Cardiac Biomarkers

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Expert Advice for Clinicians

Editor

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Dedicated to
my wife, Francine Fomon-Maisel
who has been a tremendous source of
support and love

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Preface

Cardiac biomarkers have permeated our hospitals and research laboratories like no other time in the recent history. Thus, it is essential that healthcare practitioners have a clear understanding of this rapidly evolving field so that we can use them to better arm ourselves in the care of the patient. It is in this light that we present "Cardiac Biomarkers: Expert Advice for Clinicians."

We have divided this book in five sections. Section one deals with markers of cardiac risk. Here we give an overview of why this is such an important area covering some of the new exciting biomarkers. In specific, the oxidized phospholipids appear to play an ever-increasing role in detecting early cardiovascular risk.

In the section "Markers of cardiac ischemia," we tackle one of the most important and rapidly growing areas in medicine today—acute coronary syndrome. Understanding how the new "high-sensitive" troponins work is crucial to patient care, both for rapid diagnosis and effective triage. Besides exploring both the laboratory and the emergency department (ED) perspectives, we also offer insight on the potential new biomarkers for acute coronary ischemia that should add to the value of the new high-sensitivity troponins.

Natriuretic peptides (NPs) are firmly established as biomarkers for making the diagnosis of heart failure as well as ruling out heart failure in the patient presenting with shortness of breath. There are caveats to their use, such as renal failure, obesity, and the gray zone, and these are discussed as well as alogorithms for their use in the ED. NPs are extremely useful for risk stratification, and can help determine who should be admitted and potentially what treatment they should receive. Levels of NPs drop quickly as the volume overloaded patient is diuresed. Thus, using BNP levels should help one determine the optivolemic state and aid in discharge decisions. The lower the NP at discharge the less likely readmission will occur. The future for NPs will be discussed in terms of using these markers in the outpatient area. This will include as a monitor for decompensation as well as a way to guide outpatient therapy.

One of the most novel and relevant areas of biomarker translational work is in the setting of cardiorenal disease. The new definition of cardiorenal syndromes as well as the implications of these syndromes on medical management are discussed. Biomarkers of renal injury can be used to detect functional damage to the kidney up to two days before one sees the structural changes manifested by serum creatinine. These new biomarkers of early detection should allow us to target renal preventative therapy with more confidence as well as eventually target specific new treatments that will be developed. These treatments may include those that prevent renal toxicity

from contrast media or nephrotoxic drugs. Additionally, renal injury markers might target a patient with sepsis for early dialysis, perhaps even before serum creatinine is elevated.

In the final section we take a look toward the future of biomarkers, with specific emphasis on a number of the most promising markers. Adrenomedullin appears to be perhaps the most robust biomarker of prognosis in patients with dsypnea and perhaps other diseases as well. Galectin-3, a marker of fibrosis, should allow us to target popoulations at risk for myocardial fibrosis and perhaps lead to the institution of early preventative treatment. ST-2 is a biomarker that transcends myocardial stretch and inflammation, and its future looks promising. Finally, copeptin, a pro-hormone surrogate for arginine vasopressin, may be a marker of early myocardial infarction as well as be a guide to heart failure treatemnt with a vasopressing antagonist.

Biomarkers are never stand-alone tests, but rather adjuncts to what the clinicians bring to the table with respect to their history-taking, physical examination, and other tests. There are always caveats and learning curves when using biomarkers. I believe in the following:

"*Biomarkers will make a bad doctor worse and a good doctor better*."

That is the purpose of this book. Make good doctors better.

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