

MORE ABOUT....HYPERTENSION – A FAMILY PHYSICIAN’S PERSPECTIVE

HYPERTENSION – AN APPROACH TO DIAGNOSIS, EXAMINATION AND INVESTIGATIONS IN YOUNG ADULTS

FARAZ AHMAD, MB BS, MSc
(Med)

Family Physician, Eldorette

AAMIR HASSAN, MB BS, MMed
(Int Med)

Internist, Witbank

Hypertension is a common condition affecting millions of people. It is a recognised risk factor for cerebrovascular, cardiovascular and renal disease. Even patients with mild elevation of blood pressure have been shown to have a significantly increased risk of adverse cardiovascular events. It is asymptomatic, but can be readily detected and is usually easily treated. However, a prudent approach is imperative when dealing with young hypertensive patients. Around 5% of patients exhibit an underlying cause for their hypertension; therefore the aim should be to find a cause which can be treated either surgically or medically.

It is customary to classify arterial hypertension into essential (idiopathic or primary) and secondary hypertension. It is worthwhile keeping this classification in mind when evaluating such patients, as it may provide a clue as to the cause of the hypertension. Table I shows the possible causes of different types of hypertension.

Table I. **Causes of different types of hypertension**

Systolic hypertension with wide pulse pressure

- Arteriosclerosis
- Increased stroke volume
- Aortic regurgitation
- Thyrotoxicosis
- Fever
- Arteriovenous fistula

Systolic and diastolic hypertension

- Renal causes
 - Acute and chronic glomerulonephritis
 - Chronic pyelonephritis
 - Renal vascular stenosis
 - Polycystic renal disease
- Endocrine causes
 - Adrenocortical dysfunction
 - Cushing’s disease and syndrome
 - Conn’s syndrome
 - Phaeochromocytoma
 - Myxoedema
 - Oral contraceptives
 - Acromegaly
- Neurogenic causes
 - Psychogenic
 - Increased intracranial pressure (acute)
 - Spinal cord section (acute)
- Miscellaneous causes
 - Coarctation of aorta
 - Polycythaemia vera
 - Hypercalcaemia
 - Glucocorticoids
 - Polyarteritis
- Unknown causes
 - Essential hypertension
 - Toxaemia of pregnancy

Diagnostic evaluation

Diagnosis and evaluation of patients with hypertension should begin with history-taking and physical examination. The history should include enquiry about weight gain/loss, tremors, palpitations, headache, irritability, urinary tract infections, use of oral contraceptives in females, mood changes with

panic attacks, alcohol intake, family history of hypertension and other cardiovascular disease, and medication (glucocorticoids, oral contraceptives, caffeine, pseudoephedrine, ephedrine, non-steroidal anti-inflammatory drugs, tricyclic antidepressants, tobacco, cocaine, cyclosporine). Evaluation for associated cardiovascular risk factors is imperative (angina, myocardial

infarction, target organ damage, smoking, diabetes mellitus, hypercholesterolaemia, obesity, sedentary lifestyle).

The aim of the examination should be twofold. First, to detect the underlying condition that might be causing elevated blood pressure, and secondly, to detect the target organ damage. It is essential to examine the following:

- General body habitus, e.g. cushingoid face, obesity.
- Pulse – measure rate, rhythm, volume for at least 1 minute, and look for radiofemoral delay.
- Blood pressure – using a validated device blood pressure should be recorded with the patient in a sitting position and with the back supported, after he/she has rested for at least 5 minutes. The arm should rest on a surface and the blood pressure device should be at the level of the heart. The patient should not have smoked, drunk coffee or tea or eaten in the previous 30 minutes. A cuff of appropriate size should be used, as inappropriate cuff size may give rise to a false reading (under cuffing and over cuffing), and two readings should be taken 2 minutes apart during one visit. Readings should be repeated three times at intervals of at least 1 - 2 days before making a clinical assessment of hypertension.
- Pedal oedema (secondary to renal pathology or cardiac failure).
- Body mass index (BMI) (mid-abdomen circumference and waist-over-hip ratio can also be used).
- Skin bruising and rashes (Cushing's disease and vasculitis).
- Eyes – proptosis and fundoscopic examination (hypertensive retinopathy).
- Neck – goitre and bruit.
- Lungs – basal rales (due to secondary congestive cardiac failure).
- Heart – left ventricular hypertrophy (displaced apex beat) with left-sided S4 (indicative of hypertension for more than 6 months), early diastolic murmur for aortic regurgitation.
- Abdomen – scars from previous genitourinary (GU) surgery, palpable kidney or mass, flank tenderness (pyelonephritis, obstruction), or bruit (renovascular disease).

- Extremities – disparity in blood pressure.

Investigations

General clinical acumen and physical examination results should guide the family physician in evaluating a young patient with hypertension. Generally the laboratory evaluation in such patients falls into four categories:

Side-room tests

- urine dipstick (look for proteinuria, haematuria and glucose)
- blood glucose (finger-prick method).

Screening tests

- urine culture (if there is an indication of a urinary tract infection and renal pathology)
- electrolytes (e.g. hypokalaemia indicative of Conn's syndrome)
- urea and creatinine (indicative of renal failure due to the nephritic syndrome)
- calcium levels (hyperparathyroidism)
- uric acid
- full blood count with differential count
- lipid profile
- resting ECG.

Specific tests

- urine for microalbuminuria (predictor of cardiovascular events in hypertension)
- 24-hour urine for catecholamines (vanillylmandelic acid (VMA) for pheochromocytoma)
- hormone levels (thyroid and adrenals)
- renal ultrasound.

Specialised studies

- ambulatory blood pressure monitoring
- captopril challenge test
- captopril renal scan
- Doppler studies of renal arteries
- renal angiogram
- renal biopsy
- magnetic resonance angiography.

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USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN THE MANAGEMENT OF HYPERTENSION: AN OVERVIEW

L H MABUZA, MB ChB, BTh, MFamMed

Principal Family Physician and Senior Lecturer, University of Limpopo (Medunsa campus), and Dr George Mukhari Hospital, Pretoria

Complementary and alternative medicine (CAM) can be defined as medical interventions that are neither taught widely in orthodox medical schools nor generally available in hospitals. Such approaches include homeopathy, acupuncture, chiropractic, yoga, herbal remedies, naturopathy, osteopathy, reflexology and aromatherapy.

Thus far there is scanty scientific knowledge on the use of CAM. Systematic reviews done on the subject have found that many clinical trials testing CAM have major flaws, e.g. poor statistical power, lack of comparison with treatments or placebos or both, and poor controls. As a result these reviews typically conclude by recommending larger well-designed studies to lend authority to their findings. Furthermore, even before these products can be launched into definitive clinical trials, minimum clinical trial standards need to be fulfilled.

This article discusses the basic principles of CAM most commonly used in South Africa, their role in the management of

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hypertension, and the adverse effects that can be introduced through their use.

Herbal remedies

Herbal medicines consist of leaves, bark, roots, stems, bulbs, fruits, flowers and seeds. These may be used in their green fresh form, dried and preserved, or ground into powder. Herbs have healing properties and are applied to sores or painful parts of the body as pastes or poultices, swallowed for emesis, given as enemas, or the powders used like snuff. In South Africa a number of herbs are gaining popularity as immunity boosters for immunocompromised patients. Patients consult herbalists for a variety of ailments, including hypertension.

For example, a tea made from the leaves of *Olea europea* has been used in both Europe and Africa, ostensibly to lower blood pressure, improve blood circulation and balance blood sugar levels. Studies on animals have shown some antihypertensive and vasodilatory effects, but studies on humans are too small to allow conclusions to be drawn.

Homeopathy

Homeopathy is based on the law of similars and potentisation. The law of similars states that, as exposure to a substance can cause specific symptoms in a healthy person, the substance can be used to stimulate the body's curative powers to overcome similar symptoms during illness. Potentisation is a process that involves a series of precise dilutions and succussions

(vigorous shakings). Therefore, homeopathy is considered as a form of 'energy medicine' in which energy fields from the mother tincture are imparted to the carrier (water or alcohol) during the succussions. A substance has to undergo this process to be useful as a homeopathic remedy.

Depending on the holistic presentation of the hypertensive patient, a variety of homeopathic remedies are offered, e.g. lachesis for an anxious hypertensive, and aurum for stress-related blood pressure. However, so far, there are no studies that convincingly demonstrate that homeopathy is superior to placebo.

Acupuncture

This ancient Chinese practice is over five thousand years old. The technique uses hair-like, fine needles which are inserted into known 'acupuncture points' along meridians. The meridians are thought to be the precise pathways through which vital energy (qi) is believed to travel. Each of the 12 major meridians is connected to a particular organ. Additionally, there are 8 'extra' meridians and innumerable smaller meridians throughout the body. There are 365 specific junctures (points) along these meridians into which the acupuncture needles can be inserted, aimed at affecting the energy balance of the body, thus conferring the healing capacity. One of the roles of acupuncture is its use as anaesthesia or analgesia through the stimulation of endorphin release. Another common use is in the treatment of addictions (alcohol, drugs and cigarettes). Through its reduction of activity in the sympathetic nervous system, acupuncture is thought to have the potential to reduce elevated blood pressure.

Yoga

The concept of yogic therapy is based on total health – the harmonisation of body and mind. It operates at three levels: prevention, cure and rehabilitation.

The role of yoga has gained recognition by the World Health Organization (WHO) as a supplementary and complementary therapy. Prevention of hypertension using the principles of yoga entails adoption of a proper lifestyle: water drinking (2 - 3 glasses) in the morning for effective body waste removal (daily Ushapan); a diet free of excessive oil and saturated fats (Sattvik, simple mitahar); the practice of mind-purging techniques like Vimohana; avoidance of suppression of emotions; having 'Satsang' (being in good company or good atmosphere); and doing everything in moderation – to mention but a few.

Yoga practitioners believe that the practice unites mind and body activities, resulting in stress relief – essential in managing hypertension. The patient is guided to assume specific poses and to perform specific movements during the practice.

Chiropractic

According to Palmer's doctrine, most diseases are caused by 'misalignment' of the spinal bones (subluxations) correctable by spinal manipulation and adjustment.

Chiropractic physicians diagnose and treat patients whose health problems are associated with the nervous, muscular or skeletal systems – especially the spine. They believe that disturbance of these systems impairs the body's normal function, hence lowering its resistance to disease. Body functions are controlled by the central nervous system through the spine and vertebral column. Hence, dysfunction of the latter two leads to alteration of the important body functions. Furthermore, they hold that pain develops owing to skeletal imbalance through joint or articular dysfunction, particularly in the spine. Therefore, chiropractors offer treatment through manipulation of the back, neck, extremities and other joints.

Almost like Western-trained physicians, chiropractors follow a standard routine: medical history, and general



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physical, neurological and orthopaedic examination. They may order laboratory investigations, including radiographs (to locate the subluxations) and other diagnostic images. Treatment is drugless and non-surgical, involving, *inter alia*, manual adjustment of the spinal column, water, light, massage, ultrasound, and electric and heat therapy. This management relies on the body's inherent recuperative abilities.

Side-effects

Over recent years, a number of studies have been published on the potential adverse effects of CAM. This goes contrary to the popular belief that the medicines and methods used in CAM are 'natural', 'soft', 'holistic' and therefore harmless. It has been said that 'a drug or method without side-effects has no desired main effect'. Accordingly, it can be argued that any method with proven clinical effects probably also presents a risk for unwanted effects, including overdose.

Herbal medicine can cause hepatotoxicity, nephropathy, cardiomyopathy, encephalopathy and neuropathy. The hepatotoxic effect may lead to fulminant exacerbation of autoimmune hepatitis. Pneumothorax (rare), cardiac tamponade, iatrogenic hepatitis B, HIV infection (rare), and direct injury to the spinal cord and nerve roots are known complications of acupuncture. Acute intracranial haemorrhage was reported after acupuncture of the 'feng fu' trigger point in the skull. A patient suffered a stroke after neck manipulation (tearing of the vertebral artery intima) by a chiropractor. The practice of meditation in yoga has been associated with adverse effects such as relaxation-induced anxiety and panic,

paradoxical increases in tension, less motivation in life, confusion and disorientation.

However, the ingredients in homeopathic preparations are so diluted that they carry virtually no trace of the original substance. Consequently, they should cause no side-effects. There may be no adverse effects from the chemical ingredients of the substance as a result of the multiple dilutions, but if the original substance does in fact leave 'some kind of imprint' on the diluent molecules, imbuing them with the properties of the original substance, then adverse effects are inherent, even if by placebo effect.

Conclusion

The primary health care provider should be committed to the context of the patient's illness and to the patient as a person. Although it cannot be expected of him/her to be an expert on CAMs, patients will use them, so knowledge of the different CAM modalities is important.

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THE FAMILY PHYSICIAN AND THE PREGNANT HYPERTENSIVE

J V NDI MANDE, MB ChB, MPraxMed
Senior Specialist, Department of Family Medicine and Primary Health Care, University of Limpopo (Medunsa campus), Pretoria
Consultant, Dr George Mukhari Hospital, Pretoria

Part of the family physician's responsibility is to care for the pregnant patient. The measurement of maternal blood pressure remains an essential part of the examination at any antenatal clinic. Ideally the patient's blood pressure should be assessed before she falls pregnant, as a decrease in blood pressure during the first half of pregnancy is normal.

Hypertensive diseases of pregnancy are the leading causes of direct maternal deaths in South Africa. Pre-eclampsia is a multi-organ disease unique to pregnancy, clinically evident by the presence of hypertension and proteinuria. In its severe forms pre-eclampsia is the commonest cause of maternal and perinatal mortality and morbidity.

Significant problems relate directly to the effects of elevated blood pressure. A family physician can prevent these problems by rendering advice on lifestyle modification such as alcohol and cigarette smoking. This principle, if applied, can prevent severe adverse effects on both the mother and the unborn baby.

Maternal blood pressure has an effect on the weight of the baby. Perinatal mortality is associated with raised maternal blood pressure in women with pre-existing hypertension and in those in whom hypertension is first diagnosed in pregnancy.

Pre-eclampsia is a serious condition that must be detected early and managed promptly and efficiently. It causes significant maternal and fetal mortality and morbidity in 5 - 7% of all pregnancies.

Blood pressure in women without pre-existing hypertension or pre-eclampsia falls slightly during the first half of pregnancy, but then rises from about 34 weeks onwards.

Taking blood pressure in a pregnant patient

Blood pressure in a pregnant woman should be taken while she is sitting to avoid the lower reading that can occur if the patient is lying on her back. A diagnosis of hypertension cannot be made after a single reading. See the South African Hypertension Guideline 2006 for full details on measuring blood pressure – in Professor Mhlongo's article, Hypertension and its management, in this edition of *CME*.

Pre-eclampsia

Pre-eclampsia is a serious condition that must be detected early and managed promptly and efficiently. It causes significant maternal and fetal mortality and morbidity in 5 - 7% of all pregnancies. If pre-eclampsia occurs, it is generally seen from 20 weeks of pregnancy. In primary health care this condition can be diagnosed by accurate blood pressure recordings and by detecting protein in the urine using a dipstick. Proteinuria (> 300 mg/24 h) and the presence of oedema are important in the diagnosis of pre-eclampsia.

The patient may have to be admitted to hospital for blood pressure monitoring. The situation should be explained fully and the importance of bed rest emphasised. If admission is not possible, the family physician and midwife are responsible for monitoring the patient and ensuring bed rest at home.

The patient must be informed of the danger signs – increasing swelling of the feet and legs, headaches and epigastric pain.

The HELLP (**h**aemolysis, **e**levated liver enzymes, **l**ow **p**latelets) syndrome (severe eclampsia) is a medical emergency and, if possible, the assistance of a specialist unit should be sought. This syndrome is likely to occur if treatment of pre-eclampsia is delayed. Should it occur, the baby is delivered by caesarean section, the fastest available method, unless the cervix is sufficiently dilated to permit prompt delivery.

Diagnosis of pre-eclampsia

Elevated blood pressure and proteinuria after 20 weeks are diagnostic of pre-eclampsia. Severe pre-eclampsia is indicated by a more sustained and greater degree of proteinuria. Oliguria is also a serious sign. Neurological symptoms such as blurred vision, headache and deteriorating consciousness are signs of impending eclampsia. Pulmonary oedema can cause nocturnal dyspnoea.

Hypertensive emergencies in pregnancy (impending eclampsia, eclampsia)

Very high blood pressure should be lowered with an infusion of labetalol 5 mg/ml at a rate of 4 ml/h via a syringe pump. The infusion rate should be doubled every half hour to a maximum of 32 ml (160 mg)/hour until the diastolic blood pressure has fallen and stabilised at an acceptable level (95 - 100 mmHg).

Labetalol can also be used as an intermittent bolus infusion – 50 mg (10 ml of labetalol 5 mg/ml) given over at least 1 minute. This should have an effect by 5 minutes and should be repeated until the diastolic blood pressure is lowered to between 95 and 100 mmHg. Labetalol bolus infusions can be repeated to a maximum dose of 200 mg. The pulse rate should remain over 60 beats/min.

An alternative choice is nifedipine (10 mg oral tablet, not a slow-release tablet). Nifedipine should not be given sublingually and should not be chewed or bitten or used buccally.

Gestational hypertension

This is the development of hypertension during pregnancy or in the 24 hours post partum in the absence of pre-existing chronic hypertension and other signs of pre-eclampsia. Gestational hypertension is distinguished from pre-eclampsia by the fact that there is no proteinuria and evidence of end-organ damage. Simply measuring the patient's blood pressure does not distinguish between gestational hypertension and pre-eclampsia. Therefore the features of pre-eclampsia must be sought as gestational hypertension rarely merits treatment and is rarely associated with poor outcomes for mother and baby. However, the woman's blood pressure should be monitored after delivery to check that hypertension does not persist.

Renal disease in pregnancy

Patients with renal disease and hypertension may expect worsening of their hypertension during pregnancy. For the family physician, a simple urine test could assist in assessing the renal state of a pregnant hypertensive patient. A trace of proteinuria is acceptable as it may be due to contamination with vaginal secretions. However, blood detected in the urine must always be taken seriously as it may indicate renal disease.

Treatment of the pregnant hypertensive patient

In the pregnant woman antihypertensive treatment should be used when the systolic blood pressure is ≥ 160 mmHg or the diastolic blood pressure is ≥ 110 mmHg. In the presence of other markers of potentially severe disease, e.g. thrombocytopenia, oliguria and/or abnormal liver function tests, treatment should be started at lower degrees of hypertension. Diuretics and atenolol should generally be avoided, but ACE-I and ARBs are absolutely

contraindicated. Suitable drugs to be used in pregnancy are:

- methyldopa 500 mg 6-hourly
- nifedipine XL 30 - 60 mg daily
- apresoline 25 - 50 mg 8-hourly
- labetalol 100 - 200 mg twice daily; up-titrate to 600 mg if needed.

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HYPERTENSION AND THE ELDERLY PATIENT

J V NDI MANDE, MB ChB,
MPraxMed

Senior Specialist, Department of Family Medicine and Primary Health Care, University of Limpopo (Medunsa campus), Pretoria

Consultant, Dr George Mukhari Hospital, Pretoria

Hypertensive patients who are over the age of 65, and particularly those over the age of 75, offer substantial challenges to the doctor. Hypertension is abnormal at any age and not an inevitable part of ageing. Managing blood pressure is probably one of the top medical expenses of the public sector in South Africa. Managing blood pressure among the elderly decreases the incidence of strokes, which reduces the burden of care for both the patient's family and the state. Caring for an elderly

patient after a stroke, particularly if he/she is bedridden, is a significant problem for many black families.

Hypertension must be taken seriously in the elderly and the family doctor is a major part of the team, both in treating the hypertension and in any palliative care required by someone who has already suffered a stroke. In the elderly, hypertension commonly co-exists with other conditions such as diabetes mellitus, arthritis, renal conditions or other complications. As a result, polypharmacy is a problem, with concomitant drug interactions.

Measuring blood pressure in the elderly

The South African Hypertension Guideline 2006 should be consulted when measuring blood pressure at any age – see Professor Mhlongo's article, Hypertension and its management, in this edition of *CME*. The elderly may benefit from self-measurement of blood pressure where this is possible.

Common types of hypertension in the elderly

Systolic and diastolic hypertension. In this type of hypertension both the systolic and diastolic pressures are elevated above normal. Elevated systolic and diastolic blood pressure results in peripheral vascular resistance. A number of diseases associated with this elevation include renal and endocrine conditions.

Isolated systolic hypertension.

This is defined as a systolic blood pressure above 150 mmHg, with a normal diastolic blood pressure. Isolated systolic hypertension is common in the elderly. Systolic hypertension implies vascular rigidity, increased peripheral resistance, or increased cardiac output conditions such as thyrotoxicosis (Pende's sign), Paget's disease, anaemia, or aortic insufficiency.

Evidence-based medicine

There is evidence that treating elderly patients can reduce the incidence of major cardiovascular events, cerebro-

vascular events, as well as coronary events, thus reducing mortality and morbidity among this group. EWPHE (European Working Party in the Elderly) – a trial of 840 patients of mean age 72 years – showed a reduction of 27% in cardiovascular mortality. The STOP (Swedish Trial in Old Patients)-hypertension trial of 1 627 patients at mean age of 76 showed a 43% reduction in total mortality. The SHEP(ISH) (Systolic Hypertension in the Elderly Programme (Isolated Systolic Hypertension)) trial of 4 763 patients of mean age 72 showed a 54% reduction in congestive cardiac failure. The Syst-Euro(ISH) (Systolic Hypertension in Older Adults in Europe (Isolated Systolic Hypertension)) trial of 4 695 patients of mean age 70 showed a 50% reduction in the incidence of dementia. The MRC-Elderly (Medical Research Council treatment of hypertension in the Elderly) trial of 4 373 patients also showed improvement in the mortality of the elderly.

The HYVET (Hypertension in the Very Elderly Trial) has also demonstrated a 35% decrease in mortality in 80-year-old patients with hypertension.

Several studies have reported that healthy elderly patients of both sexes treated with relatively modest doses of antihypertensive agents show a substantial reduction in the incidence of stroke and of stroke-related deaths. This is true in both systolic and diastolic hypertension or isolated hypertension. What is not clear from these studies is how broadly the results can be extrapolated, as the studies were performed on healthy elderly patients, and multiple pathology is common in this age group. Therefore, in the elderly, therapy should be individualised. Hypertension in the elderly is associated with low-renin essential hypertension, as it is in diabetics and in individuals of African descent.

Investigations in elderly patients with hypertension

Basic investigations should include the following: urinalysis, full blood count, blood chemistry, lipid profile, 12-lead

Hypertension is abnormal at any age and not an inevitable part of ageing.

The South African Hypertension Guideline 2006 should be consulted when measuring blood pressure at any age.

electrocardiography and chest radiographs.

Lifestyle modification

As with all other patients lifestyle modifications are important among the elderly and these include: regular physical activity, smoking cessation, moderate alcohol consumption or none

at all, weight reduction and salt restriction.

Treating the elderly hypertensive patient

The principles of treatment in the elderly are the same as those in younger patients, taking into consideration other drugs that the person may be taking and other pathology that may co-exist. See the South African Hypertension Guideline 2006 for a comprehensive overview of the treatment of hypertension.

The diabetic patient with hypertension is particularly challenging to treat because multiple agents are often needed to achieve goal blood pressure and because many agents used to control the blood pressure can affect glucose metabolism adversely.

Thiazides and beta-blockers are particularly problematic. The existence of other pathology, such as renal problems, may also make the choice of agent difficult. In these cases, it would be better to refer to a specialist in elderly medicine for advice.

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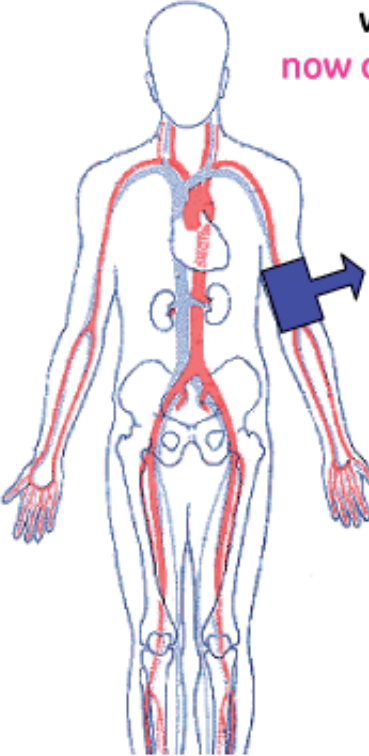

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