Impact of Biomarkers, Proteomics, and Genomics in Cardiovascular Disease

Bob Barrett: This is the podcast from *Clinical Chemistry*. I am Bob Barrett.

In January 2012, *Clinical Chemistry* published a special issue on the impact of biomarkers, proteomics, and genomics in cardiovascular disease. The growth in both the clinical use and new investigations of biomarkers has been explosive over the previous decade.

Interdisciplinary guidelines have led to the international acceptance of cardiac troponin as the standard biomarker for use in the diagnosis and management of patients with acute coronary syndrome, and the natriuretic peptides have come to be widely accepted for use in the diagnosis, management, and risk assessment of patients with heart failure.

More recently, the role of genomics has been shown by the introduction of basic science findings into clinical practice. A trend that will only continue to evolve and that will carry substantial implications for future guidelines directed at early detection and therapy, and the ultimate goal of improving patient outcomes.

Joining us in this podcast to discuss the special issue is the guest editor of the issue Dr. David Morrow, who also serves as the Director of the Levine Cardiac Unit at the Brigham and Women's Hospital.

Doctor, the January special issue of '*Clinical Chemistry*' is full of rich material for a broad audience. What are the themes that you and the other editors saw develop in this issue?

Dr. David Morrow: It really was a true privilege to work on this issue with the outstanding staff from *Clinical Chemistry* Nader Rifai, the Editor-in-Chief, and all of the contributors who were so generous with their immense expertise.

I think the issue really is reflective of the times and what is important to both laboratory professionals and clinicians right now. We saw I think three main themes develop, but with a lot of subplots to those. The first was the evolving role of analytically improved assays for troponin, the use of their improved accuracy, the use of change values and how that can be used in clinical care.

Next, we saw the role of biomarkers in optimizing clinical diagnostics in heart failure, natriuretic peptides, galectin-3, growth differentiation factor 15, mid-region pro-adrenomedullin, all of the emerging biomarkers that have seen a lot of important data, and there are new articles on each of those in this issue.

And then lastly, we saw genomics and heart disease covering the fundamentals of genomics discovery. 9021 is a landmark in the genomic revolution and coronary disease, and lastly, some of the twists and turns that we are taking with pharmacogenomics.

So I think all of these have really covered the areas that are pretty important to us involved in this area.

Bob Barrett: There has been a lot of positive feedback on this issue. Are there any articles you want to make sure that readers don't miss?

Dr. David Morrow: Well, it really was an outstanding issue simply because of all the talent of the individual authors who submitted their top-notch original science and exemplary reviews. There really is something for everyone in this issue, from a clinical laboratorian to the researcher, to the clinical cardiologist and emergency physicians.

I think I hope everyone will read all the original science. There really are some great articles in there. The two point and counterpoint articles are kind of a really fun way to get to the issues around the use of troponin in clinical practice and weigh the emerging biomarkers against what we have now.

So those are great to read. There is a great review on metabolomics and biomarker discovery, which I think are particularly important, because much of the readership of *Clinical Chemistry* may not be exposed to that area as frequently in their practice. So it's a very good review article.

Dr. Ladenson's '*Reflection on the Evolution of Cardiac Biomarkers*' is incredibly insightful, and I think on a personal note even though I know him very well as my research chairman and most admired mentor, reading Dr. Braunwald's interview was captivating. He really is a remarkable scientist and continues to be a role model for us all. So people should not miss that outstanding interview.

Bob Barrett: Many of the articles of course address the clinical impact of biomarkers in cardiovascular disease, where do we stand now in the clinical use of cardiac biomarkers?

Dr. David Morrow: Well, I think biomarkers have become an indispensable part of our clinical evaluation of patients with cardiovascular disease. We use them for diagnosis, risk stratification, therapeutic decision-making. I think even now for monitoring the successive therapy and sometimes as applications, as endpoints in clinical trials.

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So we really are quite expansive in the way we have integrated them into care, and troponin and now natriuretic peptides have shown us that path and left us with a pretty high bar for newer biomarkers.

I think clinicians and professional societies and even regulatory authorities are looking now for that third element meaning the therapeutic decision-making before anyone is ready to really embrace a new biomarker and that's set a pretty tough standard, a challenge for us, but I think it really has and will continue to lead to even stronger-and-stronger clinical studies and better science with the next generation of biomarkers.

Bob Barrett: Well, let's look ahead Dr. Morrow, what's next in 2012?

Dr. David Morrow: I see three major directions I guess that are all reflected in this issue. Number one we still have driving questions around really the bread and butter use of cardiac biomarkers. So how do we use the newer sensitive assays for troponin, what are the right cut-points, how do we changes in values, where new applications are going to take us. That really is going to occupy us a lot this year.

Therapeutic items, number two, that's really the name of the game, and I think especially with heart failure markers we are going to see more-and-more larger studies of direct applications, and that's going to continue this year and into the next several years.

Then lastly, I think omics are going mainstream. Pharmacogenomics has really become a reality. We've gone from being an infant to crawling now and maybe unlike my kids, it's still probably going to be a few more years until pharmacogenomics is toddling along, but it's crawling a little bit faster everyday, and I think this year we are going to see a continued expansion that will continue over the next three to four years.

Metabolomics and proteomics along with the other omics are going to make big strides, and then lastly micro-RNA, an offspring of genomics, I think is entering a real growth phase that we are going to see takeoff in 2012 at least for continued research, and hopefully will lead to something new clinically in the coming years.

Bob Barrett: Dr. David Morrow is the Director of the Levine Cardiac Unit at the Brigham and Women's Hospital and has been our guest in this podcast from *Clinical Chemistry*.

I am Bob Barrett. Thanks for listening!

Total Duration: 8 Minutes