Dr. Abraham (0:00):

Welcome to the American Heart Association podcast on hypertrophic cardiomyopathy. The topic today is how to bridge patients reflections and a specialist recommendations. The American Heart Association's HCM initiative is sponsored MyoKardia. I am Ted Abraham at the University of California in San Francisco, and I am part of the HCM Center of Excellence here. And we have two outstanding speakers today, both with great expertise on the topic of discussion, Dr. Sharon Cresci, Associate Professor of Medicine and Associate Professor of Genetics at Washington University at St. Louis. Also a member of the Hypertrophic Cardiomyopathy Center of Excellence there. Her specialties are echo cardiography and clinical genetics. She's also Director at the Impact, the initiative for mentoring, promoting networking and advocacy for cardiology trainees. And thank you for being with us, Dr. Cresci. We have also Dr. Vlad Zaha Assistant Professor of Internal Medicine at UT Southwestern Medical Center in Dallas, where his specialties are in multi-modality cardiovascular imaging.

Dr. Abraham (1:08):

And he's also a Medical Director of the Cardio-Oncology program and a member of the HCM Center of Excellence at UT Southwestern in Dallas. And welcome Dr. Zaha. Thank you both for making the time to be here. We are also very fortunate today to have a patient representative with us, Ms. Gwen Mayes. And thank you, Ms. Mayes for joining us and providing your perspective on this call. In this podcast we will move through a clinical presentation, a systematic diagnostic evaluation, and focus on how early diagnosis is better than the risk of missing a therapeutic opportunity. Hopefully our physicians will highlight the importance along with our patient representative of having all our patients seek medical attention early and establish a relationship with their physicians for a long-term follow-up. So I'd like to start actually with Dr. Cresci and ask her how important is family history in your evaluation of a patient and what are some of the warning signs or prompts that sort of prompt you to go deeper into the family history?

Dr. Sharon Cresci (2:16):

Thank you. And thank you for having me. This is wonderful. So family history is extremely important. When I see a patient for the first time, I take at least a three generation family history and things that I look for in that family history are any history of heart disease. I do ask if the patient has a family history of hypertrophic cardiomyopathy, but often the patient is unaware of that family history and things that will raise red flags in my mind are if a patient says, "Oh, well, I have had multiple family members who have passed away from a heart attack." And often they'll say that they've passed away from heart attack at a very early age. So younger than we would typically think of someone dying from a heart attack, or they'll say that they know that their family has always had a very thick heart or an athletic heart or a robust heart, extra strong heart.

Dr. Sharon Cresci (3:18):

All of these things may not seem to be significant for the patient, but as a physician, when I hear those things, I want to explore that further and try and get more details. And often I'll ask the patient to go back and talk to their family members and ask if they have any more details. Things that are really big red flags, or if they say something like, "Oh, well my family member they went to bed one night and they seemed perfectly fine, but they never woke up the next morning." Or, "They went into work and they were just sitting at their desk doing work and suddenly had a massive heart attack" or, "They were doing something athletic activity and again, had this massive heart attack." All of those points in the history

really make me want to, get further information and really want to have further discussions with the patient about that.

Dr. Abraham (4:17):

Thank you, Dr. Cresci, Ms. Mayes, how much of this resounds with you? How did your journey start? If you could focus on the family history, did you have family members who had some of the history that Dr. Cresci just described?

Gwen Mayes (4:30):

Absolutely. Thank you, Dr. Abraham and thank you to the American Heart Association for making sure that the patient's voice is included. Very, very important. And yes, it resonates very clearly and very closely to me. So I'm in my mid 60's now, but my mother was told when I was born, that I was born with a heart murmur and it was somewhat dismissed. So several years ago, I think what's important is when I was young, I heard a lot of stories from my mother and her mother about what would be my maternal grandfather. And my mother found him dead on the bathroom floor, her senior year in high school. The water was still running in the sink, he was getting ready to go to work. I was in Western Kentucky. He was a foreman at a State Penitentiary, and it irrevocably changed her life.

Gwen Mayes (5:21):

My grandmother would talk about how he would always feel tired after eating a big meal, or if he had stress at work. Of course, this was before there was a great deal of emphasis on genetics or a great deal of the emphasis on family medical history. But it was the story that I heard my entire life. His father also died of a sudden cardiac arrest at the age of 35. So I grew up, my mother never exhibited any symptoms, but I heard her stories about not only finding her father, but also hearing him talk about losing his father when he was a child and finding him dead from a sudden cardiac arrest, again, not even doing something that was overly tiresome or exertion, but just living everyday life.

Gwen Mayes (6:16):

So much of this resonates, obviously in more current days, the importance of family history is stressed as it should be. But many years ago, and for maybe others that are more my age contemporaries who haven't been diagnosed, they should really look very carefully at this experience of having family members who are unusually tired or fatigued, or really just feeling anxious as if their heart is racing or not feeling well.

Dr. Abraham (6:20):

Thank you. Thank you, Ms. Mayes for that very informative story spanning several generations. Dr. Zaha, so you have someone walking into your clinic with a strong family history of multiple disturbing events happening at an early age. Can you walk us through what is going through your mind when somebody walks into your clinic with this multi-generational family history? And also maybe touch upon folks who don't have such a history and they're coming to you de novo with either a suspected or a potential HCM diagnosis?

Dr. Vlad Zaha (6:53):

Thank you, Dr. Abraham. This is really a wonderful discussion here. Starting from the red flag of the family history, it is important for the patients to appreciate the sometimes discreet nature of the

symptoms that they get. And the fact that many times there is a tendency to consider those symptoms being part of the normal life and find something that they can relate in their everyday life that would explain them. So the role of the medical team is really to bring up some of the consistencies in the symptoms to consider. For example, what is the level of fatigue relative to the level of activity that the patients have? What are palpitations that they may feel in what circumstances? What is the reproducibility of those conditions? Are there any high risk features such as feeling like passing out, having presyncopal episodes? And again, how do they relate to their activity?

Dr. Vlad Zaha (7:56):

There is an important difference here between the resting state and the exertion. What is the level of exertion that the patients can achieve? Probably a second important group of patients would be the patients that do not have symptoms at all. They have a family history. Considering the progression of the disease and a manifestation at different ages, it is again important to consider the longitudinal development of such symptoms. And maybe a third category of such patients would be the ones that have been referred for a concern related to findings unrelated to their symptoms, but related to their risk profiles, such as athletes where this visit can be triggered by something that their coach has noticed in their performance or some other manifestations that their peers have noticed. So we will have different categories of patients with different levels of motivation. Most of the time, people like to feel healthy and will find psychological arguments to downgrade any of the symptoms that they feel in which case we have to have a high level of scrutiny for what they can present with.

Dr. Sharon Cresci (9:16):

If I could add something here on one of the things that Ms. Mayes said really stands out in that she said that her family member got very tired after eating a big meal. And this is a symptom that is actually very common with patients who have hypertrophic cardiomyopathy in that anything that decreases the afterload will actually cause them to be symptomatic. And this is something that patients have that when patients report this symptom, if a physician's not aware that this is a common symptom, they may ignore it or pass it off as being something that's trivial when really this is a very important symptom that we need to pay attention to.

Dr. Sharon Cresci (10:01):

The other thing that I hear from a lot of my patients is that when they were younger, they were either diagnosed with exercise induced asthma or some other non-cardiac diagnosis for the fact that when they were participating in sports, they always felt like they couldn't keep up. So even though on the outside they looked incredibly healthy and like they should be able to physically be able to keep up. They felt like they could not keep up and they didn't really have a good reason for that. In fact, sometimes their gym teachers would tell them that they were lazy, that they just weren't trying hard enough. And so any of these symptoms really needs to be paid attention to and explored further rather than dismissed.

Gwen Mayes (10:48):

Dr. Abraham I'd really liked to, as a patient tie a few of these points together because they're all just really resonating with me on many sides of this picture. So I first had symptoms actually that I recall when I was about the age of eight and I was in the fourth or fifth grade, and I was out and asked to run a 600 yard run walk, actually walk at school as part of the Presidents physical fitness certificate. And it was the only part of the test that I'd not been able to complete. And I'll never forget a football field that's

three times down back, et cetera, for 600 yards. And the teacher kept saying to me, "You just need to walk it. You don't need to run." And I just remember this feeling that my mind wanted to do one thing, and I was telling my body to do one thing and my body wouldn't do it even as a young girl.

Gwen Mayes (11:44):

And what was so frustrating for me was I was part of the cheerleading squad. So in some ways I ended up actually being on a cheerleading squad for eight years. But during those eight years, I fainted giving blood when I was age appropriate to give blood, I wasn't able to go hiking on fraternity and sorority trips in college. I too found myself avoiding big Thanksgiving meals. And so, again, even though I wasn't diagnosed at the time I had this mixed reaction to what's exertion some days better than others, very sensitive to fluid, very sensitive to heat.

Gwen Mayes (12:29):

And so I bring that up in that, as we know with patients with HCM, they're all so unique. They're all so different that really asking about the scope, the landscape of their everyday activities and listening for these subtle situations where their reaction is not comparable to what maybe you would expect for that age group is very, very important because it can masquerade in a lot of different ways.

Dr. Sharon Cresci (13:01):

I think that's really important that you said that it may be very variable on different days because that's another key point is that it you may not get the same symptoms with the same level of exertion on a daily basis. And so that also can be very confusing to physicians if they're not in tune. And as you say, have an extended discussion with the patient to really hear and listen to what their symptoms are over time.

Dr. Abraham (13:33):

Fantastic discussion. Again, I think Dr. Zaha led off with a range of symptoms that he would look for and followed up by some very important points by Dr. Cresci. And Ms. Mayes, I think you really summarized your story very well. And I'd say that there's a range of symptoms ranging from asymptomatic to a particular constellation that people need to be suspicious about. But the take home point that I'm getting is that they're very vague and could be often mistaken for other conditions. We are going to move on to a topic that very often may not be discussed. We get embroiled into symptoms, into diagnostics, into technical terms. But one of the things that we forget, especially from the physician's side is the anxiety. And what's going on in the mind of the patient as they're visiting the clinic, maybe even prepping for the journey to the clinic.

Dr. Abraham (14:24):

And when they leave your clinic with a lot of information both diagnostic and medical and genetic information. Ms. Mayes, I want to start with you on this question on what is the anxiety? What is running through your mind as you are facing this discussion, coming into in the clinic when they bring a lot of information is being thrown at you, and then you're putting all this into your bag of medical portfolios and walking out of the clinic? Tell me about what's going on through your mind, the potential anxiety or lack thereof, and maybe even what is the discussion between you and your family members? And then I'll invite Dr. Zaha and Cresci to offer their comments.

Gwen Mayes (15:04):

Thank you Dr. Abraham, because not only living with this condition, but having worked with other patients of HCM, I think the common thread is the enormous emotional toll that the uncertainty of this disease brings with it. Not only is there the newness of the diagnosis and the familiarity of clinicians and centers of excellence, but many of us are living when there were no patient support groups. There was really hardly any internet. There certainly wasn't the emphasis on telling your story publicly. And what I have found in working with patients and certainly myself, is that when I was first diagnosed having this background knowledge of what happened to my maternal grandfather, great grandfather and the devastation to my mother, not living her dreams, not getting to go to college. I was predisposed to thinking that if I was diagnosed with this condition, it was a death sentence.

Gwen Mayes (16:07):

I was absolutely predisposed to that. I ignored the symptoms. I knew better. I was in risky behavior. I was in my 20s and I ignored it. By the time I was diagnosed, it took me passing out on the red line in the Metro, under the ground in DC, landing in George Washington University emergency room. I did everything to avoid being diagnosed. And when I was, the first thing that was told me was, the very first thing, "You will have a shortened life expectancy." I was 30 years old, and it's very hard to know what to do with that statement. A lot more is known today, but that was my entree into living with HCM. You will have a shortened life expectancy. And I have thought of that many, many times in my life. The uncertainty of this condition is something that a patient will live with every day, whether they're feeling okay or not, because there is the uncertainty, it may progress, they may not have access to the center of excellence.

Gwen Mayes (17:20):

They may not show up in an emergency room with a clinician who even understands this condition. So there is an incredible need for what the American Heart Association and others are doing to simply bring awareness to this condition. I would say the other thing I would add that of the age and regardless of when you're diagnosed and so much more is known now is that patients will naturally tell themselves stories. This is true in any chronic health condition, but when a doctor says X with their lab, they're testing, their knowledge, their incredible expertise, a patient will hear something else. It's inevitable, their life is going to have to be lived. Whether they're going to go to school, go to college. I was advised not to have children. It had a devastating effect on my relationships, I never married.

Gwen Mayes (18:17):

Of course, all of that information now is really in my past. And it's not what is told to patients today. But patients will, regardless of their age, they will tell themselves stories. They've either witnessed somebody in their family die, get a transplant, be on medications, get short of breath, have to give up their hobbies, sit down when they want to stand up and they will formulate their own stories. So I would say anything that a physician, nurse practitioner can do to acknowledge the emotional toll of this condition. And just simply ask, "I'm telling you X, tell me what you're hearing, tell me how this is going to help and not in your family. Do you have mental health experts? Are you familiar with patient support groups? Have you talked to someone who provides an anchor for you, a faith leader, another patient?" And just repeatedly make sure that in every exam, every example, every time you interface with an HCM patient that you gently inquire about how their emotional wellbeing is because it will be with them the rest of their life.

Dr. Abraham (19:40):

That was very moving, and I appreciate, and actually commend you for the courage to share that story. I'd like to start with Dr. Zaha. I know you had a comment on the previous topic but also maybe after that comment you could lead in to how you potentially address some of the anxiety related topics or issues that Ms. May's just brought up. Dr. Zaha.

Dr. Vlad Zaha (20:06):

Thank you, Dr. Abraham. Regarding the prior topic that we approached, the complexity of the symptoms. Thinking that our podcast will have an outreach nationwide. It is important to consider the geography. It is important to consider the seasonal manifestations of these symptoms and how they would be present somewhere in Wisconsin, for example, with cycles of weather pattern and somewhere down in Louisiana. Secondly now regarding the next point of the patient's psychological adjustment and the role of the physicians in supporting that, what Ms. Mayes shared with us is extremely important. The patients are presenting with a state of uncertainty and awareness of the different possibilities is important. A trusted relationship with a provider is probably one of the main support systems for the patient in the course of this disease. So establishing that first encounter with the provider with experience and with certain perspective on how to direct the discussion and how to address the questions, how to bring up the questions that were not asked and how to navigate the patient through the course of diagnosis and decisions.

Dr. Vlad Zaha (21:37):

In addition to this, the course of the disease can be taking different terms and it is important to build the expectation of uncertainty. It is a gradual process where this communication level needs to stay open and to be re-approached in different stages of life. In many instances, the diagnoses are happening early and there are many events in life that will create turns. So in summary, this is a journey that starts with awareness. And I would say at this point in history, probably the patients would have much more awareness. The patient support groups are very active. There are checklists of questions that the patients may ask that their first encounter, and there are several alternative explanations for some of these symptoms, but it is important to come to the point of engaging into the relationship with the provider and go on to the next step of testing and thinking about navigating the management of the disease with medical support.

Dr. Abraham (22:46):

Dr. Cresci, any additional comments?

Dr. Sharon Cresci (22:51):

Yes, just a couple of points. I think that it's really important as Ms. Mayes said, to really listen to your patient and hear what their concerns are. It's important to know that with our current therapies and treatments for hypertrophic cardiomyopathy for most patients they have a normal life expectancy. And so I think addressing that concern about a potential death sentence with a diagnosis of hypertrophic cardiomyopathy needs to be confronted early on and really a discussion about what the therapies are and how this may impact someone's life expectancy should be had with the patient. On the second point that I wanted to bring up is that most patients know that this is a genetic disorder. And so there is a certain amount of guilt that comes with this diagnosis in that they realize that they may pass on the genetic variant that causes this disease to their children and grandchildren.

Dr. Sharon Cresci (23:50):

And so I try to have discussions about that as well because you know, we're passing on genes and variants that provide all sorts of different beneficial aspects and some more concerning aspects. And so we really need to try and address that guilt and to make sure that patients are not overly concerned about that.

Gwen Mayes (24:14):

Dr. Abraham, Gwen again. I just really want to reemphasize what Dr. Cresci just said, because while my experience early in life was based upon the knowledge at the time, and we're talking 1980, I also 20 years later walked into a center of excellence. And that was several years ago. And the Director of the Institute, the first thing he said to me was, "Just because you have hypertrophic cardiomyopathy doesn't mean anything bad is going to happen to you." And I contrast those two experiences and they have made such an impact on my life. And I am so grateful that in more recent years, the knowledge has grown to the point that patients can be reassured that the risk of sudden cardiac death is low. But I do think that putting it out there and addressing it and just letting a patient talk about it is very important.

Dr. Abraham (25:15):

Thank you, Ms. Mayes. So part of that reassurance and part of that knowledge has really come from a lot of advances in diagnostic technologies. And I think this might be a good way or a good segue into having Dr. Cresci maybe start by talking about some of the diagnostic technologies she uses initially in a patient and then maybe to further characterize them. And I'll have that followed up by Dr. Zaha with his additional comments. Dr. Cresci.

Dr. Sharon Cresci (25:44):

Sure. So echocardiography is kind of the mainstay of diagnosis for hypertrophic cardiomyopathy. At our center, we do a very detailed echocardiographic analysis using all cutting edge techniques, including segmental strain. And we're looking for very subtle signs of hypertrophic cardiomyopathy in patients and in their family members. We also use exercise stress testing. I'm sorry, let me say that again. We also use echo exercise, stress echocardiography to evaluate many of our patients and get a semi quantitative measure of what their exercise capability is and what their LV outflow track obstruction does with exercise provocation. And we use all of this information to form a diagnosis.

Dr. Abraham (26:38):

Thank you, Dr. Zaha, you want to continue on what comes beyond echo? Is echo the be all end all? Do you have other things in your back pocket that you pull out to try to better characterize the patient? Thank you.

Dr. Vlad Zaha (26:50):

Thank you, Dr. Abraham. In many instances, ultrasound windows can be limited and these limitations may affect the interpretation of the studies. Therefore, one of the important imaging modalities that is used for characterization of the hearts in patients with or suspected to have hypertrophic cardiomyopathy is cardiac MRI, which can provide several parameters that can characterize in detail the tissue structure and the wall thickness and the associated changes in the cardiac structures, as well as the dynamic characterization of cardiac function. It can also allow longitudinal comparison when an

initial diagnosis is not present, but a dynamic comparison is needed over time and it can provide further details for potential planning for a procedure.

Dr. Abraham (27:47):

Thank you, Dr. Zaha. Ms. Mayes, did you have specific points that you'd like to share with clinicians and other patients as you went through your diagnostic testing? I'm pretty sure you went through at least some imaging because that's the hallmark and probably the only way you can nail someone down as having HCM. What are your comments having heard some of the diagnostic techniques described by Dr. Cresci and Dr. Zaha?

Gwen Mayes (28:12):

Well, first of all, I think the most important thing is that the technology just continues to advance. And that is so reassuring for patients like myself who have managed this condition for a long time. I'm very fortunate. I am medically managed and with some lifestyle changes when I was first diagnosed with my history and my presentation, it was as simple as stand up, squat down, take a deep breath. The suspicion was that I had at that time was IHSS. It had a completely different name. So the good news is the emphasis not only by technology and interventions, but clearly the development in research of having medications and therapies that are going to be specific to the underlying disease is hugely important.

Gwen Mayes (29:00):

Patients such as myself, you're sort of treating one symptom one day, the next, the next test here and test there. But I will say the advancements in the diagnostic testing is incredible. Many of them that have been mentioned I have had and I certainly feel that I have received the very best of care at a center of excellence. I'll also add that that has worked well in tandem with a local cardiologist who have shared ideas. And so I feel comfortable that not only at home, but that I can be treated well, but for more important of progression of the condition, I can go to a center of excellence.

Dr. Abraham (29:41):

Thank you, Ms. Mayes. Thank you, Ms. Mayes, we're almost at the end of the hour. So an important topic given that HCM as a genetic disease would be cardiac genetics related to HCM. And I'd like to invite Dr. Cresci to start off this part of the discussion. If you could tell us a little bit about HCM and the genetics of HCM itself, and then maybe talk also about patient testing, genetic testing in patients with HCM, and then we'll have Dr. Zaha follow that discussion. Thank you.

Dr. Sharon Cresci (30:14):

Sure. Genetic testing for hypertrophic cardiomyopathy has advanced significantly in the past 10 years or so. But the test itself is still not a 100%, so... Excuse me. So depending on patient characteristics, the yield of the test is anywhere from between about 50% to about 70%. And what that means is that approximately 30% of patients with hypertrophic cardiomyopathy will not have an identifiable pathogenic variant on genetic testing. And this needs to be explained and discussed with the patient so that they understand the implications of their genetic test. However, if we are able to identify a pathogenic variant in a patient with hypertrophic cardiomyopathy, this allows us to test all first degree relatives of that patient to see if they also carry that familial variant and to give them some information about their risk of developing the disease.

Dr. Sharon Cresci (31:21):

What I'm trying to say there is if they do not carry the pathogenic variants, they have a very, very low, almost 0% chance of having that disease throughout their lifetime. However, the flip side of that is that if they do carry the pathogenic variant, they still may never get the disease. They still may never get hypertrophic cardiomyopathy. And so before we undertake genetic testing in any patient with hypertrophic cardiomyopathy, I typically have an extensive discussion with the patient and their family members and make sure that they understand the implications of the test and really decide on an individual basis whether they want to continue with genetic testing or not.

Dr. Abraham (32:06):

Thank you, Dr. Cresci. Dr. Zaha, any additional comments?

Dr. Vlad Zaha (32:10):

Yes. I have two points here in addition to what Dr. Cresci and Ms. Mayes presented. And they are really connected to what is the current approach and to the rate of increase in scientific knowledge about this disease, and then projecting out the possibility of genetic treatment at some point in the future based on the developing technology of genetic editing. And also considering the potential vulnerability of the patients that have a genetic diagnosis, where the hearts, while they do not present a complete phenotype of hypertrophic cardiomyopathy may be more vulnerable under circumstances such as pregnancy. So with this, I think we have a full appreciation of where the science has brought us today and also perspective for the patients that are diagnosed with genetic abnormalities for potential future benefit from this diagnosis.

Dr. Abraham (33:16):

Ms. Mayes, how was your interaction with the genetic evaluation? You want to give us some brief comments on what you had done and how you felt about that?

Gwen Mayes (33:26):

Yes, I'm more than happy to address it. Quite frankly, the option of genetic testing was not raised with me until I went to a center of excellence. So I was in my early 50s and certainly on speaking with the counselor, it was quite a sort of a breathless moment when we talked through my family history and the news that I was first told when I was of childbearing years is completely different now. And so that really left me with a big impression. I will say, and working with many other patients, I know particularly young women are extraordinarily and young parents are extraordinarily concerned about having children that they may pass this gene on to. I also know that for adults more, my age contemporaries, there can be discord in families if siblings don't want to be tested.

Gwen Mayes (34:24):

So in my case, I chose to be genetically tested. I have one sibling who refuses to be tested and that is not an uncommon experience, but I believe it's becoming less common, but it can create a lot of... in the sort of first degree relatives or even extended relatives, some tension that again, needs to be addressed by a genetic counselor or a mental health or somebody who can address the consequences to that.

Dr. Sharon Cresci (34:56):

If I can just follow up on that. As long as there is one person in the family, who would find that information useful, it's not really mandatory or even recommended that everyone in the family takes advantage of the genetic testing. So I try to support my patients and their family members, that it really is a personal decision and there should not be any real coercion or any guilt if you do not desire to have the genetic testing done. It's really a very personal decision. What we do recommend, and I'm sure you're aware of this as well. We recommend that if you do not undertake genetic testing and you are a first degree family member of someone with hypertrophic cardiomyopathy that you follow the guidelines and have clinical screening for hypertrophic cardiomyopathy because we would not want to miss that diagnosis.

Dr. Abraham (35:52):

Thank you all. Dr. Cresci, one follow-up comment if you could briefly address variants of unknown significance. How do you deal with them again? Just a brief comment for the folks out there who will probably see a fair number of genetic testing coming back with that statement. Thank you.

Dr. Sharon Cresci (36:10):

Sure. If we get a result back and it identifies a variant of unknown significance, what I tell my patients is that is exactly what it sounds. It's unknown significance. It has not met the criteria or the level of certainty to be put into the classification of pathogenic or likely pathogenic. And we do not currently act on that, meaning we do not test family members for that variant of unknown significance because we don't know whether or not it is causative for the disease. It may be reclassified in the future. And if it's reclassified to become a pathogenic or likely pathogenic variant, then we could in the future test family members for that variant, but we would not do so today.

Dr. Abraham (37:03):

Thank you Dr. Cresci. I'd like to end this podcast. First of all, thank you Ms. Mayes for your time and courage and sharing your story and helping us all learn from your great experiences. And many thanks to Dr. Cresci and Zaha for sharing your expertise and helping us all gain knowledge about HCM, as you all know, that's the most common inherited heart condition in the world. So I thank the American Heart for addressing this important topic. Thank you for all of you who are listening in. This was the American Heart Association's HCM initiative which is sponsored by MyoKardia. Based on this very informative discussion, I would exhort the clinicians, listening to this podcast to encourage your patients, to track your symptoms so they can be ready for their next visit. Also, they can go to the AHA's hypertrophic cardiomyopathy patient website for more information.