Desk Guide

MANAGEMENT of Hypertension-CVD & Type-2 Diabetes

Primary Health Care in Pakistan

Identify and respond to a severe condition

Assess for a severe condition – on the basis of following complaints and vital sign abnormality.

<u>Complaints</u>

- Chest pain > half hour at rest (MI);
- Chest pain with few minutes exercise, going away at rest (angina)
- Shortness of breath and ankle swelling (heart failure)
- Sudden one-sided weakness/ slurred speech/ vision loss (stroke/TIA)
- Pain in the back of lower legs or buttocks on walking, relieved with rest (peripheral vascular disease)
- Altered consciousness (blood glucose: < 70mg/dl or > 360mg/dl, or volume depletion)
- Severe numbness hand and feet (neuropathy)
- Leg ulcer/ gangrene or infection (fever > 98.6^{o} F)

<u>Vital sign abnormality</u>

- Pulse: > 120/ minute and patient feel fainting
- High Systolic BP*: > 200 mm of Hg (with or without signs of CVD)
- Low Systolic BP": < 90 mm of Hg (with signs of shock)
- Respiratory rate: > 20/ minute (shortness of breath)

If severe condition, stabilize the patient, and then refer to the hospital (see CMG page 11 and 12

If no severe condition, assess for the diagnosis of hypertension and/or diabetes.

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* OR High Diastolic BP: > 110 mm of Hg (with or without signs of CVD)

"OR Low Diastolic BP: < 60 mm of Hg (with signs of shock)

Diagnose Hypertension and Type-2 Diabetes in Adults

⇒ Investigate for hypertension and/or type-2 diabetes, if adult **patient:**

- Appears to be overweight* (i.e. more than target weight in Appendix-3), OR
- Has family history of hypertension and/or type-2 diabetes, OR
- Presents with one or more of the following complaints:

Hypertension	**Type-2 diabetes**
Dull headaches, light headedness	Increased thirst and/or hunger and/or frequent urination
Nose bleed	Recurrent infections, thrush, skin boils
Type-2 diabetes	'Pins and needles' in feet
Feeling tired or difficult to concentrate	
Blurred vision	

Hypertension

Take two consecutive readings, one minute apart, and record the lower reading as the clinic blood pressure[#]. If the clinical blood pressure is:

- More than 140/90 mm Hg, label and manage as hypertension.
- Less than 140/90 mm Hg, life style counsel and reassess after month 1 and 6.

Type-2 Diabetes:

⇒ Check random blood glucose, RBG (mg/dl), If RBG is**:**

- Less than 140 mg/dL, then no further assessment.
- 140 mg/dL or more, then next morning

⇒ Check fasting blood glucose (FBG), if FBG is:

- 110 – 125 mg/dL, then repeat FBG testing after 1 month.
- 126 mg/dL or more, then label as diabetes, register and treat.

Note hypertension:

- Make sure patient has not carried out any physical activity (e.g. walking) in the last five minutes.
- If difference in the two consecutive readings is > 5 mm Hg, then take a third measurement and record lower of the last two measurements as clinic BP.
- Do not record BP when patient is under stress, has consumed tea/ coffee, smoked tobacco or done exercise in the past 30 minutes

Conduct Baseline Clinical Assessment

Each diagnosed case is weighed and assessed for a set of associated conditions and special conditions (e.g. pregnancy) as follows:

Associated Conditions:

A patient diagnosed with hypertension must undergo assessment for diabetes and vice versa.

⇒ Assess for **heart attack or heart failure or other CVD** in the past (e.g. stroke, transient ischemic attack, angina, claudication) by asking & checking records

⇒ Assess for **Renal function** by examining for ankle edema and peri-orbital puffiness, and checking proteinuria on two occasions (at least 6 hour apart)

⇒ Assess for **hypercholesterolemia** (i.e. ≥ 200 mg/ dL) by checking blood cholesterol

Special and Other Conditions:

⇒ Assess for **smoking status** by asking patient, and if smoker then suggest stop smoking, and if patient agrees then refer for smoking cessation counseling

⇒ Assess for **eye complaints** (i.e. effects of HTN and/or diabetes) by asking patient, and if yes - refer for eye specialist opinion.

⇒ Assess for **pregnancy** by asking for late/uncertain LMP and testing urine, if pregnant assess the risk of preeclampsia[#], if positive then refer to hospital

(# Note on signs: sudden weight gain, face & hand edema, and proteinuria)

Inform patient about (by the physician):

- Disease: hypertension and/or type-2 diabetes, require lifelong management
- Effective disease management: affects the longevity and the quality of life.
- Effective disease management includes regular drug intake and healthy lifestyle i.e. diet, exercise, weight control and no-smoking.
- Report to the doctor if any “unusual” symptom/complaint is noticed.
- Guide/refer to the designated paramedic for structured counselling session

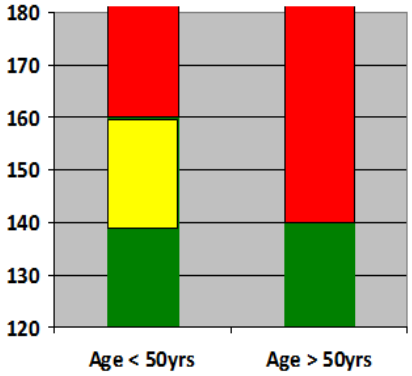
Treat for Hypertension and Type-2 Diabetes

⇒ Offer **life** style **counseling** to every person with hypertension or/and diabetes, which includes diet, exercise and smoking cessation (use the communication tools i.e. flip book and brochure).

⇒ **Guiding Principles** (for treatment of hypertension and diabetes)

- o Prescribe anti hypertensive and/or anti-diabetic drugs after diagnosis
- o Start the treatment with the lower recommended dose
- o Change the dose or add drug only after four weeks of anti-hypertensive and eight weeks of anti-diabetic drug intake,
- o Increase dose of a drug up to the upper limit of maintenance dose (if inadequate response).
- o Add a new drug if upper limit of the maintenance gives inadequate response

⇒ Assess risk and decide to initiate anti-hypertensive treatment as follows:



Key:

: Life style counseling only

: Add anti-HTN regimen, only if associated condition#.

: Add anti-HTN regimen, regardless of associated condition#.

#: Associated conditions (for anti-HTN regimen SBP: 140 - 159)

Diabetes	**Smoking**	**Serum cholesterol**
Yes	Yes	≥24 0mg/dL
Any one of the two is yes		≥320mg/dL
Renal compromise regardless of diabetes, smoking, serum cholesterol level.		

Based on risk ≥ 20 - WHO/ISH "CVD Risk Prediction Charts EMRO"

Treat Hypertension

Hypertension without an associated condition

Start with step-1, and go to the next step if BP remains 160 mm Hg or more (or DBP remains 100 mm Hg or more).

Step-1:

⇒ Thiazide

Step-2:

⇒ Add ACE inhibitors or CCB

Step-3:

⇒ Thiazide plus ACEi plus CCB

Step-4:

⇒ Label as resistant hypertension, and refer.

Administer preventive treatment[1] (in hypertension/diabetes)

Diabetes	SBP (baseline)	Smoker	Serum cholesterol
Yes	SBP: ≥140 or smoker or serum cholesterol ≥ 200mg/dL		
No	≥180		
	160 – 179	Yes	≥ 240mg/dL
		No	≥ 320mg/dL
		Renal compromise regardless of diabetes, smoking and/or serum cholesterol levels.	

(Note: Shaded cell means "not relevant" for decision to administer preventive therapy)

Administer

- Simvastatin 10 mg OD (at night), then add 10 mg /day if inadequate response in 8 weeks. Increase the dose up to 40 mg / day.
  (caution: exclude pregnancy, breast feeding & active liver disease)
- Aspirin (enteric coated) 75 mg daily (after meal)
  (caution: exclude pregnancy, breast feeding, bleeding tendencies & dyspepsia)

- if ACEi causes dry cough, replace with ARB
- exclude MI/ HF/other CVD for prescribing CCB

[1] Mainly based on risk ≥ 30 - WHO/ISH "CVD Risk Prediction Charts EMR D"

Treat Hypertension

The treatment of hypertension with associated conditions covers only the hypertension regimen, whereas the treatment required for the associated diabetes is covered in the next section of the guide (Note: The prescription for other associated conditions is not covered).

Start with step-1, and go to the next step if SBP remains 160 mm Hg or more (or DBP remains 100 mm Hg or more).

MI / HF / Other CVD:

⇒ Refer to the specialist, if history of MI / HF / other CVD.

Diabetes and/or Renal insufficiency

⇒ If baseline proteinuria is 4+, then refer for nephrology consultation

⇒ If baseline proteinuria is 1+ to 3+, treat for hypertension as follows:

Step-1:

⇒ ACE inhibitors or ARB
(caution: withhold treatment and refer, if signs of hyperkalemia i.e. palpitations and muscle weakness {K^+ >5 mEq/ L})

Step-2:

⇒ Add Thiazide or loop diuretics (if no worsening proteinuria, or hyperkalemia)

Step-3:

⇒ Label as resistant hypertension, and refer.

Pregnancy (without signs of preeclampsia)

Step-1:

⇒ Methyldopa
If not tolerated then change, or systolic BP remains 160/100mm Hg or more,

Step 2:

⇒ Add hydralazine (oral)

<u>During the breast feeding period</u>:

⇒ Manage with ACEi and/or CCB, also add a beta blocker, if needed.

Caution: ACE inhibitors and ARB are contraindicated in pregnancy.
Thiazide & methyldopa not recommended during the breast feeding period

Prescribe anti-hypertensive drugs

Drug			Daily dose (mg)				Comment
Class	**Name**	**Tablet**	**Initial**	**Add[#]**	**Maint.**	**Max.**	
Anti-hypertensive drugs							
CCB	Amlodipine-besylate	5 mg 10 mg	5	2.5	5 -10	10	O.D [2]CI: MI/HF
ACE inhibitor	Enalapril	5mg 10mg 20mg	5	5	10 – 20	40	O.D or B.D
Thiazide Diuretics	Hydro-chlorthiazide	25mg	12.5	12.5	12.5 – 25	50	O.D or B.D
Beta blockers	Atenolol	25mg 50mg 100mg	50	25	50 -100	100	O.D
Centrally acting drugs	Methyldopa	250mg	250	250	250-2000	3000	B.D or TiD
Vasodilator	hydralazine	25mg	25	25	25-100	100	B.D
Cholesterol lowering drugs (both in hypertension and diabetes)							
Statins	Simvastatin	10mg 20mg 40mg	10	10	10-40	40	O.D at nights
CVD prevention drugs (both in hypertension and diabetes)							
Anti platelet agent	Aspirin	75mg 150mg 300mg	75	75	75-150	150	O.D CI: H/o bleed tendency, liver disease, age < 21 or >80 yr.

([#] mgs to be added or reduced from the current daily dose)

key: O.D = once daily, B.D= twice daily, T.i.D= thrice daily, q.i.d= four times a day

For other anti-hypertensive agents, not included in the essential drug list, please see Appendix-1.

[2] CI: contraindicated, MI: myocardial infarction, HF: Heart failure

Treat Type-2 Diabetes

Decide to Treat

⇒ If FBG 126 – 199 with no associated condition

- Start life style modification, add drugs if inadequate response in a month

⇒ If FBG 126 – 199 with associated condition

- Start drugs and life style modification

⇒ If FBG≥200 regardless of associated condition

- Start drugs and life style modification

Administer Drugs:

Start with step-1, and go to next step if FBG ≥ 126 mg/dl (or RBG ≥ 200mg/dl)

Diabetes with or without associated conditions:

Step 1:
⇒ Metformin (if renal insufficiency, start with step-2)

Step 2:
⇒ Add Sulphonylureas (if pregnant, skip step-2)

Step 3:
⇒ Add insulin therapy to oral drugs.

Step-4:
⇒ Label as non-responding diabetes, and refer.

Note: Other available oral hypoglycemic agents are not included in the regimen because of their non-inclusion in the essential drug list. See Appendix-2 for new oral hypoglycemic agent e.g. thiazolidinedione & DPP-4 inhibitor

Prescribe oral anti-diabetic drugs

Drug			Daily dose (mg)				Comment
Class	**Name**	**Tablet**	**Initial**	**Add#**	**Maint.**	**Max. /day**	
Biguanides	Metformin	250mg 500mg 850mg 1g	500	500	500-2550	3000	B.D or T.i.D
Sulphonyl-ureas	Glibencl-amide	2.5mg 5mg	5	5	10-15	15	O.D
	Gliclazide#	80mg	40	40	40-80	320	O.D or B.D
	Glimepride#	1mg 2mg 3mg 4mg	1-2	1	1-4	8	O.D

#: Gliclazide and Glimepride are not currently included in essential drug list.

Administer Insulin

Insulin regimen	Type / dose of Insulin	Administration
Insulin augmentation	Long acting (glargine) 0.15 units / kg weight	⇒ Continue oral agents at the same dosage. ⇒ Add single injection of long acting insulin at bed time. (start with 10 units, then every 3rd day add 2 units till FBG ≤125 or 40 units limit is reached)
Insulin replacement: conventional (to be initiated at hospitals only)	Combination of Regular + intermediate acting (NPH) 0.5U/Kg body weight	⇒ Two injections per day (one before breakfast and other before dinner) are given. ⇒ 2/3 of the calculated dose is given in the morning and 1/3 in the evening.

Follow up – Hypertension and/or Type-2 Diabetes

Monthly Follow-up for Continued Treatment:

⇒ Assess the adherence?

- Ask patient adherence to the prescribed drugs
- Verify adherence - check empty strips of drugs
- Address non-adherence – counsel

⇒ Assess clinical condition (including signs of side effects)

- Check BP, pulse, and edema
- Ask and respond to the new complaint(s):
  - Adjust dose of: anti-hypertensive if: hypotension, edema, muscle weakness, anxiety, and anti-hyperglycemic if: hypoglycemia
  - Refer to specialist if: signs of HF or preeclampsia (in pregnant)
  - Stop drugs and refer to specialist if: jaundice, or fast and deep breathing, or severe muscle pain

⇒ Investigate:

- Check every month:
  - Urine for protein (refer for kidney care if proteinuria worsens)
  - Blood for glucose (only if diabetic)
- Check every 6 months:
  - Serum cholesterol - if baseline ≥ 200 mg/dl or CVD risk factor.
  - ALT* - if on simvastatin (ALT is first tested at the end one-month)

⇒ Educate for lifestyle and treatment (as required)

- The patients advised for smoking cessation are followed monthly for four months and then evaluated at 1year.

⇒ Prescribe:

- Same regimen, if adequate response and no side effect
- Adjusted regimen, if inadequate response or side effects
- Stop simvastatin - if ALT rises three times than the baseline.

⇒ Maintain record

- Enter data in “Chronic Disease Card”.

Annual Assessment:

⇒ Eye examination (for retinopathy)

⇒ Examine for peripheral neuropathy

⇒ Blood glucose (for a non-diabetic hypertensive)

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*ALT normal range: Males= 10-40IU/L, Females= 7-35IU/L

Manage severe condition - complaint and vital sign abnormality

CVD-Complaints

⇒ If chest pain > half hour at rest (MI); or few minutes exercise, going away at rest (angina)

- Administer the following, then refer to hospital:
  - ✓ sublingual nitroglycerine (0.5mg) - one tablet asap, then one tablet every five minutes if pain persists (i.e. maximum 3 tablets in 12 hours). *Contraindication*: chest pain with hypotension
  - ✓ aspirin (300mg) - one tablet (even if 75mg preventive intake reported) *Contraindication*: BP>180/110, or reported allergy to aspirin.
  - ✓ oxygen administration – after pulse oximetry or may be clinical signs: inability to breathe, cyanosis of lips and nails, and confusion.
  - ✓ opioid injectable analgesics considered, if severe pain. *Contraindication*: if SBP<90 or respiratory rate<10/ minute.

⇒ If shortness of breath and ankle swelling (heart failure)

- Administer oxygen and diuretics (if no hypotension), then refer.

⇒ If sudden one-sided weakness/ slurred speech/ face drooping/ numbness (stroke)

- Restrict oral intake, maintain I/V, and maintain airway (only if altered consciousness), then refer.

⇒ If peripheral vascular disease (PAD) with danger signs: pain, pallor, pulseless, paresthesia, and paralysis of limb.

- Maintain I/V line, administer oxygen, and then refer to hospital (Note: do not elevate the extremity)

⇒ If dry gangrene

- Maintain I/V line, then refer for surgical debridement and I/V antibiotic.

Additional comments:

⇒ If pneumothorax: administer oxygen, establish I/V line (needle thoracostomy for tension pneumothorax), then refer.

⇒ If asthma: administer bronchodilator and steroid (refer if status asthmaticus)

⇒ If altered consciousness because of injury (history), infection (fever with stiff neck), intoxication or poisoning (history), manage accordingly.

Manage severe conditions – continued

⇒ If altered consciousness (with RBG: >360mg/dl and dehydration)

- Infuse 2 liter normal saline in one hour, and administer insulin I/V infusion or subcutaneous (0.1 unit per kg) to achieve 250 – 300mg/dl, then refer

⇒ If severe hypoglycemia with altered consciousness (with RBG: <70mg/dl)

- Administer I/V (in ≤10 minutes): 20ml of 50% dextrose or 200ml of 5% dextrose, repeat after 15 minutes if target (≥90mg/dl) is not achieved.

Vital sign abnormality

⇒ If pulse: > 120/min and patient feel fainting

- Loosen the clothing/belts/collars, elevate feet, and maintain airway. Do CPR (if required), then refer.

⇒ If systolic BP: > 200 mm of Hg (with signs of CVD)

- Administer intravenous vasodilator or calcium channel blockers, then refer
  - ✓ sodium nitroprusside: 2.5 – 5 mcg/kg in 10 minutes (not if renal failure) (monitor BP every minute) OR
  - ✓ Diazoxide 100 mg every five minutes (not if heart failure) OR
  - ✓ Clevidipine: 1 – 2mg per hour in infusion.

⇒ If systolic BP: > 200 mm of Hg (without signs of CVD)

- Administer oral beta blocker or ACE inhibitors, then refer
  - ✓ Labetalol: 100mg twice a day OR
  - ✓ Captopril: 25mg twice or thrice a day

⇒ If systolic BP: < 90 mm of Hg (shock)

- Administer drugs and fluids, then refer
  - ✓ Dopamine (if BP:70-90): I/V infusion 5mcg/kg/min, OR
  - ✓ Nor-epinephrine (if BP <70): I/V infusion 2 – 4 mcg/min
  - ✓ I/V normal saline or Ringers lactate (only if non-cardiogenic)

⇒ If respiratory rate: > 20/ min (shortness of breath)

- Upright the position and give low flow oxygen at 2L/min, then refer.

Additional comments:

⇒ If non-cardiogenic shock – adjust the management accordingly and refer.

⇒ Rapid breathing - main conditions include heart failure, anxiety, pulmonary embolism, diabetic ketoacidosis, pneumonia, COPD, asthma, pneumothorax.

Appendix 1

Other Anti Hypertensive Drugs

Drug			Daily dose (mg)				Comment
Class	**Name**	**Tablet**	**Initial**	**Add#**	**Maint.**	**Max./ day**	
CCB	Diltiazem	30mg 60mg 90mg	60	30	60-120	360	B.D or T.i.D
	Verapamil	40mg 80mg 240mg	40	40	40-80	480	T.i.D or q.i.d
	Nifedipine (retard)	20mg	20	20	20-40	90	B.D
ACE inhibitor	Captopril	12.5mg 25mg 5mg	12.5	12.5	6.25-25	50	B.D
	Enalapril	5mg 10mg 20mg	5	5	10-20	40	O.D
	Lisinopril	5mg 10mg 20mg	2.5	2.5	10-20	40	O.D
Beta Blocker	Carvedilol	6.25mg 12.5mg 25mg	12.5	12.5	12.5-25	50	O.D or B.D
Loop diuretic	Furosemide	20mg 40mg	20	20	20-40	80	O.D or B.D
ARBs	Losartan potassium	25mg 50mg	50	50	50-100	100	O.D

Appendix 2

Other Oral Anti Diabetic Drugs

Drug			Daily dose (mg)				Comment
Class	**Name**	**Tablet**	**Initial**	**Add#**	**Maint.**	**Max./ day**	
Alpha-glucosidase inhibitors	Acarbose		25	25	50-100	300	T.i.D
Thiazolidine dione	Pioglitazone	15mg 30mg 45mg	15	15	15-30	45	O.D
DPP-4 inhibitors	Sitagliptin	50mg 100mg 500mg 1g	100				O.D

Appendix 3

Target weight for height chart

Height (feet, inches)	Target weight (kg)	
	Male	Female
4’6”	35	35
4’7”	39	37
4’8”	40	40
4’9”	44	42
4’10”	46	45
4’11”	50	47
5’0”	53	50
5’1”	55	52
5’2”	59	55
5’3”	61	57
5’4”	65	60
5’5”	68	62
5’6”	70	65
5’7”	74	67
5’8”	76	70
5’9”	80	72
5’10”	83	75
5’11”	85	77
6’0”	89	80
6’1”	91	83
6’2”	93	85
6’3”	96	88

Appendix 4

Drugs	Major Side effect	Management
Anti-diabetic		
Metformin	Lactic acidosis: • breathing: rapid and short, • heart: rapid rate; • abdomen: vomiting and pain; • mental: anxiety, weakness	Stop the drug and seek expert advice.
Sulphonylureas and insulin	Severe hypoglycemia: • skin: sweating, cold • heart: rapid rate, palpitations • mental: nervousness, anxiety, weakness • abdomen: nausea, hunger	
Anti-hypertensive		
ACE inhibitors	Angio-edema: • face: swelling (especially in and around mouth) • hands: swelling, and itchy and painful. • Skin: reddish marks • breathing: wheezing or shortness • mental: altered consciousness Hyperkalemia: • heart: palpitation • mental: uneasiness	Stop the drug and seek expert advice.

	• muscle: weakness • breathing: mildly rapid	
Diuretic	<u>Arrythmia</u>: • heart: palpitation and discomfort • mental: fatigue, dizziness, fainting • breathing: shortness	
Preventive treatment		
Statin	• Severe muscle pain	Stop the drug and seek expert advice.
Any of the above three		
	<u>Moderate to severe allergic reaction</u>: • Skin: rashes/itching • Breathing: wheezing, difficulty • Mental: altered consciousness (in severe)	Stop the drugs and seek expert advice.

This guide, as a decision-aid, does not cover all possible situations and/or solutions related with the management of hypertension-CVD and type-2 diabetes. The clinical judgment of the doctor remains the basis for final decision-making, and this aid should only be taken as a supplement and not a substitute of the clinical acumen. The desk guide contents, based on international guidelines, have been contextualized to the operational circumstances, through in-country working group process. The main guidelines consulted for the exercise include:

- WHO (2007): Prevention of cardiovascular disease - Guidelines for assessment and management of cardiovascular risk.
- NICE (2011): Clinical management of primary hypertension in adults (127)
- JNC-7 Express (2003): Prevention, detection, evaluation and treatment of high blood pressure
- IDF (2005): Global guidelines for type-2 diabetes
- NICE (2009): The management of type-2 diabetes (66)

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