Alcohol Consumption and Acute Coronary Syndrome: “In vino Veritas”

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The conflicting evidence of favorable and adverse cardiovascular effects of alcohol consumption have been attracting the attention of researchers for decades. High doses of alcohol have adverse effects on the heart, directly causing heart failure and arrhythmias, and indirectly increasing the risk of developing hypertension and coronary artery disease. On the other hand, mild to moderate alcohol consumption has been associated with a reduction of coronary artery disease burden, and, as a consequence, decreased mortality. In 1992, Renaud et al. [1] first described the notorious “French paradox,” the hypothesis that a lower than expected risk of adverse cardiovascular events in the French population could be linked to increased alcohol consumption. However, enthusiasm for alcohol as a cardiovascular protective agent has faded following the publication of many studies demonstrating a consistent J-shaped relationship between alcohol consumption and cardiovascular disease (CVD), both in the general population [2, 3] and in high-risk populations like diabetics [4].

In this issue of *Cardiology*, Tersalvi et al. [5] analyzed the correlation between alcohol consumption and cardiovascular adverse events in patients with acute coronary syndrome (ACS) enrolled in the Acute Myocardial In-

farction in Switzerland (AMIS) Plus Registry. In-hospital mortality and major adverse cardiac events (MACE, a combined outcome of in-hospital reinfarction, stroke, and/or death by any cause) were about 40% higher in heavy drinkers (>2 drinks/day) in comparison to light drinkers (≤ 2 drinks/day). The observation that, at least at high doses, the detrimental cardiovascular effects of alcohol intake prevail over the benefits, is not new. Many large-scale epidemiological studies [2, 3] on the general population demonstrated a J-shaped relationship between alcohol consumption and CVD, with light-to-moderate consumption generally presenting the lowest risk. Other studies confirmed these findings in high-risk subjects like diabetics [4]. In the CARDIO2000 II study, low ethanol intake (<12 g/day) was associated with a 47% reduction in the risk of developing ACS (compared with nondrinkers), while an intake of >12 g/day predicted unfavorable outcomes.

These figures compare well with those reported by Tersalvi et al. [5], who had the merit of extending these observations to an even higher-risk population, i.e., patients with ACS. These patients often embark, after being discharged from hospital, on a rehabilitation journey, and nutritional advice represents an essential part of this. The

Table 1. Mechanisms and effects of alcohol consumption on the cardiovascular system

	Mechanism	Effects
Vascular system	Vasodilation (low dose, acute) Vasoconstriction (high dose, chronic)	Hypotension (acute) Hypertension (chronic)
Heart function	Inhibition of cardiac muscle contractility	Heart failure Alcoholic cardiomyopathy
Heart rhythm	Hyperadrenergic state associated with drinking followed by withdrawal Reduced vagal tone QT interval prolongation	Atrial fibrillation Ventricular ectopies or tachycardia Sudden cardiac death
Neurohormones	Baroreceptor reflex impairment	Orthostatic hypotension
Glucose metabolism	Enhanced insulin sensitivity	Reduced risk of type 2 diabetes
Lipid metabolism	Increased HDL levels	Reduced atherosclerotic burden
Aggregation, coagulation and Rheology	Platelet aggregation inhibition Fibrinogen concentration reduction Fibrinolysis increase Plasma viscosity reduction	Thrombosis and plaque destabilization risk reduction
Inflammation	Promotion of antioxidant effects	Reduced atherosclerotic burden

knowledge that moderate alcohol consumption may exert beneficial effects over the cardiovascular prognosis could be misleading for this patient population. The clarification emerging from the AMIS Registry analysis seems to therefore be most appropriate.

The reasons for the peculiar dose-response effects of alcohol consumption are not fully understood. After the description of the “French paradox,” one of the first mechanisms proposed for explaining the benefits of moderate alcohol intake was the alcohol-related increase in high-density lipoprotein (HDL) cholesterol. However, HDL cholesterol is not higher in French people, in comparison to other countries, and this explanation hardly explains the “French paradox”. Subsequently, the inhibition of platelet aggregation [6], a reduction in plasma viscosity due to reduced fibrinogen concentration, an increase in fibrinolysis, an improvement in endothelial function, a reduction of inflammation, the promotion of antioxidant effects, and insulin sensitivity [7–9] are other potentially beneficial effects justifying the observed data (Table 1). Although intuitive thinking would suggest an advantage to red wine, large-scale studies failed to demonstrate this hypothesis [10]. At the best of the current knowledge, no differences are attributable to a drinking pattern or a type of drink, and the benefit of wine is like that of other alcoholic drinks.

Tersalvi et al. [5] bring, once again, alcohol consumption and its prognostic value in ACS back onto the stage, but with an analysis that is far from being a simple repetition of the past results. Their study has remarkable strength due to the retrospective design, the large population of 25,707 patients with ACS that were enrolled, the 12-year clinical follow-up, and the evaluation of cardiovascular risk after adjustment for GRACE score components [11]. When tested with GRACE score parameters, heavy alcohol consumption was independently associated with in-hospital mortality, doubling the event risk. Moreover, the correlation of in-hospital mortality and MACEs of heavy drinkers adjusted for the GRACE score itself was evaluated, showing a 50% rise of these end point risks. Due to the well-known high predictive value of the GRACE score and its components, already used as the gold standard to test the predictive value for in-hospital outcomes of many other parameters in the ACS setting [12], the role of a high intake of alcohol becomes evident.

Tersalvi et al. [5] concluded that heavy alcohol consumption is a strong independent predictor of in-hospital mortality in this population. Of course, the study brings the limitations of its retrospective nature; in addition, data on alcohol consumption were based on patients’ self-reporting, so the authors cannot exclude the possibility of patients neglecting to report, so that the percentage of regular drinkers has actually been underestimated. However,

the considerable size of the study population and the statistical analysis performed are strong enough to support the conclusions. According to these last considerations, we need further randomized trials. However, in a nutshell, once again we affirm that “in vino veritas, in medio stat virtus” i.e., “in (real) truth, virtue is in the middle”.

Disclosure Statement

The authors have no conflicts of interest to declare.

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