Treatment of Hypertension: Lifestyle and pharmacologic approaches

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DR. GEORGE BAKRIS: Hello, I'm Dr. George Bakris, Professor of Medicine and Director of the American Heart Association, Comprehensive Hypertension Center at the University of Chicago Medicine. Today I want to talk to you about treatment of hypertension, focusing on lifestyle and the pharmacologic approaches. I want you to embrace this concept like physical guidelines designed to ensure that hikers stay on the safest path through tricky terrain. Expert medical guidelines aim to steer clinicians towards the best practice. I don't know if you've ever heard that but that's really what guidelines were all about.

Let's start off with kind of a review. This is the evolution of the JNC Guidelines. And so you can go back to JNC-1 where you were considering therapy for diastolic pressure when you were at a 105 and you started treating at 105. And now we've got people who want to be below 80. You can see the evolution over the last few decades as to where we've come in. Systolic pressure is no different except that there were no guidance given in JNC-1 and JNC-2. And then all of a sudden in JNC-3, if you had a blood pressure of 140, you were borderline. You're labeled with a psychiatric diagnosis of borderline personality if you are 140. Obviously they got rid of that and you can see again that things progressed and now everybody wants to be below 130. I think you can see as we learn more and got more data about epidemiology and cardiovascular risks, kidney disease, things change. And that's what these are reflecting. That's why I'm showing you the evolution of applying knowledge to guidelines.

If we look at the old JNCs, those are gone. But I wanted to show you these are all the societies that had input into those guidelines. And now we have the AHA/ACC which pretty much is nowhere near as reversed in terms of input and it focusses on cardiovascular risk. And basically it says for adults with confirmed hypertension and greater than a 10%, 10-year risk for CVD, you want a blood pressure of less than 130/80. Now I have to tell you, most of the trials had greater than 15-year of a 15% risk, but nevertheless that's what the guidance says. And you can see here that it gets a grade 1B which is pretty good. Now there are a number of modifiable risk factors and you all know this, cigarette smoking, diabetes, I'm not going to bore you with that. You know what it is. They're listed there. And then there's other risk factors that you can't change. And so I think keeping this in mind and I know most of you are lecturing the patients on this but it is important that they understand that these can make a major difference.

Now, there is the ASCVD risk calculator. This has not got some issues because there's been some updates on this. But up until basically a few months ago, this is what was used to calculate. This is the patient's risk. And actually you can plug in what you're going to do. It actually shows you how you're going to reduce the risk, so important observation.

Now that's the background. It is critically important that you measure blood pressure correctly. What I see, as the patient walks in, you got the shirt on, the jacket, cuff gets put on over that, they get a number, then you're done. That is not an accurate blood pressure and it is an incorrect way to measure it. So here's a checklist. You have to make sure that the patient comes in and they maybe late for the appointment, I'm sorry, they

need to sit in a quiet area for at least five minutes. The shirt has to come off, the cuff goes around the arm, properly fitting cuff, so it's good to measure it. And then after five minutes you measure three blood pressures, one minute apart. And then you exclude the first one and average the next two. That is a proper blood pressure and you will pick up a lot of white coat hypertension if you do it that way, very important. That's what's been done in the trials. That's what's recommended. And I'm giving you some shortcuts because it's more detailed in that. But if you do at least that, it's better than what's going on right now.

This is just to give you an idea of how to measure arm circumference. If the cuff is too small, you're going to get a false high reading. If the cuff is too big, you're going to get a falsely low reading, again very important to keep this in line. Of course blood pressure monitoring out of office, patients need to go home and check their blood pressure and report back. You need to teach them how to measure their blood pressure at home, the level of evidence 1A, very, very important.

Now this is an algorithm that is in the guideline in terms of detection of white coat hypertension and masked hypertension. Masked hypertension, the truth is unless you have a patient that is highly vigilant, it's going to be very difficult to check masked hypertension unless you so it a 24-hour ambulatory monitoring. If you don't have access to that, then you need to give the patient instructions to measure the blood pressure while they're at work and see if it's elevated substantially. Because a lot of people don't do that and you'll find especially with I call left brain jobs. These are jobs like an accountant, stock worker, person working in the stock market, analytical jobs. Those people are highly likely to have masked hypertension and they really should have it checked.

Now ABPM and home blood pressures. Home blood pressures if you educate the patient, they're for everybody. No question about it. If you look at ambulatory blood pressure monitoring, those are for subsets of patients that you really want to identify things like masked hypertension, perhaps white coat hypertension. People that are not sleeping well, those kinds of things will be picked up in ambulatory blood pressure monitoring. And you can also pick up salt sensitivity. Patients will inadvertently have high salt meal. You'll see the pressure go up. You show it to them, they're believer. If you have access to it, it's quite powerful.

Now these are the categories of blood pressures. I'm just showing you this. I know you all know this. This is just to remind you. This is looking at the prevalence and awareness of treatment. This is going back from 1988 through 2008 when this was done. And you can see that the percentage of people look at the bottom panel, the percentage of people controlled has increased regardless of whether you're a man or a woman and regardless if you're African American or Hispanic. Although the African American/Hispanic groups are not as good as the White group but they're improving anyway.

Here you have different stages of hypertension that were put together after the 2017 guideline. And you can see here that the percentages are all pretty much the same in the last let's say 10 years. It really changed very much.

Now there's a laundry list of non-pharmacologic interventions and most physicians don't spend a lot of time with this. I think it's very important that the patient understand things. Patients get referred to me. I ask them do you know about low salt diets? Yeah, I don't use it. No, inappropriate. The patient has to know that they need to be in a 2000 mg sodium diet. They need to know how to read the labels. If you don't have time for it, they need to go to a dietician. The most common cause of poor blood pressure control in this country is poor salt intake, meaning excessive salt intake. And most patients really don't know how to read labels and they don't know how to monitor their salt and don't understand the impact.

Now I have the luxury of talking to the patients about this. If you don't, that's okay, have a dietician do it. But this is very important. This table that you see in front of you, I put together for the JNC-7 and it still used today, has been expanded a bit, but I think it does have all the vital information that you need. Now you can give it to the patient. If they're educated they can read through and ask questions. But most patients are not. So you really do need to walk them through this.

Now if you look at this in terms of thresholds, again this is the recommendation per the guidelines. And the key is, is your cardiovascular risk high? Alright. If you've got somebody that does not have a high cardiovascular risk and their blood pressure is 135, non-pharmacologic treatment, you don't just slap them on a drug. If they have high cardiovascular risk, then you should at least start with monotherapy and lifestyle. That's the important point. And the recommendation here of course is 1A. And in fact when you look at initial medication choices, one of the things that has been in the literature since 2003, actually 1997 but definitely 2003, combination therapy as initial therapy. And it's with us in 2017.

If the patient comes in and the blood pressure is 20 over 10 above the goal, the goal being 130, if they are 150/90, starting monotherapy is probably not going to get you there and there are a number of medications, there's single pill combinations of low doses of a CCB or diuretic with an ACE inhibitor or an ARB, and if you give them, you have an excellent chance of getting blood pressure control. And if they actually go on a low salt diet, then you have an even better chance. Then you can even back off and patients love it when you back off because then they think not only you're good but they're doing something, so it's very important to understand that these drugs are around the European Guidelines that made this first-line. You have to use combination therapy. And no, the argument about side effects, every anything falls apart, this is excellent data that when you combine the two, actually side effects go down, so sorry about that.

In fact, speaking of the European Guidelines, here they are, alive and well and this is directly from the guidelines. They were published pretty much at the same time as the American Guidelines. And you can see here what the recommendation is in terms of combination therapy as first-line. And the reason for that is poor adherence, poor adherence to monotherapy or if you're going to start giving two pills. You're better off with a single pill.

Here we have recommendations for African Americans. In terms of initial therapies, dithiazide diuretics and CCBs, general rule, older patients, those over 65, African

Americans, dithiazide diuretics or CCBs. If you're going to use monotherapy, those are the agents to use because they're going to be the most efficacious for lowering blood pressure. Combine them with an ACE inhibitor, that's fine. But that's really where you want to be.

Now if we look at kidney disease, the blood pressure goal there is no different than the general population, less than 130/80. But it's vitally important to measure albuminuria. If you don't measure albuminuria first of all, you don't really know what stage of kidney disease the patient has. GFR's half the diagnosis, so you don't want anybody accusing you of doing half ass diagnosis. You need both spike albumin and creatinine and the GFR.

Number two, if you have diabetes or diabetic kidney disease, you must be on an ACE inhibitor but maximally tolerated doses, not five of lisinopril, not 25 of losartan, you need to be on maximally tolerated doses. And then if you have more than 300 mg of albuminuria, you probably should be on SGLT2. But you need to measure albuminuria. That's very critical. And if your blood pressure is greater than 300, you have to be below 130 if you want to slow kidney disease progression.

Now these are guideline statements about diabetes. And I will tell you that the ADA is saying very pretty much the same thing, less than 130/80, level 1B evidence. And if you want any antihypertensive agents are effective, clearly it's there, ACEs and ARBs I already told you about this.

Now there is a lot of controversy when this came out and this has kind of died down now. Because there are a lot of controversy that there was huge differences between the diabetes guidelines and the ACC/AHA guidelines. And I was going to think of this since I was writing the ADA guidelines, it turns out that if you really look at this and you come right down here, in terms of needing treatment above goal, there's a 96% agreement. And even here, defining hypertension, there's about a 90% agreement. It's really the recommendation for treatment and when you give it that was different. That's pretty much it. There is no difference in the types of medications. There was no difference in the blood pressure goals. There's none of that. I think one needs to be aware of. In fact, here, you're talking about older people, bottom line less than 130 if you can get them.

Now the European Guidelines are a little different and I think it's important for you to have this as a perspective. You can see by age here on the far left, they have the different categories and then they have the different diseases. If you have hypertension by itself, hypertension-diabetes, hypertension-kidney disease, hypertension-coronary disease, and off you go. Notice the diastolic pressures, they want at 70. They don't want them below that. It turns out that's very conservative. And it turns out that actually you can have diastolic in the 60s and be okay. But I'm just showing you what the European Guidelines set. But here across the board, they're making a big deal out of not getting the pressure too low, which I think is appropriate. And they're all pretty much in agreement of 130-139. I just wanted to say, there's more kumbaya going on here than there is disagreement.

Now if we actually want to take a look at the European Guidelines and the American Guidelines, here you go. There's more and this is on home blood pressure in the American

Guidelines. The European Guidelines want home blood pressure too but it's more for confirmatory reasons and they're not using it in the same way the Americans are. Single pill combos are listed in the ACC/AHA Guidelines but they're mandatory in the European Guidelines as initial therapy. There's more attention to detail on blood pressure measurement in the ACC/AHA Guidelines. And there's attention given here too. It's really they're pretty similar. Focus on improving adherence. They talk about this in the American Guidelines as being a problem and we really need to improve it. And here, they're talking about detecting poor adherence and they have the various techniques that they suggested that physicians can use to detect poor adherence.

Those are the similarities. What are the differences? Well, there's no specific focus in the European Guidelines about a 10-year risk. There's no specific attention given to prevention. It's more focused on treatment. There's much less attention given to specific ethnic groups than racial groups. They retain the definition of greater than 140/90 and encourage patients discussion and education to get it at less than 130/80. There's a little bit of a difference. And again you can use your judgment depending on which guideline you want to follow. And again there are limitations and they don't want the blood pressure below 120/70. That's what it is.

Now this is a flow chart that is published and what this represents is if you want to be pristine with the guidelines, follow the guidelines to the latter. You need to do everything that is on this list. And we've discussed everything on this list. But I just wanted to let you know that we didn't talk about evaluating for secondary hypertension. Primary hyperaldosteronism is by far the most common secondary cause, much more common than you think and you didn't even think about it, not everybody has to have hypokalemia. You can have potassium of 3.9 or 3.8, you can still have this. You need to be aware. But all the other things here are very important and need to be addressed. Hypertension is not as simple as a lot of people think and you don't just slap the cuff on. There's an art to doing this and doing it well. And that's what this slide really represents.

DR. BAKRIS: Now let's talk about how you put combinations together because this is also important. The three classes of antihypertensive medications that need to be used are diuretics, ACEs or ARBs and calcium antagonist. You can mix and match diuretics with ACEs or ARBs, calcium antagonist with ACEs or ARBs. Those are single pill combinations that already exist. But this is what the guidelines are telling you. Notice beta blockers are missing. There's a reason for that. They are not really indicated for blood pressure reduction. They will reduce blood pressure but they're not ideal agents and one of these three needs to be what you're going to start with or combine with another, very important.

Now just to let you know, in case you're still in the monotherapy camp, this is a summary of clinical trials. And these clinical trials have the blood pressures listed to what you can see there. And they also have the number of anti-hypertensives. I will tell you that there are an average of 2.6 anti-hypertensives needed in these trials. Monotherapy with two pills really goes a long way because patients do pay attention to build count, so that's a big deal. Again when you think combo therapy, it's a good way to go. And I think if we do

this, you're going to be more likely to achieve blood pressure goals. At least that's what the data from European would say.

Now here's more evidence to support using combinations. This is a study that was done back in 2009. And what they did is they took the different classes of anti-hypertensives and they asked the question, what is the likelihood we'll get the blood pressure goal by doubling the dose or adding a second drug at a lowered dosing keeping the first drug at a lower dose. You can see across the board here, it didn't matter if you added a second drug at its initial dose to the drug already existing. You across the board got blood pressure goal. Doubling the dose did not get you the blood pressure goal and you had more side effects, so just keep that in mind.

There is a document published by The American Society of Hypertension, this is back in 2011 that goes through in great detail all of the evidence for combinations, which combinations work, which ones don't. This is an easy summary for you. We said preferred because these are agents that have evidence based behind them. Some have outcome trials and they're all endorsed by the FDA. These are combos that are really important and can be used. There's acceptable combinations that have been used but again there's no trial data or anything. But if you use the combinations, they will lower pressure. And then we have less effective and I kind of put them out. But it's important to understand, I see a lot of patients especially referred from cardiologists on an ARB or an ACE with a beta blocker. There is a zero additivity for blood pressure. Now if they're on for heart failure, totally different story. But for blood pressure, there's totally no effect and there's published data on this, so very important. Also clonidine with a beta blocker, zero additivity for blood pressure and huge increase in side effects, so not something you want to use.

The adherence issue is a big issue. I just want to quickly point this out to you. There's two studies that were published a number of years ago. And the important here is one study actually told the patients they were measuring their urine for metabolized, the other one did not and they just did. Both studies showed 45% adherence with blood pressure lowering meds. It didn't matter if they knew you were measuring or not, 45% adherence. This is a big problem and it needs to be sorted out.

I want to talk to you a little bit about sleep. No, not sleep apnea. Sleep apnea if you treat it, it will give you some blood pressure help. You'll get about 1 mm/hr of being on the machine. But maximum, you'll get 7 mmHg reduction in blood pressure, nothing thread home about. In some they only have a hand is a big deal, affects cardiovascular risk as well as blood pressure. This is a very nice review that really highlights this. Basically the magic number is five hours. But you'll see in a minute that it may not be five. It may be a different number. But five hours for sure, you're in trouble. And not only is your pressure going to go up but you do have increased cardiovascular risk.

This is data from the Nurses Health Study. This data is actually very important. Now look at this. They used the eight hours as the base. If you sleep 7 hours, your risk of having a cardiovascular event, this is 71,000 people went up 6%. If you sleep six hours, it's 30%. And look at this, if you go five hours, it almost doubles. This is a 10-year follow up of coronary heart disease. you really need to be getting a minimum of six hours, ideally

seven hours. And you need to get this history from the patient and you need to be able to use drugs like trazodone or Ambien or even send them to a sleep specialist, not somebody that does a CPAP because that will be a pulmonary doctor but an actual sleep specialist, usually neurologist to help them with this.

Now I just want to show you, there's a pilot study that we did. But I just want to show you the power of restoring sleep. Now this is in people with advanced kidney disease. And you can see the blood pressures here that are in the 150s. And you can see that their GFR is 43. You can see that most of them are getting between four to six hours of sleep or less than four. This is a big deal. We work with them and these are the blood pressures that this is mean arterial pressure that I'm showing you here. But you can see that after about three months of restoring sleep and maintaining it, their blood pressures drop nicely. And in many cases, we were able to either stop or reduce by 50% the number of many hypertensive medications here. This is a very big deal. Just to give you an idea of the real numbers where they ended up, you can see. Just so you know, the one on the left is home blood pressure. The one on the right is office blood pressure.

There are resistant hypertension guidelines. It's really a consensus report but it really does serve as kind of a guideline. And we took, what you're looking at here is the flow sheet of how you can assess resistant hypertension. The definition of which is of course you're on maximally tolerated doses of three complimentary mechanistic drugs. One of which is a diuretic and your blood pressure is still above 130/80. You can see here the algorithm that goes through this. I'm actually very proud of this. I was honored to be a member of this committee. But I will tell you, it was a who's who of experts unlike the usual thing. It's a who's who of experts in this specific area. We put this together based on what we do with very good evidence. Just keep this in mind. I did this, I mean accidentally on the last page, that's your last resort. Not hydralazine but minoxidil. I'm going to finish with that. I want to thank you for joining me for this and I look forward to talking to you on other sections. Thank you very much.