

Virginia Howard: Welcome to the American Heart Association, Getting to the Heart of Stroke podcast series. The title for this episode today is: Stroke in Younger Women. And I am Virginia Howard. I'm an epidemiologist from the School of Public Health at the University of Alabama at Birmingham. Let me first start with reviewing the learning objectives for this specific podcast for today.

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[00:01:00] One is we will introduce a little bit about the epidemiology on stroke in young women. We will discuss the workup for cervical artery dissection as a cause for stroke, and then we'll identify hypertension as one of the top modifiable risk factors for stroke as often undiagnosed, often undertreated. And we'll describe some barriers to a younger woman getting guideline based treatment for hypertension.

We are joined today by our distinguished colleagues, Dr. Eliza Miller and Dr. Fernando Triana, and I would like them to introduce themselves. Dr. Miller, why don't we start with you?

Dr. Eliza Mille...: Thank you so much, Dr. Howard. And again, my name is Eliza Miller and I'm an assistant professor of neurology at Columbia University and I'm a vascular neurologist and clinical researcher, and I study stroke in young women.

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Virginia Howard: Dr. Triana?

Dr. Fernando Tr...: Well, thank you very much. Thanks for the invitation. My name is Fernando Triana. I'm a cardiologist. I am based here in San Antonio. I am an interventional cardiologist, but these days I do much more of preventive cardiology and general cardiology. And I am the physician in chief for our healthcare system, the Methodist Healthcare System here in San Antonio.

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Virginia Howard: Thank you very much. I look forward to this discussion. Okay, so now I'm going to give a little introduction to the epidemiology of stroke in women. And we talked about what do we mean by young women? And a lot of the studies have reported less than 65 versus 65 and older, but then when you look at under age 65, we still need to break down further into women of childbearing reproductive age versus women who've gone through menopause. And so, that's something to consider as we're looking at stroke risk in young women.

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[00:03:00] Many of the traditional risk factors like hypertension, smoking and diabetes are similar across the different ages of women. But there's also some sex specific factors related to women of reproductive age, such as pregnancy related migraine, autoimmune diseases, preeclampsia and breastfeeding potentially being protective and different things like that that we need to consider. More women than men die of stroke each year because women live longer than men and women accounted for 56.5% of stroke deaths in 2020. In recent years, the overall decline in stroke incidents has stalled and in younger age groups, defined by less than 45, stroke increases at a faster rate in women than men.

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[00:04:00] So, we need to consider that stroke is not just a disease that affects older adults, but for stroke prevention really needs to be starting at younger ages. It's estimated that about 10% of ischemic strokes occur in young adults less than age 50, and these young stroke survivors, and women in particular, are living with significant lifelong consequences. So, just need to keep in mind that stroke has a differential impact on women compared to men because of their responsibilities in the household. And just to be thinking of the differences between men and women in the prevalence of the risk factor and also just the sex specific risk factors.

[00:04:30] So, let's continue with our discussions. And our first topic is spontaneous cervical artery dissection as a cause of stroke in a young woman. Dr. Miller, how common would you say this is?

[00:05:00] Dr. Eliza Mille...: Spontaneous cervical artery dissection, and so we mean carotid artery dissection and vertebral artery dissection, is not common. However, it is a common cause of stroke in young adults. And so because of that, it's something that I see actually really frequently and probably every time I have one of my stroke clinics, I see a patient, a young woman, who has had a cervical artery dissection and they can occur in lots of different settings. Now, the most common cause of dissection is typically a traumatic event. So for example, a car accident or a twisting of the neck of some kind, but they can just occur with no inciting event.

[00:05:30] I've had a patient where she was just sitting around watching TV and it happened suddenly then and we know that it happened then because she had the sudden onset of the neck pain, the headache, and then followed by actually having a stroke related to that. So the question of how common it is, it sort of depends what population you're looking at, and I think it's more common than we think. And I think it's also likely underdiagnosed. A lot of times it doesn't always result in a stroke. And so people might just think that they're having a neck spasm or a bad headache and they may not actually get the diagnosis.

[00:06:00] Virginia Howard: Well either Dr. Triana or Dr. Miller, what should the workup be then, especially if you mention it being underdiagnosed?

[00:06:30] Dr. Eliza Mille...: Sure. Well, so in terms of the diagnosis, anytime somebody presents with sudden onset of neck pain, headache or any stroke really, you're going to get vascular imaging of the head and neck and sometimes you find these dissections. And so, the first thing is really to take the history and figure out was there an inciting traumatic event. It's very important to consider that intimate partner violence can be a cause of a cervical artery dissection and one that a young woman may not be so comfortable saying right off the bat. So, it's something to keep in mind. But if you have ruled out any traumatic cause, and I ask all kinds of questions, I mean, I've had people who were parallel parking their car, I've had people who went to the hair salon, went to the chiropractor, any number of sudden neck movements.

[00:07:00] And so, if you've ruled out that kind of more traumatic cause, at that point I start thinking about more underlying connective tissue conditions or collagen vascular

[00:08:00] conditions that may be associated with spontaneous cervical artery dissection. And that's when I tend to actually get my cardiology friends involved, because what I have found is that sometimes when you go looking at their other vessels and the rest of their vasculature, you're going to find other signs that there's something else going on. So maybe Dr. Triana, you can speak to what type of workup you would do if I sent you a patient who has had a spontaneous cervical artery dissection.

[00:08:30] Dr. Fernando Tr...: Sure, and thanks for that introduction. That is exactly the case where I find myself often. And is the case of a young woman who has a stroke, who has been hospitalized, evaluated with imaging, and now there's a spontaneous dissection that has been found in the carotid vessels. And for some reason in my practice is more common in the vertebral circulation. I have seen many more vertebral spontaneous dissection than in other areas.

[00:09:00] So, the challenge for me as a cardiologist, and knowing that the endothelium covers everything from the head to the toes, is are we dealing with a condition that could predispose this patient for dissections or vascular events in other territories? So, the first thing that I do is a general assessment and see if there is anything that could indicate that the patient has as a hypermobility syndrome and the ability or the predisposition when I examine the patient to induce or have a spontaneous lobation of the interphalangeal joints, or the knee, or in some elements, the loss or accentuation of lordosis in the spine or curvatures tears in the spine. Those things tell me that probably the patient is in that just large group of hyper elasticity or hypermobility syndrome. And that the-

[00:09:30] Dr. Eliza Mille...: If I could just jump in a minute, I think I 100% agree with you and there are some questions that I typically ask when people come in with dissections. For example, are you very flexible? Do you do yoga? Is yoga easy for you? Were you a gymnast? I find a lot of people that have these hypermobility syndromes, they may end up, for example, being dancers or they tend to have these long limbs and be very, very flexible. So, these are questions that I typically ask. And also, I agree, just observing the patient and looking for other signs such as the sort of translucent quality of the skin as well, you can see. But I 100% agree, that's one of the first things we look for. And you can just see it right in your office. You don't have to get a lot of fancy tests.

[00:10:00] Dr. Fernando Tr...: Right. No, that is great. Now, the context is important, because if I'm able to document that, then I really have to focus on whether or not the patient may have the predisposition to have this vascular problems somewhere else. We call this SCAD in cardiology, a spontaneous coronary artery dissection, and it's also called SCAD in neurology, as a spontaneous cervical artery dissection. So, it's the same as SCAD in two different fields, but I worry about the possibility of these young patients developing chest pain and for many years they can go with a spontaneous dissection of coronary artery that are undiagnosed. And those two territories are key, because they have the potential to be life-threatening or produce long-term impairment.

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What do I do after that? I think that the education of the patient about the awareness that this chest pain in young women need to be evaluated a little bit harder with a little bit more caution in that context, is what is important. Directly related to the workup, I contribute very little, because by the time these patients come to me, to the many cardiologists, they have been thoroughly worked up. It is just providing context for future follow-up.

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Dr. Eliza Mille...: I also think I tend to look carefully at the renal arteries as well, because sometimes we see the condition called fibromuscular dysplasia, which is not exactly a hypermobility syndrome, but it's more of a fibrotic and non-inflammatory change in the blood vessels in multiple territories. And it can affect the cervical arteries, it can affect the renal arteries in such a way that they become stenotic and the person gets secondary hypertension. So, that's something that really needs to be looked at.

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But as far as the SCAD goes, I actually have seen patients who had spontaneous dissections in the coronaries, in the cervical arteries, in the iliac arteries, and even in the aorta. So, it's certainly something that you want to keep in mind that they're going to be at higher risk for these things. Now, is there a way to prevent it? That's another question, but certainly if the person has uncontrolled hypertension, that is going to add quite a bit to their risk. And so that's something to definitely keep an eye on.

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I also, personally, tend to keep these people on aspirin in perpetuity. So in general, for example, if someone has a car accident and a cervical artery dissection as a result of that, I will treat them with antithrombotic medication for a period of time, but eventually the dissection heals and I don't think that that person necessarily needs to be on an antiplatelet or anticoagulant for the rest of their life. However, if I'm going to find one of these other conditions or multiple dissections, I think that's a different story. I don't know how you feel about it, Dr. Triana?

Dr. Fernando Tr...:

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I agree with you and I'm so glad that you mentioned the renal territories, because sometimes we run into this situation where we have that dissections and then we have hypertension, and we may be oblivious to the fact that the renal vasculature then needs to be examined very specifically to see if renal vascular hypertension could be a contributing factor to this. No, I feel the same way as you do regarding the general approach-

Dr. Eliza Mille...:

Sorry to interrupt, but when you say it should be investigated very specifically, how do you do it? Because I am always kind of up in the air about what's the best way to do this and the most accurate way. What do you think?

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Dr. Fernando Tr...:

For renal vascular hypertension? Yes, typically I will do, first of all, see if I have a problem with hypertension. But if I have a woman typically younger than 40, although that group is very tricky, 40 to 60 is very tricky, but younger than 40 for sure, and they come with a cerebrovascular event and now the blood pressure is

[00:15:30] trending up, that is enough for me to go after the vascular territory. I typically do an ultrasound, and the sensitivity of the ultrasound is very low for dissections and for fibromuscular dysplasia. And if I don't have a clear diagnosis, I go to an MRA, excuse me, a renal MRA.

[00:16:00] The one thing I wanted to mention because you were very keen on bringing up the ability to dissect in other territories, is that for these patients to be educated about, and knowledgeable, and to have awareness of the process is so important, because in the coronary case, for example, I am very, very explicit with my patients about the fact that they do not need the stents. The treatment for a spontaneous coronary artery dissection is observation. We need to treat those patients medically. And if I make them aware of that, there is less likelihood that they may come back from a trip from out of town or somewhere with a stent because they had a problem somewhere else. So yeah, those are some of the things I think about when I see these patients.

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Dr. Eliza Mille...: One more question for you, Dr. Triana. Do you send these patients for genetic testing?

Dr. Fernando Tr...: I don't. I have sent very few of them, but the threshold for me for genetic testing is when I see that the aorta, the large vessels, have some level of compromise. And you mentioned it already, but if the aorta is trending up, in a young woman the aorta exceeds in the ascending thoracic level as little as 35 or 36 millimeters in diameter, or if I have any hint that the aorta is becoming irregular, then I send them for a full testing for all genetic markers of the Marfan and Marfan like syndromes.

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Dr. Eliza Mille...: I want to add in terms of the genetic syndromes we look for, it's those collagen vascular disorders including Vascular Ehlers-Danlos syndrome, which I've had several patients discover to have that mutation. So, I think for me, my threshold is a little bit lower to send them for genetic testing actually, if they've had a spontaneous dissection or a dissection in more than one territory. So, when I see someone who's had, for example, both vertebral arteries spontaneously dissect, which I've seen, then that person I'm going to send to my colleagues in medical genetics and do a pretty thorough workup.

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Virginia Howard: This has been a wonderful discussion and leads us well into the next topic about hypertension. And we have a case discussion to get us started. So, thinking about hypertension in a younger woman, perhaps in her 30s, and she has a history of preeclampsia with the severe preeclampsia about two years ago, and she was seen in primary care. She had been seen by an OB, a neurology clinic as well for migraine and noted to have blood pressure in her 140s and 90s, and she's not on any meds. And so there's a special things we could talk about here. So, why would we talk about this on a podcast about stroke?

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Dr. Fernando Tr...: Yeah, let me tackle that one because that comes more from my angle as a cardiologist. And as unusual that it is in my practice to see a patient with a

[00:19:00] spontaneous dissection, this is the completely opposite end of the spectrum. I'm seeing patients this morning, I will go from here to see patients, and I will see several today who will be young women with hypertension. And you describe a relatively straightforward case where there is a predisposing factor, preeclampsia, and the patient now has a blood pressure that has up-regulated and we see that every day.

[00:19:30] And to me, it's a public health emergency, nothing short of that. The fact that we get used to seeing women of all ages, but particularly this group, women under the age of 40, and in that borderline group 40 to 60, and that for some reason it is not really, really rational for me to understand it or I don't find a rational way to understand it, we tend to just be oblivious to the fact that the blood pressure of

[00:20:00] 135 or 140 in a young woman is not really normal and that we really need to aim for a lower level of blood pressure.

The one thing that I do is I educate my team and my colleagues in just the cross-pollination that we have constantly about the fact that the blood pressure of 140 in a young woman is much more dangerous than a blood pressure of 140 in a young man of the same age.

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Dr. Eliza Mille...: I'm so happy you said that. That is 100% true. And I see a lot of young women, for many different reasons, who have not had a stroke. And for example, if I'm seeing someone for migraine and they say, "Oh, my blood pressure is too low," and I say, "No, no, no, your blood pressure is normal. Your blood pressure is a 100 over 60, that is a normal blood pressure for a person your age, a young woman your age."

[00:21:00] But people are kind of scared of that. They don't see that as normal. And conversely, exactly what you're saying, this elevated blood pressure, doctors are seeing these patients and attributing it to anxiety, attributing it to pain. Say somebody comes into the emergency department with a very bad migraine and their blood pressure is 180 systolic, well, that's not okay. I mean, no migraine should make your blood pressure that high.

[00:21:30] And so, that's a real red flag for me. So, I'm just so happy to hear you say that. I think it really gets underdiagnosed, kind of attributed to other factors, especially anxiety. People get misdiagnosed with, quote, "Oh, I have white coat hypertension." I say, "Well, have you ever taken your blood pressure at home? So, how do you know it's white coat hypertension if you've never checked it anywhere but in a doctor's office?" And they're really not getting treated.

[00:22:00] And then the other thing I wanted to bring up, which may be you can address, Dr. Triana, is I think there's a hesitation to start younger women on antihypertensives because of the potential that they might get pregnant. And so, how do you handle that and what's your first line therapy for somebody if you are going to start them on antihypertensives and they say, "Well, I am planning a pregnancy in the next year or two."

Dr. Fernando Tr...: That is always a touchy and a very difficult situation. And by the way, it's a situation

[00:22:30] where we can never spend enough time with the patient. I'm very upfront and ask my patient, "Are you planning on having children?" And just, we're talking about the broad range 25 to 55, and are you planning on having children? And if the case is, "Yes, I am planning to do so." I said, "Well, the blood pressure is really going to be an issue, and my first choice of therapy will be a calcium blocker." So, I tend to go with a calcium blocker. I tend to favor in women who tell me that they're may be pregnant in the next year or so. I tend to go with a low dose Nifedipine and I pivot towards Cardizem, and I do it that way because every obstetrician, and everyone who will follow these patients, will feel more comfortable with the low dose Nifedipine.

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The alternative to these drugs are relatively limited, and the beta blockers are the second line of drug that I will use and in beta blockers will be Labetalol and just information is just very sparse. But I feel comfortable using Metoprolol and Propranolol in these patients as well. The use of diuretics is always welcome there, and if I am not achieving a rapid control of these patients, I'm quick to add a Thiazide and I'm always ready to pivot as soon as the patient tells me that she may be pregnant.

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So, this is a constant adjusting. This is not cruise control and I'll see you in one year. This is a constant adjustment and assessment of the fact that it is a decision that has to be discussed between the physician and the patient. So yeah, those are not a lot of tricks by the way, but rapid communication and just openness about the fact that it is a field that may change from month to month and typically quarter to quarter. What do you think, Dr. Miller?

Dr. Eliza Mille...:  
[00:25:00] I really think it sounds like you're a great doctor. I would love to send my patients to you, but they are in New York, not in Texas. But I want to come back to something that Dr. Howard said earlier, which was why are we talking about hypertension in a podcast about stroke? And a couple of things I want to mention, and one is that the impact of hypertension on stroke risk is different in women than in men. And the population attributable risk or basically the impact we can make on reducing stroke risk is greater in women than in men and especially in younger women. And when you're talking about pregnancy, if someone goes into a pregnancy with uncontrolled chronic hypertension, their risk of developing preeclampsia is really, really, really high. And the risk of having a stroke associated with that pregnancy either during the pregnancy or in the postpartum period is way higher if you have uncontrolled hypertension. And that's been shown in lots and lots of studies.

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[00:26:30] So, the fear of treating the hypertension is really misguided, because if anything, you are actually protecting both the woman and the fetus actually, because there are a lot of terrible fetal effects of somebody developing preeclampsia and other hypertensive disorders of pregnancy. And so, it's just incredibly important to have that blood pressure optimized going into a pregnancy. So, I do talk about that with my patients, and I talk about the stroke risk.

The other thing I talk about is just educating them, like you said, but about stroke

[00:27:00] signs and symptoms and about red flag features of headache, which can indicate that there's something going on that could be stroke related, especially in pregnancy, in the postpartum periods. And when I tell them, "Look, if you're home and it's the week after you gave birth and you get a terrible headache, even if you have a history of headaches, please take your blood pressure. And if it is elevated, even if it's just elevated for you, I want you to call your OB and talk to them about it."

[00:27:30] And chances are, this actually just happened to me the other day. I had a patient with a long history of headaches and I had seen her for headaches during the pregnancy, and then she gave birth, and then she went home and her blood pressure went up, and she called me because her headaches were much worse and different. And I said, "What's your blood pressure?" And she said, "Well, it's not that bad. It was like 149." And I'm like, "Ah!" I said, "Please call the OB." And she did. And then I looked the next day and she was admitted on a magnesium drip. So, [00:28:00] it's really, really important to really put that out there and make sure women realize that the blood pressure is critical to preventing terrible stroke complications both early on and then later on, like what you're seeing.

Dr. Fernando Tr...: Yeah, it's interesting because when I meet women with hypertension, I have to [00:28:30] convey to them a couple of messages in a very direct way and in a very kind way. The message is you are more vulnerable than males and that your male partner to have and that your male friends and that your coworkers who are males, you are more vulnerable to damage by hypertension than they are, because sometimes my patients tell me, "Well, but you are just too worried that, too anxious about this. [00:29:00] My blood pressure is only 140 and my husband's is 140, and his doctor is not saying all these things that you're saying." And these are not even women who are pregnant or who have been pregnant recently or delivered recently. So, just an average individual.

[00:29:30] And I tell them, "Yes, but you are more vulnerable. Please understand that. It's like you are more vulnerable to vascular problems if you have diabetes and with your counterpart males and you're more vulnerable, you have atrial fibrillation do more damage if you were to have a stroke. So, you just belong to that group that we have to take care of, because for some reason, a lot of studies indicate that you are more vulnerable for the same level of disease than your counterpart may have." So, I do my best to convey that in a way that is non-frightening or threatening just to bring the level of awareness of my female patients that they need to be at a [00:30:00] lower level for the right reasons.

Virginia Howard: Well, related question: what are some of the other barriers to these women actually getting guideline based treatment for their hypertension? You've talked about some of the individual, the patient level barriers, the education is a key part, but what are some other barriers to they're actually getting?

[00:30:30] Dr. Fernando Tr...: Yeah, I think that one of the, to me being very, very direct about this, to me, the largest barrier may be cultural. In the sense that we as a medical community, for



[00:31:00] some reason, have up-regulated our tolerance for hypertension in women. It just happens. And I think that the attribution of hypertension or elevated blood pressure to things like anxiety or a new environment happens quickly based on gender. And I think it's a terrible, terrible predisposition as healthcare workers to attribute the elevated blood pressure, the hypertension, to environmental factors.

[00:31:30] I think that we just need to just reset. And I do it every day and I said, "No, your blood pressure is here, but it's not that you're anxious. This is real." And we have to prove that. The way to overcome that in a very objective way is to have the measurements at home and to really educate the patient about how to check the blood pressure. And it takes five to six minutes. This is not a 30 second deal. And also, when I have difficulty walking the patient there and walking myself to there, then the 24-hour ambulatory pressure recordings that just provide a lot of data in terms of how aggressive it should be. I think that that is one of the greatest barriers in my practice. What do you think, Dr. Miller? What do you think is holding us back? Because I feel guilty as a practitioner that we're doing a bad job here.

Dr. Eliza Mille...: Well, you shouldn't feel guilty, because I don't think you're doing a bad job. You're doing a great job. But I think in addition to what you mentioned, which I 100% agree with, there are a lot of barriers just to a young woman getting to a primary care doctor. And a lot of young women are going to OB/GYNs for primary care, and OB/GYNs can do great primary care, but may not be as comfortable doing a hypertension workup, aggressively treating hypertension, and it's not as much a part of their training. So, I think a big part of this is to bring our OB/GYN colleagues into this conversation. And if they're not comfortable treating hypertension themselves, then have a doctor that they can refer to when they see this pattern of someone always being a bit elevated when they come in. And of course they know the OB history of the hypertension in pregnancy and all of that.

[00:33:30] And to have somebody that they can say, "I'd really like you to see my colleague in internal medicine or cardiology and kind of get a handle on your blood pressure, because I don't really feel that comfortable titrating blood pressure meds." It's not really part of their training in the primary care setting. So, I think that's a big part of it. And I think women are busy. We're busy. You're getting your kids to the doctor, you're working, you're juggling 50 different things, and getting yourself to the doctor is a hard thing to do. And for whatever reason, a lot of women are more likely to get themselves to the OB than to any other doctor.

[00:34:00] Virginia Howard: Thank you. This has been a great discussion. I really thank you both for sharing your experiences with us. I think we have time to, if you could, Dr. Miller, if there's one or two things that you would want people to remember from today's discussion, what would your key takeaway be?

Dr. Eliza Mille...: Yeah, we talked about a lot of stuff. I think the blood pressure is just where it's at. From my perspective, it's a measurement that it doesn't matter what your specialty is, it doesn't matter, you're going to be taking blood pressure on young women. If you ever see a young woman in your practice, whether you're a cardiologist, a

neurologist, an emergency room physician, an obstetrician, and to pay attention to that and investigate it if it's elevated, I think is really the key takeaway. The dissections are fun and interesting to talk about, but you're not going to see them as commonly if you're not a stroke neurologist or a cardiologist. But blood pressure applies to everyone. I don't know how you feel about that, Dr. Triana?

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Dr. Fernando Tr...: I agree. I think that common things are common, and to me, it's nothing short of a public health emergency, as many people have pointed out that we're treating hypertension poorly. But within that poor job, we're doing a particularly poor job with women and probably with the younger segment of women. And I tell my patients, know your numbers, know your numbers. It's more important than your social security number, it's more important than how much money you have in the checking account or in your savings, because this represents years of life, know your number, know what you're comfortable with in terms of being able to live a long life and don't settle for anything less than what is optimal.

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And I tell my younger patients that they're going to go through phases, of course, during the reproductive age that will set them for areas or periods of vulnerability. With every pregnancy come the development of a placenta and the potential elements that are associated with all these theories that the blood pressure begins to fluctuate up and down after pregnancies, and that there is a segment of women that will have difficulty controlling that blood pressure afterwards. So, I think that the high level of awareness, know your numbers, and don't settle for anything less than optimal.

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Virginia Howard: Thank you. Hypertension is one of the key factors for prevention and management, for sure. We thank you for your time today. HCA Healthcare and the HCA Healthcare Foundation are national sponsors of Getting to the Heart of Stroke. The views and opinion in this activity are those of the speakers and reflect the synthesis of the science. The content should not be considered as the official policy of the AHA. So, to get additional information, please visit [learn.heart.org](http://learn.heart.org).

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