value can be given for “moderate alcohol intake,” since an individual’s alcohol metabolism depends on environmental factors, such as one’s current intestinal flora, as well as on genetic polymorphisms that affect the activity of enzymes involved in alcohol and aldehyde metabolism. Even a teetotaler’s liver is exposed to the trace amounts of the endogenous alcohols produced in the gut. Assuming there is no previous history of

alcohol abuse, moderate alcohol consumption is now accepted as reducing all-cause and cardiovascular mortality, and it also can reduce the incidence of certain diseases. The metabolic changes produced by moderate alcohol consumption include increased circulating levels of adiponectin, high-density lipoprotein cholesterol, apolipoprotein A1 and C-reactive protein, as well as decreased levels of fibrinogen, but clear-cut connections to any of the protective effects of alcohol remain to be established.

— Stephen W. Spaulding, MD

## References

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3. Hamaguchi M, Kojima T, Ohbora A, Takeda N, Fukui M, Kato T. Protective effect of alcohol consumption for fatty liver but not metabolic syndrome. *World J Gastroenterol* 2012;18:156-67.