Egg consumption in relation to cardiovascular disease and mortality: the story gets more complex$^{1,2}$

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More egg on our faces? It’s really hard to say at this point, but it still seems, if you’re a middle-aged male physician and enjoy eggs more than once a day, that having some of the egg left on your face may be better than having it go down your gullet. In this issue of the Journal, Djoussé and Gaziano (1) have calculated an adjusted hazard ratio of 1.41 for all-cause mortality over a 20-y span in 21,327 Harvard-educated male physicians who ate $\geq 1$ egg/d. It is important that a pattern of less frequent intake did not influence risk. However, if diabetes was coexistent in these health care professionals, a trend existed across a broader range of egg consumption. The egg intake pattern in this study population was extremely low: only 8% of participants were eating $\geq 1$ egg/d. For comparison, 36% of the men in the Framingham study (2) and 37% of men in a Japanese study (3) with similar outcome assessments ate $\geq 1$ egg/d. However, in both of those other cohorts, there was no association between egg consumption and myocardial infarction, cardiovascular disease (CVD), death, or all-cause mortality. Yet, this much higher consumption pattern may have confounded a graded effect that occurred at lower egg intakes.

So why was egg consumption in the study by Djoussé and Gaziano related to all-cause mortality, but not to myocardial infarction or stroke? Is there any reason why egg consumption should predict all-cause mortality but not CVD mortality? Because the existing literature has focused on CVD events and CVD-related mortality, this surprising finding requires validation. There is one report of an association between egg consumption and non-Hodgkin lymphoma (4), but confirmation is lacking. Presumably, the relation to all-cause mortality in the physicians studied by Djoussé and Gaziano still reflects atherosclerotic disease. Even if the causes of death in their cohort cannot be made certain, there is no reason to posit causes other than CVD. Perhaps the effect of higher egg consumption on coronary artery disease death was related to fatal arrhythmias. An antiarrhythmic effect of fish or fish-oil consumption on coronary artery disease mortality has been proposed (5).

The historical and current concerns about egg consumption and atherosclerotic risk have to do with the cholesterol content of eggs. However, when one considers the effect of diet on CVD risk, the effect of cholesterol intake on CVD risk is less consistent than is that of saturated and trans fatty acid intakes (6). As pointed out by Djoussé and Gaziano, higher intakes of saturated and trans fats typically raise LDL-cholesterol concentrations more than do higher amounts of cholesterol in the diet. It is of interest that the trend to higher risk in subjects with diabetes begins at lower egg (yolk cholesterol) intakes. The expected effect on plasma LDL cholesterol would be expected to be small. It is noteworthy that this relation between egg consumption and CVD risk in patients with diabetes is not a novel finding (7, 8). Cholesterol absorption has been shown to be higher in patients with type 1 diabetes (9) but not in patients with type 2 diabetes (10). It is not stated—but may be presumed—that most of the subjects with diabetes in the study by Djoussé and Gaziano had type 2, not type 1, diabetes.

Unfortunately, data for LDL cholesterol and many other important covariates that relate to CVD risk were not available in the sample in their study. The study also suffers from the lack of detailed dietary information that may confound the interpretation, such as patterns of dietary intake of saturated and trans fats, fruit and vegetables, whole grains and other fiber, and fish. In the male physicians without diabetes, the trend analysis was weak, and significance was achieved only at consumption patterns of $> 1$ egg/d (hazard ratio: 1.22). At this level of intake above the average ($\approx 200$ mg) for $\approx 2000$ kcal/d, a maximum increase in total cholesterol would be 40 mg/dL (11). Of course, this value is likely an overestimate, and it fails to take into consideration the subject’s overall lifestyle, including dietary composition.

It is important to note that Djoussé and Gaziano assessed egg intake every 2 y for 10 y. It is not clear how these data were analyzed with the time-dependent Cox model the authors used. We are told that, because egg intake values at 2 y were similar to those at baseline, data at 2 y were substituted for baseline data in the 113 participants without baseline data. One would assume that the overall lifestyle of subjects with higher egg consumption would have predicted more CVD. That is, the physicians with higher egg intake were older, smoked more cigarettes, were less physically active, ate breakfast cereal less often, and had a higher prevalence of hypertension and diabetes than did those with lower egg intake.

So, if you are a male physician and are going to eat $\geq 1$ egg/d, why not eat the whites only? Just think—with all of the trimmings, that 3-white egg omelet is almost indistinguishable by taste from an omelet enriched with 600 mg cholesterol, and the whites-only omelet also remains a very good source of protein.

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riboflavin, and selenium. If you cannot do without the yolks, go ahead and enjoy them, but why eat them >3–4 d/wk? If you are a man with diabetes, a more limited egg intake pattern seems prudent. But, remember: eggs are like all other foods—they are neither “good” nor “bad,” and they can be part of an overall heart-healthy diet.

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REFERENCES