Moderate alcohol consumption as a risk factor for adverse brain outcomes and cognitive decline: longitudinal cohort study

Objectives

To investigate whether moderate alcohol consumption has favourable, adverse or no association with brain structure and function.

Design

Observational cohort study with weekly alcohol intake and cognitive performance measured repeatedly during a 30-year period (1985 to 2015). Multimodal Magnetic Resonance Imaging (MRI) was performed at study endpoint (2012-5).

Setting

Community-dwelling adults enrolled in the Whitehall II cohort based in the United Kingdom (the Whitehall II imaging sub-study).

Participants

We included 550 men and women of mean age 43.0 years (standard deviation ±5.4) at study baseline, none scoring "alcohol dependent" in the CAGE screening questionnaire, and safe for brain MRI at follow-up. Exclusions (n=23) were due to incomplete or poor quality imaging data or gross structural abnormality (e.g. a brain cyst), incomplete alcohol use, sociodemographic, health or cognitive data.

Results

More alcohol consumption over the 30-year follow-up was associated with increased odds of hippocampal atrophy in a dose dependent fashion. Whilst those consuming over 30 units weekly were at the highest risk compared with abstainers (odds ratio 5.8 95% CI: 1.8-18.6 p=<0.001), even those drinking moderately (14-21 units per week) had three times the odds of right-sided hippocampal atrophy (odds ratio 3.4 95% CI: 1.4-8.1 p=0.007). We found no protective effect of light drinking (1- <7 units weekly) over abstinence. Higher alcohol use was also associated with differences in corpus callosum microstructure and faster decline in lexical fluency.

Conclusions

Alcohol consumption, even at moderate levels, is associated with adverse brain outcomes including hippocampal atrophy. These results support the recent reduction in UK alcohol guidance and question the current USA safe limits.