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Hypertension: Am I Receiving Excellent Care? Part I – Blood Pressure Numbers; Are they Real?

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Your Life Your Health

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How can you know whether you are receiving excellent care for your high blood pressure (Hypertension)? First, you must consider what the numbers of your blood pressure reading mean. The top number is your “systolic” pressure. This is the pressure which is created by the beat (the contracting) of your heart. This should represent the highest pressure experienced by your arteries and heart. The bottom number is your “diastolic” pressure. This is the pressure which is sustained in your arteries when your heart is in the relaxation phase.

Typically, elevated blood pressure will affect both the systolic and the diastolic pressure but there are conditions where one or the other is affected more. And, in the elderly, there is an important condition called “isolated systolic hypertension” where the top number is high and the bottom number is normal. This is an important condition and one which must be properly treated to avoid strokes.

Albert Einstein said, “All things are not measurable and all things which are measurable are not worth being measured.” As a society, we are so trusting of numbers; we forget that the mere presentation of a numerical value for “something” does not mean that the number is valid, real, or reflective of something which is valuable to know. No where in medicine is this truer than with the blood pressure reading. Why?

A blood pressure of 150/100 is a numerical value, which may or may not be real; the assessment that the person with that blood pressure has hypertension is a judgment which may or not be correct. This is true for several reasons:

1. The normal response in a healthy person to certain stimuli is for the blood pressure to go up. This is normal and does not represent a disease process. If the blood pressure is taken at the time the stimulus is being experienced and because the blood pressure is elevated, the judgment is made and recorded that the patient has hypertension, the invalid conclusion takes on a life of its own.

It is not your blood pressure at one specific point in time which is important to your health. It is your daily “blood pressure load” which is a function of your average blood pressure over the entire day. This concept is so important that normal human physiology was designed for there to be a “dip” – a normal and natural temporary lowering – in the blood pressure during the early morning hours. This “dip” helps protect the heart and arteries from the adverse effects of blood pressure. Patients who have this normal physiological drop in blood pressure are called “dippers,” and those who do not are called “non-dippers

What we really are trying to obtain in measuring the blood pressure is an accurate and valid approximation of the “mean arterial pressure” inside of the artery. This can be measured directly by putting a special catheter into the artery and obtaining the value. However, in a routine office visit, no one wants to go through the ordeal of having a painful arterial puncture to get their blood pressure reading. Thus, we use a blood pressure cuff to approximate the pressure inside the artery both when the heart is contracting (systole) and when it is relaxing (diastole). Sometime one of the stimuli for raising the blood pressure is trying to pronounce the technical name for a blood pressure cuff which is “sphygmomanometer.”

2. All phenomena which are reflected in numbers have a method required to determine if the number reflects something real or not, but few numbers have as many variables as blood pressure. One presentation of the “correct method” of obtaining a blood pressure reading which is correct and valid ran to over 13,000 words. This article is about 1800 words. Knowing whether your blood pressure is being taken correctly is not an unimportant aspect of determining if you are receiving excellent care of hypertension

Blood Pressure Cuff size

If the blood pressure cuff is too small, your blood pressure will appear to be higher than it really is. If the blood pressure cuff is too large, your blood pressure will appear to be lower than it really is.

Acceptable Bladder Dimensions for Arms of Different Sizes

Cuff	Arm Circumference Range at Midpoint (cm)	Arm Circumference Range at Midpoint (inches)
Adult	27-34 cm	up to 13.38 inches
Large Adult	35-44 cm	13.7 inches to 17.3 inches
Adult thigh Cuff	45-52 cm	17.7 inches to 20.4 inches

One classic study on the importance of correct cuffing was Maxwell et al (1982). This study examined obese people already diagnosed with hypertension, and then re-took their blood pressure with the correct cuff for their arm circumference. They found that 37% -- more than ONE THIRD! -- of obese hypertensives were incorrectly diagnosed and actually had normal blood pressure.

Graves (2001) reviews research from other studies on "miscuffing" and the errors it leads to. He cites research that showed that in large patients (Body Mass Index >34), "Subjects were 2.2 times more likely to be classified as hypertensive and 1.4 times more likely to be classified as borderline hypertensive when the standard cuff was used to measure

blood pressure compared with when the classification was based on the more appropriately sized large adult or thigh cuff."

Sprafka (1991) found that blood pressure cuff sizes made a significant difference in the prevalence of hypertension, even among people who were marginally large and whose arm circumferences were right around the cuff cutoff of about 13 inches. They found that "Using a cuff one size smaller than appropriate resulted in...[an overestimation of the prevalence of hypertension of] approximately 36%." Even if your arm is not very heavy and is borderline for needing a larger cuff, having the correct cuff makes a difference!

Where you are sitting

Amazingly, your blood pressure will be higher, or lower depending on where you are sitting when your blood pressure is taken. If you are sitting on the examination table, your blood pressure will be higher than if you are sitting in a chair with a back support.

To take a person's blood pressure accurately, the patient should be:

- Seated with legs supported (no dangling legs from sitting on the edge of an exam table!)
- Seated with back supported (again, sitting on the exam table is not good technique)
- Seated with legs uncrossed (legs should be uncrossed at both the knees and the ankles)
- Seated without the arms resting on the armrests of the chair (the nurse should support the arm for you to the correct height)

The person taking the blood pressure should:

- Support the arm of the patient at about the level of the heart (an unsupported arm or one that is too low or too high changes BP readings)
- Not talk to the patient or let the patient talk (many nurses talk to the patient to relax them but this has been shown to raise BP)
- Check the blood pressure device to be sure it is properly calibrated (it should read exactly zero before beginning and should be calibrated frequently, a procedure which is often neglected in offices)
- Not pump the blood pressure cuff up too high at the beginning of the measurement (pumping the cuff too high also raises blood pressure)
- Not take the blood pressure over your clothes (the blood pressure cuff should not be placed over your sleeves)

According to the American Heart Association Committee that reviewed the current blood pressure guidelines, taking a person's blood pressure when seated on the exam table with no back support can raise blood pressure by 10 points. Not an earth-shaking amount, but one that can buy a lot of intervention if your blood pressure is borderline already.

Similarly, Terent and Breig-Asberg (1994) found that taking the blood pressure with the arm at the side of the chest instead of supported at the level of the heart raised blood pressure by about 10 points as well. This is the average difference and that some differences may actually be quite a bit greater than 10 points.

Netea et al. (1999) found that the common practice of having the patient rest her arms on the arm-rests of the chair also resulted in falsely elevated blood pressure values. Along with sitting with legs dangling and no back support, taking blood pressure with arms at the wrong level is probably one of the most common technique errors found.

Taking blood pressure over a person's clothes is also improper technique. You can help by wearing clothes to your appointments that have sleeves that are short and loose or are easy to push up. If this is not possible, you can insist on taking your arm out of your sleeve before the blood pressure reading. It can make a difference.

Finally, the nurse should not pump the blood pressure cuff up too high at the beginning of the blood pressure measurement; because this can result in what Kugler (1994) termed "cuff inflation hypertension." This can be a problem for plus-sized women, because medical personnel often assume that all heavy people have high blood pressure and accordingly pump the cuff up quite high at the start.

Exercise raises the blood pressure

The mean arterial blood pressure is a function of your heart rate (how fast your heart is beating), your blood volume (how much fluid is in your artery), the "tone" and the "elasticity" of your arteries. "Elasticity" refers to whether your arteries have a normal ability to relax and stretch or whether due to age or illness they have become stiffer. The "tone," the ability of your arteries to relax and expand, thus lowering or raising your blood pressure, also affected by various metabolic conditions in the body which can cause your arteries to constrict or relax. The constriction of your arteries will raise your blood pressure. If that constriction is chronic due to inflammation, smoking, obesity, insulin resistance and many other causes, it can contribute to heart disease and to strokes.

If your blood pressure is taken when you first walk into your healthcare provider's office, your heart rate may be slightly or significantly elevated. This will make your blood pressure go up. That is why the first standard of excellence in the care of your blood pressure is that if your blood pressure is elevated upon the first reading, it must be repeated after an 8-10 minutes period of sitting quietly. If your treatment is based on the first and the only blood pressure reading you will be over treated as your blood pressure will almost always come down after sitting quietly.

If your healthcare provider does not routinely repeat your blood pressure after such an interval, you should ask that it be done.

Hypertension is called "the silent killer," because it like many other conditions causes no pain or discomfort until its consequences causes a major disaster. If you have

hypertension, it should be treated; but, it is imperative that the blood pressure be taken properly, with the proper instruments, in the proper setting so that you can have confidence in the number which is being treated.

Remember, it is your life and it is your health.