

ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #404

Title: Correlation of Amount and Type of Alcohol Intake on MRI Changes in the Brain

Abbreviated Title: Alcohol and Brain MRI

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Rationale:

It has long been recognized that alcoholism may result in a number of syndromes or injuries such as Wernicke's and Korsakoff's encephalopathies, central pontine myelinolysis, Marchiafava-Bignami syndrome, hepatocerebral degeneration, and head trauma (Charnes 1993). Some damage may result from direct neurotoxicity, from nutritional deficiencies (predominantly thiamine) or a combination (Charnes 1993). Many of the syndromes have been associated with gross anatomic changes within the brain. With the advent of magnetic resonance imaging (MRI) there have been multiple clinical studies in chronic alcoholics which have found one or more of the following changes: ventricular enlargement, loss of white matter, increased T2 signal around the aqueduct and third ventricle and atrophy of the mammillary bodies, atrophy of the cerebellar and cortical gray matter (seen as enlarged sulci) and reduction in subcortical gray matter structures, increased T2 signal or cystic areas of decreased T1 signal within the corpus callosum, increased T1 signal or increased T2 signal within the basis pontis, and an increase in cerebral spinal fluid (Charnes 1993, Pfefferbaum 1992 and 1995, Kroft 1991, Zipursky 1989, Agartz 1991 and Chick 1989). It has been suggested that alcoholics lose a disproportionate amount of subcortical white matter as compared with cortical gray matter. However, there has not been uniform agreement. While the majority of alcoholics will have enlargement of the cerebral ventricles and sulci on MRI, the findings do not correlate consistently with either the duration of drinking or the severity of cognitive impairment (Charnes 1993). A number of studies also investigated the change in ventricular and sulcal size and change in gray matter in abstinent alcoholics (Pfefferbaum 1995, Mann 1995, Shear 1994, Kroft 1991, Zipursky 1989) with most studies indicating at least some shrinkage of the ventricles toward normal. Kroft, 1991, however, found no significant change in ventricular size in ten alcohol dependent women before or after abstinence, and suggested that women may not respond identically to men to the intake of alcohol. The variation in significant findings among studies may be due to the small number of patients found in most studies, variation in type of alcohol dependent persons studied, or lack of control for other factors that may contribute to brain changes. The studies rarely controlled for other possible diseases or factors which can contribute to brain lesions such as atherosclerosis, hypertension, and diabetes. The MRI findings are reported in patients almost exclusively with severe long standing alcoholism. While several population based studies have evaluated cerebral lesions on MRI, they have not included the effect of alcohol in those studies (Liigren 1994, Breteler 1994, Manolio 1994). The ARIC data presents the chance to evaluate the effect that intake of different levels and types of alcohol has on MRI changes while controlling for numerous other factors.

Main Study Questions: The following MRI changes are available for evaluation: ventricular size grade, sulcal size grade, white matter disease grade, bifrontal horn/inner table grade/ central sulcus width, brain stem disease measurement, white matter disease distribution, perivascular space assessment, anterior vs posterior circulation, and infarct size and distribution.

We plan to evaluate the correlation of brain MRI changes with lifetime alcohol intake, current level of

alcohol intake, as well as changes in alcohol intake.

1. Compared to never drinkers, are different levels of current alcohol intake associated significantly with MRI changes? Do these associations remain significant after controlling for age, gender, race, history of prior stroke, TIA, history of MI, hypertension, diabetes, and medications.
2. Compared to never drinkers, are different levels of lifetime alcohol consumption correlated with MRI changes? Do these associations remain significant after controlling for age, gender, race, history of prior stroke, TIA, history of MI, hypertension, diabetes, and medications.
3. Among drinkers with similar lifetime alcohol consumption, does the status of current versus former correlate with MRI changes? Do these associations remain significant after controlling for age, gender, race, history of prior stroke, TIA, history of MI, hypertension, diabetes, and medications.
4. In patients with equivalent levels of alcohol intake do the findings on MRI vary with type (beer, wine, or hard liquor) of alcohol intake? Do these associations remain significant after controlling for prior stroke, TIA, history of MI, hypertension, diabetes, race, age, gender, and medications.
5. Do the MRI findings in participants with similar levels of alcohol intake vary in those with vs without cognitive function changes? Do these associations remain significant after controlling for prior stroke, TIA, history of MI, hypertension, diabetes, race, age, gender, and medications.
6. In patients with significantly different alcohol intake from visit 1 to visit 3, is there a correlation with change in cognitive function?
7. Do the above questions vary with the % kcal that alcohol intake represents or the level of thiamine intake?

Data (Variables, source):

Exclude patients with Parkinson's disease, epilepsy, and cancer.

Visit 1: level of alcohol intake (gms/week), cognitive function

Visit 3: ever vs never consumption of alcohol, current vs former alcohol intake, level of current alcohol intake (gms/weeks), type of alcohol intake, %kcal alcohol represents, lifetime alcohol intake in grams, cognitive function, age, gender, race, history of prior stroke, TIA, history of MI, hypertension, diabetes, medications, and MRI findings.

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