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## **Alcohol and Cardiovascular Diseases: A Historical Review and 2005 Update**

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### **Introduction**

Study of the history of a subject seldom fails to provide insights about current knowledge. One important result is

recognition of past mistakes, creating the potential for avoiding their repetition. Attempts to generalize and simplify about alcohol and cardiovascular (CV) diseases have slowed progress. Disparities in relations of alcohol drinking to various CV conditions are now clear. A basic disparity between the effects of lighter and heavier drinking always cuts through alcohol-health relations. In this brief overview, the following will be considered: cardiomyopathy, arsenic and cobalt beer systemic hypertension (HTN), cardiac arrhythmias, cerebrovascular disease, atherosclerotic coronary heart disease (CHD), and heart failure.

### **Alcoholic Cardiomyopathy**

An apparent relationship between chronic intake of large amounts of alcohol and heart disease was observed by 19<sup>th</sup> century physicians. Of special note is the term “Munchener bierherz”, coined by the German pathologist Bollinger in 1884. He described cardiac dilatation and hypertrophy among Bavarian beer drinkers, who consumed an estimated average of 432 liters of beer per year.

In 1893 Graham Steell reported 25 cases, stating “not only do I recognize alcoholism as one of the causes of muscle failure of the heart but I find it a comparatively common one”. In a 1906 textbook, ‘The Study of the Pulse’, the great William MacKenzie described cases of heart failure attributed to alcohol and first used the term ‘alcoholic heart disease’.

The classic description of beri-beri (thiamine deficiency) by Aalsmeer & Wenckebach in 1929 included heart failure. Thus, the concept of ‘beri-beri heart disease’ dominated thinking about alcohol and the heart for decades. This caused many to doubt that alcohol was actually cardiotoxic. However, over the past 50 the sheer volume of clinical observations, evidence of decreased myocardial function in heavy chronic drinkers, and a few good controlled studies have now solidly established the existence of alcoholic cardiomyopathy. The landmark report in 1989 of Urbano-Marquez et al. showed a clear relation of lifetime alcohol consumption to structural and functional myocardial and skeletal muscle abnormalities in alcoholics. Importantly, the amounts of alcohol needed were large — the equivalent of > 80 g. alcohol/day for 20 years.

Since the entity is indistinguishable from other forms of dilated cardiomyopathy, the absence of diagnostic tests remains a major impediment to epidemiologic study. Most cases of dilated cardiomyopathy are still of unknown cause. Data supporting a genetic predisposition is now strong; such predisposition is likely to extend to alcohol-induced cardiomyopathy.

Only a small proportion of alcoholics develop cardiomyopathy, a fact leading to interest in other predisposing traits. In this context, it is appropriate to consider the arsenic and cobalt beer drinker episodes and beriberi heart disease.

### **Arsenic-Beer and Cobalt-Beer Disease**

In 1900 an epidemic (> 6000 cases — > 70 deaths) in and near Manchester, England, proved to be due to accidental arsenic-contamination of beer. The amounts of arsenic involved were considered too small to be the sole cause of problems. In the mid- 1960's reports appeared of epidemics of fairly abrupt heart failure among chronic heavy beer drinkers in two US locations, Quebec, Canada, and Belgium. The explanation proved to be the addition of small amounts of cobalt chloride by certain breweries to improve the foaming qualities of beer. The etiology was tracked down largely by Morin & Daniel in Quebec leading to the condition becoming known as Quebec beer-drinkers cardiomyopathy. Removal of the cobalt additive ended the epidemic in all locations. The cobalt dose was insufficient to be the sole cause, which seemed to be synergistic cobalt/ alcohol cardiotoxicity.

### **Cardiovascular beri-beri**

The CV component of beri-beri (thiamine or vitamin B<sub>1</sub>, or cocarboxylase deficiency) is high output heart failure resulting from decreased peripheral vascular resistance. After the condition became known, many assumed that heart failure among heavy alcohol drinkers was due to associated nutritional deficiency states. Most patients clearly did not fit, however; they had low output heart failure, were well-nourished, and responded poorly to thiamine. In beri-beri generalized peripheral arteriolar dilatation creates a large arteriovenous shunt and high resting cardiac outputs. Existence of "chronic cardiovascular beriberi" has never been established.

### **Hypertension (HTN)**

Lian reported in 1916 a threshold relationship between heavy drinking and HTN in WW1 middle-aged French servicemen. There was an almost 60 year lapse before further attention was paid to this subject. Starting in the mid

1970s, dozens of cross-sectional and prospective epidemiologic studies have solidly established an empiric alcohol-

HTN link. The apparent threshold amount of drinking associated with higher blood pressure is approximately 3 drinks/day. Most studies show no increased HTN with lighter drinking; several show an unexplained J-shaped curve in women with lowest pressures in lighter drinkers. There seems to be independence from adiposity, salt intake, education, smoking, beverage type (wine, liquor, or beer), and several other potential confounders.

Clinical experiments have shown that several days to weeks of drinking or abstinence result in higher or lower pressures, respectively. Other interventional studies have shown that heavier alcohol intake interferes with drug treatment of HTN and that moderation or avoidance of alcohol supplements or betters other nonpharmacologic interventions such as weight reduction, exercise, or sodium restriction. Even in the absence of an established mechanism, the intervention studies strongly support a causal hypothesis.

### **Arrhythmias**

Association of heavy alcohol consumption with atrial arrhythmias (the "holiday heart" phenomenon) has been observed for decades. Atrial fibrillation is the commonest manifestation. The problem typically resolves with abstinence. A Kaiser Permanente study compared atrial arrhythmias in 1,322 persons reporting > 6 drinks per day to arrhythmias in 2,644 matched light drinkers, showing a doubled relative risk. It is unresolved whether cardiotoxicity, adrenergic discharge, or other mechanisms are involved.

### **Stroke**

Studies of alcohol and stroke are greatly complicated by disparate relationships of both stroke and alcohol to other

cardiovascular conditions. There is some consensus that heavier drinkers are at higher risk of hemorrhagic stroke, but stroke is unclear. There are several studies which suggest that light-moderate alcohol drinking is related to reduced risk of ischemic stroke.

## **Coronary Heart Disease (CHD)**

Heberden's classic description of angina pectoris in 1786 included "Wine and spirituous liquors--afford considerable relief". This observation led to the erroneous belief that alcohol is an immediate coronary vasodilator.

Symptomatic benefit appears to be subjective and likely to be dangerously misleading in patients with angina. In the first half of the 20<sup>th</sup> century, several pathologists noted an apparent inverse relationship between alcohol consumption and atherosclerotic disease, including CHD. Since 1974 a number of population and case-control studies have solidly established an inverse relation between alcohol drinking and either fatal or nonfatal CHD.

This

inverse relation is present in persons with and without pre-existing CHD, diabetes, and HTN. A substantial body of data support the existence of plausible protective mechanisms against CHD by alcohol have also appeared. Thus, it now seems likely that alcohol drinking protects against CHD.

In 1819 Dr. Samuel Black, an Irish physician with a great interest in angina pectoris and of considerable perception with respect to epidemiologic aspects, wrote what is probably the first commentary pertinent to the "French Paradox". He noted much angina in Ireland, but lack of discussion of the condition by French physicians, whom he greatly respected. He attributed the low angina prevalence in France to "the French habits and modes of living, coinciding with the benignity of their climate and the peculiar character of their moral affections". It was to be 160 years before data were presented from the first international comparison study to suggest less CHD in wine drinking countries than in beer or liquor drinking countries. There are now several confirmatory international comparison studies as well as reports of nonalcoholic antioxidant phenolic compounds or antithrombotic substances in wine, especially red wine. However, prospective population studies show no consensus about the wine/ liquor/beer issue, which remains unresolved at this time.

## **Heart Failure (HF)**

Since sustained heavy alcohol drinking can cause myocardial damage, there has been concern that light-moderate drinking (< 2 standard-sized drinks per day) might be harmful to persons with heart disease. CHD is the most common cause of the HF syndrome in developed countries. A recent publication from Kaiser Permanente report presented prospective data about the role of alcohol drinking in relation to risk of hospitalization for HF with separate analyses for persons with HF associated with CHD (n = 1559) and for persons with HF not associated with CHD (n = 1035). Only heavier drinking (> 3 drinks/day), but not light-moderate drinking, was related increased risk of non-CHD associated HF. In fact, in diabetics light-moderate drinking was related to lower risk of non-CHD associated HF. In this study, alcohol drinking had a robust inverse relation to risk of CHD-associated HF.

## **Should Persons with Heart Disease Drink alcohol?**

Attempts to define a safe limit are hardly new, since the medical risks of heavier drinking and the relative safety of lighter drinking have long been evident. Considerations of age, sex, and individual risks and benefits become the foci of any discussion in which a health practitioner advises his or her client about alcohol drinking. For many patients with CV conditions, light-moderate alcohol intake may be not only safe, but beneficial.

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