Technique of Blood Pressure Measurement

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Introduction

Proper measurement and interpretation of the blood pressure (BP) is essential in the diagnosis and management of hypertension. However, observational studies suggest that most of the doctors do not follow the correct technique of BP measurement, leading to potential errors in diagnosis and management of hypertension [1,2]. It was seen that among medical students who had completed a course on how to properly measure the BP, only 5% adhered to course guidelines one year later [2].

Technique of Measurement

Patient conditions :

BP should be recorded in a quiet, warm setting. Sitting pressures are recommended for routine follow-up, the patient should sit quietly with the back supported for five minutes and the arm supported at the level of heart. The patient should not take any caffeine or exogenous adrenergic stimulants during the hour preceding the reading and no smoking during the preceding 30 minutes. If possible, the BP should be measured 30-60 minutes before antihypertensive drugs are taken, to estimate trough or nadir effect.

Equipment :

Mercury sphygmomanometers provide the most accurate measurement of BP. Use of proper-sized cuff is essential, the bladder should encircle and cover two-third of the length of the arm; if not, place the bladder over the brachial artery to prevent high readings from bladder that is too small.

Number of readings :

Take at least two readings on each visit, separated by as much time as possible, if readings vary by more than 5mmHg, take additional readings until two consecutive readings are close. For diagnosis of hypertension, take three readings at least one week apart. Initially, take BP in both arms, if pressure differs, use the higher reading arm. In young patients, if arm pressure is elevated, take the pressure in leg also.

Technique :

When the BP is taken, the cuff should be inflated to a pressure approximately 30 mmHg greater than systolic, as estimated from the disappearance of the pulse in the brachial artery by palpation. Initial estimation of the systolic pressure by palpation avoids potential problems with an auscultatory gap. Korotkoff sounds transiently disappear as the cuff is deflated. Once the cuff is adequately inflated, the following steps should be followed :

The stethoscope should be placed lightly over the brachial artery, since the use of excessive pressure can increase turbulence and delay the disappearance of sound. The net effect is that the diastolic pressure reading may be artifactually reduced by upto 10 to 15 mmHg [3].

The BP should always be taken with patient's arm supported at the level of the heart. Allowing the arm to hang down when the patient is sitting or standing, will result in the brachial artery being 15 cm below the heart. As a result, the measured BP will be elevated by 10-15 mmHg due to the added hydrostatic pressure induced by gravity [4].

The cuff should deflated slowly at the rate of 2 to 3 mmHg per heartbeat. The systolic pressure is equal to the pressure at which the brachial pulse can first be palpated as blood flow is restored through the previously compressed vessel; the systolic pressure is also equal to the pressure at which the pulse is first heard by auscultation (Korotkoff phase 1).

As the cuff is deflated below the systolic pressure, the pulse continues to be heard until there is abrupt muffling (phase 4) and, approximately, 8 to 10 mmHg later, disappearance of sound (phase 5), although the point of muffling sound should be used in those patients in whom there is more than 10 mmHg difference between phase 4 and 5.

The BP should be measured initially in both arms. If there is a disparity due to a unilateral arterial lesion, the arm with higher pressure should be used.

The BP should be taken at least twice on each visit,

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with the measurements separated by one or two minutes to allow the release of trapped blood. If the second value varies more than 5 mmHg from the first, continued measurements should be made until a stable value is attained. The recorded value on patients chart should be the average of the last two measurements [1].

The above recommendations for BP measurement by the doctors apply to a single visit. It is also important to emphasize that, in the absence of end-organ damage, the diagnosis of mild hypertension should not be made until the BP has been measured on at least three or six visits, spaced over a period of months. Sequential studies have shown that the BP drops by an average of 10 to 15 mmHg between visits one and three in newly diagnosed patients, with a stable value not being achieved until more than six visits in some cases [5]. Thus, many

patients considered to be hypertensive at the initial visit are infact normal.

References

1. Baily RH, Bauer JH. A review of common errors in the indirect measurement of blood pressure by sphygmomanometer. Arch Int Med 1993;153:2741.
2. American Society of Hypertension, 14th Annual meeting, New York, USA, May 20-22, 1999-Abstracts. Am J Hypertension 1999;14(4pt2):1A-284A.
3. Londe B, Klitzner TS. Auscultatory blood pressure measurement - effect of pressure on the head of the stethoscope. West J Med 1984;141:193.
4. Mitchell PL, Parlin W, Blackburn H. Effect of vertical displacement of arm on indirect blood pressure measurement. N Engl J Med. 1964;271-72.
5. Hartley RM, Velez R, Morris RW et al. Confirming the diagnosis of mild hypertension. BMJ 1983;286:287.

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Sam and John were out cutting wood, and John cut his right arm off. Sam wrapped the arm in a plastic bag and took it and John to a surgeon. The surgeon said, "You're in luck! I'm an expert at reattaching limbs! Come back in four hours." So Sam came back in four hours and the surgeon said, "I got done faster than I expected to. John is down at the local pub." Sam went to the pub and saw John throwing darts with his right arm.

A few weeks later, Sam and John were out again, and John cut his leg off. Sam put the leg in a plastic bag and took it and John back to the surgeon. The surgeon said, "Legs are a little tougher - come back in six hours." Sam returned in six hours and the surgeon said, "I finished early - John's down at the soccer field." Sam went to the soccer field and there was John, kicking goals.

A few weeks later, John had a terrible accident and cut his head off. Sam put the head in a plastic bag and took it and the rest of John to the surgeon. The surgeon said, "Gee, heads are really tough. Come back in twelve hours." So Sam returned in twelve hours and the surgeon said, "I'm sorry, John died." Sam said, "I understand - heads are toughest." The surgeon said, "Oh, no! The surgery went fine! John suffocated in that plastic bag!"

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A distraught man ran into the doctor's office.

"Doc!" The man screamed, "I've lost my memory!"

"When did this happen?" asked the doctor.

The man looked at him and said, "When did what happen?"

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