DRAFT DGAFMS MEMORANDUM ON HYPERTENSION NO 182

Introduction

1. Hypertension is a common cause of morbidity and occasional mortality among Armed Forces personnel. Untreated or inadequately treated hypertension leads to atherosclerotic (coronary artery disease, peripheral vascular disease and ischemic stroke) and hypertensive (nephrosclerosis, CCF, aortic dissection) complications. Unfortunately the disease is essentially asymptomatic in the initial decade or so and patients are unwilling to take medicines or alter their life style. Patient education thus plays an important role.

2. In recent years there have been changes in our concepts regarding assessment and treatment of hypertension. An evidence based approach for the prevention and management of hypertension is required. This memorandum has been drawn to incorporate the latest guidelines and directions for disposal of personnel suffering from hypertension.

Definition and classification

3. Hypertension unless otherwise qualified denotes raised systemic arterial blood pressure. It is defined as systolic BP 140 mm Hg or greater, and/or diastolic BP 90 mm Hg or greater. When there is no definable underlying cause, it is called Primary or Idiopathic hypertension. When systolic and diastolic blood pressures fall into different categories, the higher category should be selected to classify the individual's blood pressure status.

4. There is evidence to suggest that levels of BP considered to be normal in the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 6) report are now associated with increased cardiovascular risk. The classification of hypertension for adults will now be as per the recommendation of JNC7 as under.

Table 1- Classification of Blood Pressure For Adults (mm of Hg)

Classification	SBP mm of Hg	DBP mm of Hg
Normal	<120	and <80
Prehypertension	120-139	or 80-89
Stage-1 hypertension	140-159	or 90-99
Stage-2 hypertension	>160	or >100

Blood pressure detection and confirmation

5. The accurate measurement of blood pressure is a sine qua non for successful management. The equipment whether mercury sphygmomanometer, aneroid or electronic should be regularly inspected and validated. Person should be seated quietly for at least 05 minutes in a chair (rather than on an examination table), with feet on the floor and arm supported at the arm level. Caffeine, exercise and smoking should be avoided for at least 30

minutes prior to measurement. An appropriate sized cuff bladder - encircling 80% of the arm should be used to ensure accuracy. At least two measurements should be made and average to be recorded. Systolic blood pressure (SBP) is the point at which the first of two or more korotkoff sounds are heard (onset of phase I) and the disappearance of korotkoff sound (onset of phase 5) is used to define diastolic blood pressure (DBP). The cuff deflation rate for auscultatory readings should be 2 mm Hg per second.

Ambulatory blood pressure monitoring (ABPM)

6. It provides information about BP during daily activities and sleep. BP has a reproducible circadian profile. The blood pressure values are higher while one is awake and physically active and lower during rest and sleep. Clinic/outpatient BP values have been used in numerous studies that have established the risk associated with elevated BP and benefits of lowering blood pressure. However, clinic/ outpatient measurements have short comings. A white coat effect (increase in BP primarily in the medical care environment) is noted in as many as 20-35% of patients diagnosed as hypertensive on clinic/outpatient recordings. Ambulatory BP values are lower than clinic readings. ABPM values suggest hypertension when :-

(a) Mean 24 hrs BP recordings exceed 135/85 mm Hg.
(b) Mean night BP readings greater are than 120/75 mm Hg.
(c) BP drops less than 10-20% of the day readings during the night.

ABPM will be helpful in the following situations :-

(a) Suspected white-coat hypertension in patients with hypertension and no target organ damage.
(b) Apparent drug resistance
(c) Hypotension symptoms with antihypertensive medication.
(d) Episodic hypertension.
(e) Autonomic dysfunction.

Evaluation

7. Evaluation of a hypertensive patient has three objectives:- (a) to asses lifestyle and identify cardiovascular risk factors or concomitant disorders that may affect prognosis and guide treatment; (b) to reveal identifiable causes of high BP; and (c) to assess the presence or absence of target organ damage and CVD. This is achieved by medical history, physical examination, routine laboratory tests and other diagnostic procedures.

History

8. Most patients of hypertension are asymptomatic. Some may give history of headache (usually in the occipital region), dizziness, palpitations, epistaxis, blurring of vision, angina and dyspnoea. While family history of hypertension suggests primary hypertension, presence of urinary symptoms (renal), weight loss (pheochromocytoma), weight gain (Cushing's

syndrome) and drug therapy (steroids, oral contraceptive pills) may point to the likelihood of underlying secondary cause. Obesity and obstructive sleep apnoea are also identifiable causes of hypertension. History of angina, limb claudication, transient ischemic attacks (TIA) and exertional dysponea suggest target organ damage. One should also take history of cardiovascular risk factors like diabetes mellitus, smoking and dyslipidemia.

Physical Examination

9. Should be directed to look for secondary causes and assess severity by evaluating target organ damage.

(a) Renal diseases are the commonest cause of secondary hypertension. They should be looked for if there is significant pallor (chronic renal failure), renal bruit (renovascular) or a palpable renal lump (polycystic kidney disease). Cushingoid habitus should prompt evaluation for endogenous or iatrogenic cause of steroid excess, while unexplained tachycardia may suggest a pheochromocytoma. Unequal pulsations and arterial pressure in upper limbs suggest aortoarteritis while low volume pulse in lower limbs with radio-femoral delay suggests coarctation of aorta.

(b) The other aspect of examination is to asses severity of involvement of target organs. Presence of hypertensive retinopathy and signs of cardiac involvement in the form of heaving apex, left ventricular third or fourth sounds and pulmonary oedema are clues to the same.

Investigations.

10. Complete blood cell count, urine analysis, blood glucose, serum creatinine, serum electrolytes, serum lipid profile, 12 lead EEG, chest radiography and USG abdomen are to be carried out in all personnel detected to have hypertension.Identifiable causes of hypertension (Secondary hypertension) are listed in Table 2. Screening and diagnostic tests for secondary hypertension are indicated if there are features inappropriate for primary hypertension (Table-3).

Table 2 -Identifiable causes of hypertension

• Chronic kidney disease
• Coarctation of the aorta
• Cushing's Syndrome and other glucocorticoid excess states including chronic steroid therapy
• Drug induced or drug Related
• Obstructive uropathy
• Pheochromocytoma
• Primary aldosteronism and other mineralocorticoid excess states
• Renovascular hypertension
• Sleep apnea
• Thyroid or parathyroid disease

Table 3 - Features of Inappropriate Hypertension

Onset before age 20 or after age 50.
BP >180/110 mmHg.
Target organ damage
Abdominal bruit
Variable pressures with tachycardia and sweating
Unprovoked hypokalemia.
Poor response to therapy.
Worsening renal function after renin angiotensin inhibitor use or angiotensin receptor blocker use
Recurrent flash pulmonary oedema

Assessment of risk

11. Based on evaluation as above an estimate of individual cardiovascular risk is made. Three factors are taken into consideration, prior to institution of therapy.

(a) Level and duration of blood pressure.

(b) Coronary risk factors / clinical cardio vascular disease (Table 4)

(c) Evidence of target organ damage (Table 5)

Table 4 - Cardiovascular Risk Factors

Hypertension
Age (older than 55 years for men, 65 years for women)
Diabetes mellitus
Elevated LDL (or Total) cholesterol, or low HDL cholesterol
Estimated GFR <60ml/min (by Cockcraft and Gault formula* or by radionucleide DTPA technitiun 99m scan where required
Family history of premature CVD (men<55 years of age or women <65 years of age)
Microalbuminuria
Obesity (BMI>30 Kg/m^2)
Physical Inactivity
Tobacco usage, particularly cigarettes

* Cockcraft and Gault formula:

$$\text{Estimated GFR} = \frac{(140 - \text{age}) \times \text{ideal Body weight}}{72 \times \text{S creatinine}}$$

Table 5 - Assessment of Target organ damage

Heart
○ LVH
○ Angina/Prior MI
○ Prior coronary revascularization
○ Heart Failure
Brain

○ Stroke or TIA
○ Dementia
CKD
Peripheral arterial disease
Retinopathy

Treatment goal

12. Ultimate goal of antihypertensive therapy is to reduce cardiovascular and renal morbidity and mortality. Since most persons with hypertension will reach the DBP goal once the SBP goal is achieved, the primary focus should be on attaining the SBP goal. Targeting the SBP and DBP to targets that are <140/90 mm Hg is associated with a decrease in CVD complications. In patients with hypertension and diabetes or renal disease, the BP goal is <130/80 mm Hg.

Lifestyle modifications to prevent and manage hypertension

13. Adoption of healthy life styles by all persons is critical for the prevention of high BP and is an indispensable part of the management of those with hypertension. Life style modifications reduce BP, prevents or delays the incidence of hypertension, enhances anti-hypertensive drug efficiency and decreases cardiovascular risk. These measures are listed in Table 6.

Anti Hypertensive Drugs

14. A large number of drugs are available for reducing blood pressure. They include diuretics, beta blockers (BB), ACE inhibitors (ACEI), angiotension II receptor blockers (ARB), calcium channel blockers (CCB), alpha I blockers and direct vasodilators. Hypertension may exist in association with other conditions in which there are compelling indications for use of a particular treatment. Compelling indications for a specific therapy involve high risk conditions that can be direct sequelae of hypertension (HF, IHD, Chronic Kidney disease, recurrent stroke) or commonly associated with hypertension (diabetes, high coronary disease risk). Therapeutic decisions in such circumstances should be directed at both the compelling indication and BP lowering (Table 7).

Indications for Treatment and Follow up

15. More than two third of hypertensive individuals cannot be controlled on one drug and will require two or more anti hypertensive agents selected from different drug classes.
Individuals with hypertension should be encouraged to follow life style modifications. Individuals with stage I hypertension will also be encouraged to follow life style modification. If after 02 months the SBP is greater than 140 mm Hg and/or DBP is greater than 90 mm Hg they will be started on drug therapy.

16. Individuals with stage II Hypertension will be advised life style modification and started on drug therapy immediately. The initiation of therapy with more than one drug increases the likelihood of achieving BP goal in a more timely fashion.

Disposal

17. The following guidelines are suggested for officers, PBORs with hypertension. For Naval/Airforce personnel equivalent medical category will be awarded.

(a) **Pre Hypertension**: All cases should be advised life style changes and monitored periodically by the AMA during AMEs and PMEs. No medical category need to be prescribed.

(b) **Stage I Hypertension and no target organ damage**: Majority of cases of hypertension fall into this group and in all those where the BP is well stabilized only with life style modifications will be observed in cat P1. Ambulatory BP monitoring will be an additional tool in assessment and follow up of these cases and to be included when the facilities exist. The choice of anti hypertensive drug for treatment can be one of many, until and unless there are some compelling indications for a particular drug class. All cases requiring drug therapy will be initially placed in temp cat P2 (T-24) after which they will be placed in perm cat P2. However, in the case of officers who maintain good control of BP while on a single drug and with no target organ damage, can be considered for upgrading to medical classification P1-B

(c) **Stage II Hypertension:-**

(i) All cases will be initially placed in temp cat P3 (T-24). Subsequently, if hypertension is well controlled & target organ damage is limited to grade 2 hypertensive retinopathy, they can be upgraded to P2 (T-24). If BP continues to be well controlled they will be placed in perm cat P2.

(ii) All patients with stage II hypertension with grade 3 or 4 hypertensive retinopathy, evidence of other organ damage or multiple risk factors will be observed initially in cat P3 (T-24) as above. Thereafter if BP is well controlled, and if target organ damage does not progress, they can be placed in permanent medical category P3. Cases who respond poorly to drug therapy or in whom the organ damage is progressive may be considered for invalidment out of service.

(d) **Upgradation to P1 will be considered in the following:-**

(i) Only cases without any target organ involvement or any evidence of decapitation documented to be normotensive for one year without drugs (including ambulatory BP monitoring every 6 months).

(ii) Secondary hypertension – where definitive cure has been achieved & individual remains normotensive without any drug for one year.

(iii) Such upgradations will be done by senior adviser in Cardiology/Medicine.

Table 6- Life style modifications to prevent and manage hypertension

Modification	Recommendation	Approximate SBP Reduction (Range)
Weight reduction	Maintain normal body weight (body mass index 18.5-24.9 Kg/m2)	5-20 mmHg/10 Kg
Adopt DASH (Dietary Approaches to Stop Hypertension) eating plan	Consume a diet rich in fruits, vegetables, and low fat dairy products with a reduced content of saturated and total fat	8-14 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mmol per day (2.4g sodium or 6 g sodium chloride).	2-8 mmHg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4-9 mm Hg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men, and to no more than 1 drink per day in women and lighter weight individuals	2-4 mm Hg

Table 7- Guidelines for compelling reasons for individual drug classes

Compelling Indication	Recommended Drugs					
	Diuretic	BB	ACEI	ARB	CCB	ALDOSTERONE ANT
Heart failure	•	•	•	•		
Post myocardial infarction		•	•			•
High coronary disease risk	•	•	•		•	
Diabetes	•	•	•	•	•	
Chronic Kidney disease without significant azotemia			•	•		
Recurrent stroke prevention	•		•			

Algorithm for treatment of hypertension