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Point of Concern for Troponin Testing with High-Sensitivity Assays in the Near Patient Setting

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Guest: Dr. Peter Kavsak from the Department of Pathology and Molecular Medicine at McMaster University and the Hamilton Regional Laboratory Medicine Program in Hamilton, Ontario, Canada.

Bob Barrett: This is a podcast from *Clinical Chemistry*, a production of the Association for Diagnostics & Laboratory Medicine. I'm Bob Barrett.

Cardiac troponin has firmly established itself as the go-to biomarker for the evaluation of acute myocardial infarction with high sensitivity, troponin assays representing the latest evolution in this space. High-sensitivity assays are now widely used in central laboratories throughout the world, but there remains considerable interest in implementing high sensitivity troponin testing at the patient bedside to speed up the diagnostic process even further.

Faster results sound good in theory but is faster always better? Given the small changes in serial troponin results that indicate a likely cardiac event, it's unclear whether point-of-care testing can provide the same degree of clarity at central lab testing. A perspective article in the October 2026 issue of *Clinical Chemistry* weighs in on this debate. Differences in specimen type, imprecision of the instrument, impact of non-laboratory personnel performing testing, all of these factor into result uncertainty.

Do these factors make point-of-care testing a non-starter or can point-of-care testing overcome these challenges leading to improved clinical workflows and patient outcomes?

Today, we're joined by the article's author. Dr. Peter Kavsak is a Professor in the Department of Pathology and Molecular Medicine at McMaster University and a Clinical Chemist for hospitals affiliated with the Hamilton Regional Laboratory Medicine Program. His research focuses on cardiac and cancer-related laboratory diagnostics, particularly high-sensitivity cardiac troponin assays.

So Dr. Kavsak, let's start with this. The perspective article is on point-of-care testing for cardiac troponin, which I see has been around for decades. So, what has changed?

Peter Kavsak: Really the protein is the same but the testing has become a lot better. Over 30 years ago, there's actually publications in

JAMA, one with an editorial board member, David Sacks on it, looking at a point-of-care troponin T, and the article that I reference in the perspective is actually a nice *New England Journal of Medicine* paper that actually looks at both a point-of-care troponin T and near-bedside troponin I assay.

So this is back in '95 and '97, and so you think to yourself 'what has changed?' and it's the analytics of the assay. You know 30 years ago, yes we could measure cardiac troponin but we weren't analytically sensitive and for the longest time that analytical sensitivity, and improvement on the analytical sensitivity, largely has been done on the large core analyzers, the big instruments in the laboratory, but over the last few years, that type of technology has now been able to be embraced by the point-of-care technology. So that's what's changed.

It's the ability that we're able to measure troponin at smaller concentrations, lower concentrations, I should say with better precision and more in line with what we're getting with the high-sensitivity assays at the large laboratory instruments.

Bob Barrett: In your article, you referenced a study that raises concerns for cut-offs when using point-of-care troponin testing. And let's shorten that to POCTT. What were these concerns?

Peter Kavsak: Yeah, the article is actually highlights something that we've dealt with in the big core lab analyzers, that depending on what sample type you use, you may get different cut-offs at the low end. But I think it highlights something that we've known on the core analyzers, but at point-of-care, that's also very important is that you may have different cut-offs based upon old blood versus plasma and in the core analyzers in that aspect, we only obtain plasma for testing. So we just have to pick the right type of plasma or serum and we can test.

But in point-of-care setting, you could do plasma or whole blood and those are totally different matrices, which we'll say, and the analytics and the cut-offs are different in both of them. So that's an added layer of complexity. This is on the background that has always occurred that different jurisdictions in different places in the world, in different labs, will set their lower end cut-offs at different levels, and that's always been a problem.

And that kind of prevents harmonization of how we interpret at the low end because difference regulatory bodies will mandate the labs only report down as low as this versus that, etc. But for point-of-care, it takes an odd level because you have whole blood versus plasma or serum. And then, the other thing about that, is little bit different, is that you're looking at how is the testing being done? Is it being done by

the laboratory staff, or is it been done in by the personnel closest to the patient? Such in this case, maybe the nurses and that is not always reflected in the studies.

And this particular study was done on frozen plasma, which is what we have to do to get these studies done. But that doesn't reflect what actually occurs in regulatory hospital practice. It would be nursing doing the testing on whole blood. And then you have the added complexity, now you have point-of-care testing. How well does the troponin results agree with the core lab instrument testing?

That is something that is again a little bit different than what we currently look at at some other point-of-care testing is that the analytics are different, the assays are different, the cut offs will be different, and so the complexity exists that how do you integrate two different assays that are going to be available? You're always going to have a troponin in the core lab because it's going to be done there. And so now you have this added point-of-care troponin and they're going to be different.

And sometimes even troponin assays from the same manufacturer, if they have a point-of-care device versus say a core analyzer assay, you think they're from the same manufacturer they are going to be similar. In fact, they're not and it could use different sample types to do the testing with different cut-offs.

And then finally, it's really on how you use the troponin results from point-of-care and what is the pathways that are going to be used in order to stratify patients at low and high risk. And that is where you have the complexity again, that you have different types of pathways or approaches that are developed in different parts of the world and then you're trying to integrate it into your own area, where you have perhaps restrictions on what you can report, perhaps the sample type you could use, and so forth and so on.

So, it is a complex issue where you have many different things occurring and if you don't keep track of all those things, they can lead into discordant results, which could then lead to discordant decisions or discrepant decisions made for patient care.

Bob Barrett: Well of these concerns, which one do you think can be addressed the fastest for POCTT?

Peter Kavsak: Yeah, I mean that's a difficult question and a lot of it, I mean I don't want to take an easy way out, or cop out or I don't know what's the appropriate term, but I'm going to say I'm not, I think it's institutional dependent. And what I do think that is probably what I've seen in the studies have

documented this is that team work is extremely important to get testing done, especially at the point-of-care setting.

So, the nursing involving in testing, the core lab or the laboratory oversight, the integration of that. That I think can work because we've already seen it work, many other things in the point-of-care. And on top of that, some of the studies that have demonstrated utility of point-of-care testing have already achieved that. But again, a lot of that is institutional dependent and on how we collaborate with nursing and lab in order to provide reproducible and great results when we use point-of-care troponin testing.

Bob Barrett: As an example for a path forward, you mentioned a stepped-wedge cluster randomized quality improvement initiative for point-of-care troponin testing, but you didn't say that that was beneficial.

Peter Kavsak: Yeah, at the time I wrote the perspective, the study, while it was completed, it wasn't accepted yet for publication but I'm proud to say that it has been accepted for publication. It's a ICare-FASTER study, accepted in circulation. Martin Than is the lead author and he led this study across New Zealand. They looked at approximately 60,000 patients and what the study revealed was that they actually demonstrated a reduction of ED length of stay by 13% and that translates to nearly 50 minutes of reduction in length of stay.

And so, that's quite powerful. So why that work though, and I referenced it, even though it wasn't published at the time and wasn't accepted, was the fact is that the troponin wasn't used in isolation. It was brought in. Obviously, this was a lot of work, a lot of stakeholder involvement, a lot of collaboration, a lot of meetings, and you had to have buy-in from nursing, physicians, lab, and everything. So there's a lot more stakeholders at the table here.

But what was really important is that they put that point-of-care troponin already in a accelerated diagnostic pathway, so it wasn't used in isolation. Even though you could use this point-of-care test and look at the benefits, it just replaced sending that sample to the lab. But how that troponin was interpreted was part of a pathway. So it really highlights, what we all kind of think about it is like troponins are very powerful biomarker.

But it even becomes even more powerful when you start to integrate it with pathways and other types of variables, and sometimes that's clinical variables and that's what clinicians do in their assessment as well. But this is why it worked, it was embedded in a pathway, and that's what I suggest as a potential path forward, is don't use troponin in isolation but you can put it with a pathway.

Bob Barrett: Well finally Dr. Kavsak, you stayed another path forward for POCTT using algorithms with other clinical and/or laboratory variables. Can I assume that means using AI?

Peter Kavsak: I think we all think algorithms are now AI, my word. Yes and no. Yes, there's a lot of interest in this. There has been some publications already using AI with looking at point-of-care assays. ARTEMIS is one example and there's some colleagues, Johannes Neumann from Germany who've done this. But what I'm really intrigued about is the pathway that we've developed, which is called ALARRM, and that uses troponin with other laboratory test variables and we can use this as a path forward to risk-stratify patients to low and high risks.

So yes, they're going to be algorithms. There could be AI, machine learning algorithms, or other evidence-based algorithms such as ALARRM, where we can now use point-of-care troponin testing in conjunction with other important laboratory variables to quickly ascertain at the point of care what patients are truly low risk and high risk, and it's really -- the patients who are really truly low risk, and there's a lot of them, that we can now send home.

And so, I see that there's a bright future for sure in using troponin, especially in the near patient setting, with additional variables for further and faster risk stratification of patients. I mean it's already been demonstrated with ICare-FASTER and there's other studies out there. And I just think in the future, they'll be more and additional approaches to use troponin in a safe manner here.

Bob Barrett: That was Dr. Peter Kavsak, from McMaster University in Hamilton, Ontario, Canada. He wrote a perspective article in the October 2026 issue of *Clinical Chemistry* describing the challenges of implementing high-sensitivity troponin testing at the point of care. And he has been our guest in this podcast on that topic. I'm Bob Barrett. Thanks for listening.