Research Article

A practical way of measuring blood pressure accurately

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Abstract

The goal of modern medicine is no longer merely treatment of the sickness but prevention of the disease; promotion of good health and improvement of the quality of life. The dichotomy of medicine into two branches i.e. curative medicine and preventive medicine has moved towards a more rational and scientific approach towards disease. The rule of halves indicates that hypertension is an "Iceberg" disease. Only half of the hypertensive subjects were aware of their condition, and only half of those aware were being treated, and only half of those being treated were considered adequately treated. Recent reports have provided a new guideline in the NHBPEP and a new category designated as prehypertension (SBP 120 to 139 and DBP 80 to 89 mmHg) has evolved. Diabetic subjects are at an increased risk of cardiovascular disease (CVD).According to JNC 7 for individuals aged (40 to 70 years) every 20 mm increment of systolic BP and each 10 mm increment of diastolic BP doubles the risk of CVD. Common target organ damages are: 1) Heart- Left ventricular hypertrophy, Angina and myocardial infarction, Heart failure 2) Brain- Stroke and TIA. 3) Kidneys- Chronic renal disease. 4) Eyes- Retinopathy. 5) Vessels- Peripheral arterial disease.

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INTRODUCTION

Hypertension is one of the most common chronic conditions dealt by a primary health practitioner. It may look very easy to diagnose hypertension but these are very small key factors which influence the blood pressure measurement. Accurate blood pressure helps us not only to categorise a person and proper management of hypertension but also determine morbidity and mortality risks associated with blood pressure. Most commonly used are the standard mercury sphygmomanometer and the aneroid sphygmomanometer and their accuracy should be counter checked. The size of the cuff used for a designated arm surface is also to be considered. Under cuffing (a small sized cuff) overestimates the blood pressure. (range error 3.2 /2.4 to 12 / 8 mmHg and up to 30 mmHg in obesity). Over cuffing (a large sized cuff) leaves to underestimation of blood pressure. (range error 10 – 30 mmHg. Incorrect blood pressure reading owing to miss cuffing would leave to misdiagnosis of hypertension. Under cuffing is more common practical problem. The ideal cuff should have a bladder length i.e. 80 % and a width that is at least 40 % of the arm circumference. (Length to width ratio 2 : 1).The British Hypertension Society (BHS) and the American Diabetic Association (ADA) recommend different cuff sizes depending on the arm surfaces.

RESULTS

Table 1: Cuff type according to British Hypertensive Society

	Maximum circumference	Bladder circumference
Small children	17 cm	4 x 13 cms
Children and lean adults	26 cm	10 x 18 cms
Adults (Most adults)	33 cm	12 x 26 cms
Obese	50 cm	12 x 40 cms

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Table 2: ADA. Recomended dimensions of blood pressure cuff / bladder sizes

Cuff size	Arm cuffing	Cuff size
Small adults	22 to 26 cm	12 x 22 cms
Adult	27 to 34 cm	16 x 30 cms
Large adult	38 to 44 cm	16 x 36 cms
Adult thigh	45 to 52 cm	16 x 42 cms

DISCUSSION

Cuff mismatch formula is 32 – (1.05 x arm circumference) if +ve, add to SBP / if –ve, substance from SBP. Blood pressure is normally measured at the upper arm but clinicians consider forearm as an alternates site for BP measurement, If a proper sized cuff is used. Alternative methods of measuring the radial artery pressure are: 1. Listening for Korotk off sound over the radial artery. 2. detecting systolic pressure with a doppler probe. 3. Using an oscillometric device, these methods determine systolic blood pressure but overestimates diastolic blood pressure. ADA provides some standard guidelines for measuring blood pressure:

1. Ensure that the subject is seated comfortably with back support, legs uncrossed and the upper arm is baned without clothing.
2. The arm should be at the level of the heart.
3. An appropriate cuff size that encircles 80 % of the arm circumference.
4. The mercury should be deflated @ 2 – 3 mm/s.
5. The first and the last audible sounds should be considered a systolic and diastolic blood pressure.
6. The column should be read to the nearest 2 mmHg.
7. Talking is prohibited on either side while measuring BP.

SUMMARY

Measuring blood pressure is as challenging as simple as it may seen, as it requires certain adoptions from the standard techniques. Although various techniques have been presented, no single method has evolved as standard for measuring BP. Miscuffing may lead to incorrect measurements, unnecessary investigation misdiagnosis and treatment. AHA and BHS have thus provided standard guidelines to reduce error. Though some clinicians use forearm to measure if a correct cuff size is not available; it is not recommended in obese patients. Further technical innovation and research is warranted in finding a better method of measuring BP; especially in obese patients. Till then its better for stick to the ADA and BHS guideline.

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