Correct Procedure On Blood Pressure Measurement

Blood pressure (BP) measurement is a basic clinical procedure and important component in physical examination of a patient. It is because the right technique in taking BP leads to detection of early stage of hypertension before it becomes worse. Therefore, the correct procedure of measuring BP should be followed according to authoritative standard guidelines such as American Heart association (AHA), World Health Organization (WHO) and Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC) guidelines. Moreover, studies conducted in Spain had shown that knowledge alone was insufficient (González-López et al., 2009). AHA had stated that there were three reasons of error in taking BP measurement in hands-on experience which were observer bias, faulty equipment and failure to standardize the technique of measurement (Mohan et al., 2014).

Basically, there are two methods for measuring BP, direct (invasive) and indirect (non-invasive method). The direct method is using an intra-arterial catheter to obtain a measurement. The indirect method is a traditional method in which BP is measured non-invasively using auscultatory technique (Korotkoff sounds) with the pressure in the cuff measured using a mercury sphygmomanometer. The cuff pressure can also be measured by an aneroid gauge or by electric pressure transducers. Nowadays, there has been a shift towards automated devices in clinical practice because automated devices can have repeatable standardized techniques and can also remove observer bias (Andersen, 2005). However, the sphygmomanometer is still the useful device for BP measurement in clinical practice (Mion, D., Pierin, A. M. G., Lessa, I., & Nobre, F, 2002).

Even though there are several methods and approaches for measuring the BP, Pickering, et al. (2005a) reported that after 100 years, recognition of limited accuracies of auscultatory method was first discovered because Krokoff technique for BP measurement had been used continuously without any substantial improvement.

According to literature by Williams, et al. (2019), there is little knowledge of understanding of BP and its role as a major risk factor for stroke and heart disease in the general public. There are two types of BP: Systolic and diastolic blood pressure (SBP and DBP) are always recorded as 2 numbers, such as 120/80, where the top number is the SBP and the bottom number is the DBP. The maximal pressure within the artery during ventricular systole is SBP while the lowest pressure in the vessel just before the next systole is the DBP, and pulse pressure is the difference between them. There are many factors such as emotional state and the time of day that can affect individual’s BP readings. Therefore, BP should be taken several times to get an accurate measurement. Hughes (2019) stated that both systolic and diastolic hypertension are significant contributors to cardiovascular risk whereas systolic hypertension is related with aging and diastolic hypertension commonly occurs in the fifth decade of life.

According to Pickering et al. (2005a), a cuff is used to place around the upper arm and inflated to above SBP in order to occlude the brachial artery. Re-established of the pulsatile blood flow can be achieved by deflation gradually and it will be accompanied by sounds which can be detected by using a stethoscope held over the brachial artery just below the cuff. The first Korotkoff sound being heard that indicates the SBP while the last sound of Korotkoff indicates

DBP (Pickering et al., 2005b). According to the research done by Armstrong (2002), it stated that the American Heart Association reported that the first repetitive tapping sounds need to be identified in order to detect the SBP while Hypertension Society recommendations described the SBP as the onset of at least two faint repetitive clear tapping sounds. Brzezinski, et al (1990) stated that phase I Krokoff sounds (i.e., the first sounds auscultated) is the best way to estimate the SBP.

The point at which all sounds finally disappear completely, known as “the last sound to be heard” or (Phase V) is recorded as DBP. However, DBP interpretation is still frequently taken as Phase IV Korotkoff sounds in which the sounds become muffled but do not disappear totally. Maley (2013) stated that phase V Krokoff sounds (i.e., loss of all sounds) is diastolic pressure and phase IV and phase V sounds usually occur very near each other. If, they are widely separated, BP may be written to signify both (e.g., 128/80/30). Under these circumstances, phase IV sounds more precise to predict diastolic pressure. Cassoobhoy (2017) mentioned that the DBP reading indicating the lower digits is the pressure in the arteries when the heart rests between beats. That is the time when the heart fills with blood and gets oxygen. A normal DBP is lower than 80. A reading of 90 or higher indicates high blood pressure.

For the auscultation method, the cuff is deflated by 2 mm Hg per second which is supported by Armstrong (2002) who stated that the recommended rate of deflation to enable accurate measurement is 2–3 mmHg/beat. The calibration of mercury columns and aneroid gauges are in 2 mm divisions. Faster rates such as 10 mmHg/beat have been proved to introduce up to a 9-mmHg error when detecting the Krokoff sounds.

In addition, the procedure of BP measurement should include both palpation and auscultation method, however Tibúrcio et al. (cited Pereira, Nascimento, Lima, Dázio & Fava, 2018) stated that in the health professional, only perform auscultation method which could lead to errors in taking blood pressure measurement in their daily practice.