Clinical Chemistry

Alcohol Consumption and Cardiac Biomarkers: The Atherosclerosis Risk in Communities (ARIC) Study

Article: Lazo, Mariana et al.
Alcohol Consumption and Cardiac Biomarkers: The Atherosclerosis Risk in Communities (ARIC) Study.
Clin Chem 2016;62:1202-1210.
http://clinchem.aaccjnls.org/content/62/9/1202

Guest: Dr. Mariana Lazo is Assistant Professor of Medicine and Epidemiology at Johns Hopkins University and core faculty of the Welch Center for Prevention, Epidemiology, and Clinical Research.

Bob Barrett: This is a podcast from *Clinical Chemistry,* sponsored by the Department of Laboratory Medicine at Boston Children's Hospital. I'm Bob Barrett.

The role alcohol plays in the development of subclinical cardiovascular disease is unclear. This makes it difficult for doctors to provide solid recommendations about whether or not regular alcohol consumption is safe for heart health. To improve understanding of this issue, researchers have measured cardiac specific biomarkers in the blood of adults with no history of heart disease, and correlated the results with alcohol consumption. The September 2016 issue of *Clinical Chemistry* details this study. The article's primary author, Dr. Mariana Lazo, joins us for this podcast. Dr. Lazo is Assistant Professor of Medicine and Epidemiology at Johns Hopkins University and core faculty of The Welch Center for Prevention, Epidemiology, and Clinical Research.

So Dr. Lazo, there's a general notion that alcohol is good for the heart. Can you tell us a little bit about what is the rationale for this statement or belief?

Dr. Mariana Lazo: Yeah. Thanks for asking this interesting question, Bob. I think it's a great way to start the conversation about my study. So the rationale for this belief is that over the past several years, a number of epidemiological studies, also known as observational studies, have consistently found that alcohol intake within recommended limits, that is in between one or two drinks per day, is associated with lower risk of heart disease, ischemic stroke, and other cardiovascular diseases. It is also something that not a lot of people may be aware of, but it's also associated with lower risk of diabetes.

Also, moderate consumption of alcohol has been associated with lower risk of total mortality, probably to the fact that a cardiovascular mortality is the leading cause of death. Studies have now pulled together all the data from individual studies and have shown the consistency of the finding. So I think that's the reason why there is this notion. In addition to these epidemiology studies, an observation in which -- we just observed individuals over time or doing a snapshot to compare the presence or

absence of disease, or the development or not development of the disease by groups defined by the alcohol consumption.

There are other types of studies which we refer to as feeding studies, or clinical trials, in which participants are given alcohol for weeks or month, and then investigators may show different outcomes in each participant. The types of outcomes that they've looked at are changes in factors that we know are important risk factors for disease. For example, the type of cholesterol, glucose, inflammatory markers, and those types of studies have been very helpful to us because they have allowed us to expand a little bit the knowledge about the mechanism behind this protective effect and what are the potential drivers or the reduced risk of diseases.

These studies again have consistently demonstrated positive effects of this moderate alcohol consumption.

Bob Barrett: In your study, you examined the effects of alcohol consumption on high sensitive troponin T and N-terminal pro brain natriuretic peptide. What are these and why are you interested in looking at them and the relationship with alcohol?

Dr. Mariana Lazo: As I alluded before, a number of studies have assessed the relationship between alcohol consumption and what we refer to as heart outcome disease, asymptomatic disease, clinical outcomes, such as acute myocardial infarction, stroke, et cetera. However, fewer studies have examined the relationship between alcohol consumption and subclinical disease which means before having clear symptoms or complaints. Historically, I think this may have been in part due to the lack of appropriate measures of subclinical disease. However, over the last decades, there has been a revolution in the diagnostic tools that we have available now for assessing cardiovascular disease early on. An example of these more novel tools include the low biomarkers that we use in this studies which as you mentioned, high sensitivity troponin T and N-terminal pro brain natriuretic peptide.

So what are those biomarkers? Cardiac troponin T is a highly specific measure of damage to the heart. So it's only produced by the heart so that if we find troponin T in the blood, that means that there is some heart damage.

This test is the standard test used to identify acute myocardial infarction. However, these new highly sensitive assays or cardiac troponin T have a much lower detection limit than the standard cardiac troponin T assays. And over the past few years, a number of studies have shown how

this high sensitive troponin T, how it has helped to improve the prediction of cardiovascular morbidity and mortality in persons with or without clinically evident cardiovascular disease.

So cardiac troponin T, a measure of myocardial damage or heart damage. Brain natriuretic peptide is a hormone secreted by the heart in response to stress at the vascular level, or what we refer to as a more dynamic stress. So when the heart finds a lot of resistance when pumping blood, the ventricular walls, or the heart walls, are stretched and they release this hormone. And the properties of these hormones include increasing dieresis and also relaxation of the blood vessels. Brain natriuretic peptide is closely associated or is a marker of the size of the ventricular walls, or the heart walls, and is clinically used for heart failure diagnosis and prognosis. N-terminal pro brain natriuretic peptide is just a stable hormone of the brain natriuretic peptide which, you know, is easier to measure and is more stable than the original hormone and has demonstrated the same associations as BNP.

So we were interested in examining the effects of alcohol on this, because although we have consistently observed reduced risk of heart outcomes among those who consume moderate amounts of alcohol, we do not really fully understand the mechanism behind the observations. So these two biomarkers provide information about key processes underlying cardiovascular disease, and therefore knowing what is the association between alcohol consumption and these biomarkers, that would help us to better understand the mechanisms behind the association and to expand just the knowledge.

Bob Barrett: Well, please talk about your study design and the major findings, of course.

Dr. Mariana Lazo: Sure. So this study was an observational study, and was nested in one of the largest and longest studies in the U.S., which is called the ARIC study. The ARIC study, it's a community based predominantly by a racial cohort of almost 16,000 middle aged adults from four U.S. communities. One, in Forsyth County in North Carolina, second, Jackson, Mississippi, third, in Minneapolis, Minnesota, and fourth, Washington County, Maryland. It started in 1987 and is still ongoing. Briefly, in the ARIC study, participants have attended a series of medical exams approximately three years apart. And during these exams or visits, what we call visits, we gathered data through a variety of sources and we use rigorous and standard procedures.

So typically we use questionnaires, physical exams, review of medical records, then medications, we draw blood and we

store samples that we can later retrieve to perform novel test that we believe will provide important information. For example, the ones used in this study.

So, the main findings of our study was that--there are two main findings. One, that there was a significant inverse association between moderate drinking and presence or development over time of subclinical myocardial damage as indicated by increases in the cardiac troponin T measure using this highly sensitive assay, which indicates somewhat this protective effect of moderate alcohol consumption. As I said before, increases in troponin T are bad, so what we found here is that those who consume a moderate amount of alcohol have lower levels of troponin T and are less likely to develop increases in this biomarker.

On the other hand, we found positive associations between alcohol consumption and increased concentrations of NT-proBNP which indicate more damage.

So it's an opposite effect and as I said, these two biomarkers indicate they are both reflective of subclinical cardiovascular health but they measure slightly different thing. So those were the main results.

Bob Barrett: Finally doctor, what are the implications of these findings and what kind of evidence do we need to provide a more definitive answer to patients and doctors about this alcohol connection?

Dr. Mariana Lazo: I think our results evaluating the association between alcohol consumption and two cardiac biomarkers that reflect different process in the myocardium, expand the previous findings of other observational studies than have found some protective effects but also some more negative effects, and highlight the complexity of the relationship between alcohol and the cardiovascular system. In our study, while there may be some suggestion of a protective effect on the myocardium as measured by the cardiac troponin T, we observed some adverse associations with myocardial wall stress as reflected by NT-proBNP.

And so I think what we need now are randomized clinical trials which are regarded as gold standard to study, design, to assess causality, in which we randomly assign participants to drink or not to drink alcohol, and then observe over time whether they develop the cardiovascular disease or they don't, and compare the occurrence of the disease into two groups. As alluded before there had been short-term controlled trials and have demonstrated reduced risk of disease or improvement in the risk factors, but currently no long-term randomized trial of alcohol consumption of risk of any chronic disease has been

performed. But it is needed at this point to provide a more definitive answer and more conclusive evidence.

Bob Barrett: Dr. Mariana Lazo is Assistant Professor of Medicine and Epidemiology at Johns Hopkins University and core faculty of the Welch Center for Prevention, Epidemiology, and Clinical Research. She has been our guest in this podcast from *Clinical Chemistry*. I'm Bob Barrett. Thanks for listening.