Blood pressure

Blood pressure is a measure of tension exerted by blood against the walls of the arteries. It de s the force of ventricular contraction, the resistance within the arterioles and the capillaries and the volume and viscosity of blood. Accurate measurement of blood pressure in the presence of findings in the history and physical examination of a patient can bring to light a diagnosis that may pertain to any of the above factors. This is why measurement of blood pressure is an integral part of general as well as cardiovascular examination. There are several processes that control the blood pressure. The two most important mechanisms are a baroreceptor mechanism and a rennin-angiotensin-aldosterone system. The baroreceptor mechanism works through stretch receptors present within the carotid sinus. A fall in arterial pressure causes a fall in the stretch on the walls of the carotid sinus leading to a fall in the firing rate of carotid sinus nerve, Hering's nerve and CN IX (Klabunde 2007), which carries information to the brain. In the brain, the set point for mean arterial pressure is 100mmHg and a pressure of less than that triggers responses that include increased sympathetic outflow to the heart and blood vessels and decreased parasympathetic outflow to the heart. As a result, there is an increase in the heart rate, contractility end stroke volume, vasoconstriction of arterioles and vasoconstriction of veins leading to an overall increase in total peripheral resistance and an increase in blood pressure to the set point. The second mechanism that maintains blood pressure by regulating the volume of blood involves the renin-angiotensin-aldosterone system. When the blood flow to kidney decreases, the kidney releases the hormone renin which causes the conversion of angiotensinogen in the plasma to angiotensin I. This is converted to angiotensin II in the lungs by the angiotensin-converting enzyme (ACE). Angiotensin II acts on

angiotensin receptors leading to a multi-dimensional response. It stimulates the release of aldosterone, a hormone, leading to increased reabsorption of sodium ion. It increases the Na-H exchange leading to alkalosis and movement of plasma from the extracellular space into the capillaries. It causes vasoconstriction of arterioles and it also increases thirst. This mechanism is counteracted by using ACE inhibitors and angiotensin receptor blockers (ARBs) in the treatment of hypertension (Volpe, M and B 2005). Other factors that regulate arterial blood pressure include cerebral ischemia, chemoreceptors in the carotid and aortic bodies, production and release of vasopressin and atrial natriuretic peptide. Certain patients are well-informed and understand that blood pressure measurement is a part of a general physical examination. Therefore they are very co-operative. However, most patients are not well-informed and suffer from " white coat effect". They become anxious and as a result, the reading obtained is higher than the normal. Patients should always be counseled about the significance of blood pressure particularly the fact that it is required in a normal healthy person. The patient should be asked if he has taken coffee or smoked cigarette because that can lead to a higher measurement. The patient should also be asked to avoid exercise before the measurement as that can lead to a lower reading. At least three readings which are separated in time should be taken in order to determine the blood pressure accurately. One must not rely on a single reading (Longmore 2007). The most commonly used method is the aucultatory method. The patient's right arm should be raised to the level of the heart if sitting or lying parallel to the patient's body if the patient is supine. An aneroid-manometer or mercury-gravity type of blood pressure apparatus is commonly used. The width of the blood compression cuff should

be suitable for the patient, that is 2. 5 to 6 cm for infants and children while 13 cm for adults; an undersized cuff can lead to overestimated blood pressure (Northridge and Grubb 2005). The deflated cuff is placed evenly around the upper arm such that the lower border is 1 inch above the brachial artery in the cubital fossa. The bell of the stethoscope is placed here. Listen to the heart beat and slowly inflate the cuff until 30mm above the pressure at which the pulse disappears. Then slowly release the cuff until heart sounds reappear and record the reading. This is the systolic blood pressure. Continue to release the cuff 2 to 3mm per heart beat until the sounds disappear again. This is the diastolic blood pressure. For the convenience of recording, the systolic value is recorded prior to the diastolic blood pressure and is separated from the diastolic value by a slash. For a normal, healthy, young adult, a systolic blood pressure reading between 100 to 140 mm Hg and a diastolic blood pressure reading between 60 to 90 mm Hg is considered normal. Works Cited Klabunde, Richard. Arterial Baroreceptors. Richard E Klabunde. January 4, 2007. www. cvsphysiology. com (accessed March 26, 2011). Longmore, Murray. " Hypertension." In Oxford Handbook of Clinical Medicine, by Murray Longmore, Ian Wilkinson and Tom Turmezei, 124-125. Oxford: Oxford University Press, 2007. Northridge, David, and Neil Grubb. The Cardiovascular System. Vol. vol 11, in Macleod's Clinical Examintion , by Graham Douglas. Philadelphia: Elsevier Ltd, 2005. Volpe, M, Ruilope L M, and Waeber B. " Angiotesin II receptor blockers: benefits beyond blood pressure reduction." (Journal of Human Hypertension) 19 (2005).