Title: TCT 22: Precision Cardiovascular Medicine With Dr Jane Leopold

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Date: 4 October 2022

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- Hi, my name is Jane Leopold, and I am a cardiologist at Brigham & Women's Hospital in Boston, Massachusetts.
Today we're going to talk about precision cardiovascular medicine.

What is precision medicine?

Well, precision medicine is an area of medicine that aims to tailor disease prevention and treatment to take into account differences among people in terms of their molecular makeup, their environments, and their lifestyles.
The goal of precision medicine is to target the right treatment or intervention to the right patient at the right time.
And this is important because, now, most of our medical therapies or interventions are really designed for the average patient. And what we find is that this one size fits all approach is not always successful for everyone.
There can be some people who respond to a treatment or an intervention, and there are others that do not.

Could you outline some examples of the cardiovascular approach in CV medicine?

In order to think about precision medicine and think about incorporating everything we know about someone's molecular makeup or their environment, or their lifestyle, we need to know a lot about individuals. So this really starts with some of the things that we're already doing, which is getting detailed histories about the patients, their families, their environments, and their lifestyles. And then we need to examine the patients and we need to consider results from laboratory testing, from imaging studies. And importantly, we can't forget to think about patients on a molecular level. So what does this mean? Well, what it really means is thinking about understanding differences in genes, proteins, metabolites that not only circulate in our blood, but also are in some of the different tissues. What we need to do in order to do this is get samples of either blood or tissue and really do these detailed molecular analyses and figure out how patients are the same, how they're different, and what makes every individual unique.

What is the data supporting the precision medicine approach?

While this is a nascent field, there are several studies that actually support the idea of using a precision medicine approach. One of the first things is that when we see patients who come in with cardiovascular diseases, we recognise that the diseases are very heterogeneous.

So some of the examples come from things like looking at patients who have an acute myocardial infarction or a heart attack. And when we look at some of the genetic causes that can predispose to this, we see that genetic polymorphisms associated with cholesterol levels can be involved. And yet, there are people who have these polymorphisms and have very mild disease.
There are some who have very severe disease, and there are likely people out there who have no disease. We can also point to other cardiovascular diseases that have the same kind of associations with genetic polymorphisms, yet the spectrum of disease is vast or patients don't have the disease.
The other factors that we look at, including environment and healthy lifestyle, are also important. And there have been important studies that have looked at patients' genetic risk for cardiovascular disease and looked at how their lifestyle affected it. Now, for example, in one study from Dr. Kara and this colleagues that was published in the New England Journal of Medicine in 2016, they looked at 50,000 participants from three clinical studies and they developed a polygenic risk score from 50 polymorphisms that they found that were associated with coronary artery disease. They then went on to look at how having a healthy lifestyle affected the risk. And so what they looked at was tobacco use, obesity, diet, and levels of physical activity. And they scored this for each of the participants in the trials. And what they found was those individuals who subscribed to a healthy lifestyle had actually lower genetic risk than individuals who didn't. And so the lifestyle factors were actually able to modify the genetic risk. We wouldn't have known this if we hadn't had all of these, all of these data together. So there is relationships between molecular signatures, and lifestyle and environmental signatures, and we need studies like this that can really put the two together.

What impact could a precision medicine approach have on daily clinical practice?

It could have a big impact on daily clinical practice. For one, it does require gathering more information. However, what this can do is it can help us to identify patients who may respond to a treatment that a large clinical study suggests we should be giving to a patient that has the particular disease or disorder that you identify in the clinical visit. So for example, if we were able to know that by taking a blood test and by doing some rapid assays, that a patient had a marker that says that the patient will respond to a medication, we would prescribe it. If they don't have the marker and we, that indicates that the patient wouldn't respond to the medication, then we would move on to another choice. So this is an area that will actually inform our clinic visits and one that will likely redefine how we're holding our clinic visits.

What are your take-home messages?

The take home message is that this is an exciting new area and a developing field that really is likely to change how we practice medicine. And although it seems daunting because of the large amount of data collected, that this will be refined over time. We have seen changes in how all of these markers are measured.
They have become faster to obtain, they have become less costly, and we've seen faster ways to actually integrate data to give us the information that we need.
So while we are still in the early days, that this is a promising new future of how we'll practice medicine.