



# Medical logic and coronary calcifications

**T**HE ABILITY TO PROCESS many bits of information scattered in time and origin and immersed in background noise is key to medical practice. Once information is gathered and verified, intelligent thought assembles it into a logical framework.

Formal courses in logic are absent from most medical school curricula, however, so we rely on training and experience. This is typified by the case study approach, in which medical logic is imparted to us as we observe the synthetic and analytic thought processes of our more experienced mentors and colleagues. This model can fail us, however, if we focus merely on the medical facts without appreciating the principles of the logical framework in which those facts are presented and analyzed.

Principles of logic are essential to the critical thought processes needed when we encounter new bodies of information, especially those prepackaged in the form of theories, diagnoses, conclusions, or advertising campaigns. At times we need Socrates more than Hippocrates.

## A case study in medical logic

The current interest in coronary artery calcifications in patients on hemodialysis provides a case study in medical logic. There are facts and there is fancy. There are correlations disguised as causality. There are surrogate markers and surrogates of surrogate markers. There are legitimate concerns and illogical claims.

In this supplement, we seek to outline what is known and not known about coronary artery calcification in the normal population and in patients with chronic kidney disease.

Drs. Halliburton, Stillman, and White (page S-6) offer detailed insight into the technologies available for basic assessment of coronary artery calcification, with an emphasis on the strengths and weaknesses of various scoring options.

Drs. Schoenhagen and Tuzcu (page S-12) provide a critical analysis of current thought in

cardiology on the biologic significance of coronary calcifications in terms of mechanisms of disease and clinical outcomes. It seems important for nephrologists to hear these views from experts in cardiology. Importantly, they conclude that the incremental value of coronary artery calcification scores in risk analysis is controversial in normal patients, and most assuredly in patients with chronic kidney disease.

Lastly, Dr. Fatica and I (page S-21) summarize the key observations in nephrology relevant to the question at hand.

## Current state of the evidence

What do we know about coronary artery calcifications? Based on the literature and analyses outlined in this supplement, there should be at least tentative agreement on these points:

- Coronary artery calcification scores correlate with atherosclerotic burden, at least in individuals without chronic renal failure.
- The correlation of coronary calcification scores with acute coronary syndromes or “hard” coronary events is looser than that with atherosclerotic burden.
- Coronary artery calcification scores in patients with chronic renal failure and all its metabolic disarray cannot be interpreted in simple accord with values from patients without renal failure.

This short list of tenable conclusions will undoubtedly grow in time. Studies are now under way to extend what little we know about the accumulation of calcium in coronary arteries of patients on dialysis. In the meantime, it is logical for nephrologists and other physicians who care for patients with chronic renal failure to focus on the established markers, risks, and treatments of cardiovascular disease.

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