North Carolina Department Of Correction
Division Of Prisons

SECTION: Clinical Practice Guidelines

POLICY # CP-31

SUBJECT: Hypertension

EFFECTIVE DATE: April 2011
SUPERCEDES DATE: None

PURPOSE

To assure that DOP inmates with Hypertension are receiving high quality Primary Care for their condition.

POLICY

All DOP Primary Care Providers are to follow these guidelines when treating inmates with this chronic disease. Deviations from these guidelines are permissible only on a case by case basis. When deviations are made they must be clearly documented in the medical record along with a clear explanation of the rationale for the deviation.

PROCEDURE

1) ***Initial and follow-up evaluation:*** **Refer to Cardiovascular CD Guideline**
2) **How to properly measure blood pressure**
   - **a)** The patient should be seated in a chair (not exam table) with feet on the floor for at least **5 minutes**
   - **b)** Arm supported at heart level
   - **c)** Appropriate sized cuff (bladder encircling at least 80% of arm)
   - **d)** Two measurements should be taken
3) **Diagnosis** based on **average resting (**usually should have multiple readings on different days**)** blood pressure**:**
   - **a) Pre-hypertension:** BP = 120 – 139/80 – 89
   - **b) Stage 1 hypertension**: BP = 140 – 159/90 – 99
   - **c) Stage 2 hypertension:** BP = ≥160/≥ 100
4) **Non-pharmacological** therapy**:**
   - **a)** Life-style modifications for treatment of hypertension:

Modification	Recommendation	Average SBP reduction range
Weight reduction	Maintain BMI 18.5-25	5-20 mmHg/10 kg weight loss
DASH diet	Diet rich in fruits, vegetables, and low-fat dairy products with reduced saturated fat	14-18 mmHg
Dietary sodium reduction	Reduce dietary sodium intake to 2.4 g (6 g sodium chloride)	2-8 mmHg
Aerobic physical activity	Regular aerobic physical activity at least 30 minutes per day, most days of the week	4-9 mmHg

   - **b)** Life-style modifications and treatments for prevention of Cardiovascular Disease
     - **i) No** tobacco
     - **ii)** Regular aerobic physical activity at least 30 minutes per day, most days of the week

iii) Aspirin if indicated
iv) Evaluate and treat lipids as appropriate
v) Low-fat diet, high in fruits and vegetables

5) Recommended for all levels of hypertension

a) Medications:

i) Thiazide-type diuretics should be used in drug treatment for most patients with uncomplicated hypertension, either alone or combined with drugs from other classes. Most patients should be initially started on a thiazide-type diuretics unless there is a specific contraindication to their use

ii) Most patients with hypertension will require two or more antihypertensive medications to achieve goal blood pressure.

iii) If blood pressure is >20/10 above goal blood pressure, consideration should be given to initiating therapy with two agents, one of which usually should be a thiazide-type diuretic.

iv) Second agents are usually chosen from one of the following classes: beta-blockers[6], ACE inhibitor, calcium Channel blockers.

v) If the above are contraindicated or ineffective at maximum tolerated doses then an agent from the ARB class maybe added to regimen**.**

vi) Clonidine is not a preferred agent and should general not be used unless combinations of 3 or 4 of the agents below fail to control or are not tolerated**. If also should not be used on a PRN basis.**

vii) COMMON DOP FROMULARY AGENTS:

Drug	Starting dose	Usual Maximum
Diuretics		
Triamterene/HCTZ	37.5mg/25mg qd	75mg/50mg qd
HCTZ[1]	12.5 mg qd	25mg bid or 50 mg qd
Furosemide [2]	20 – 40 mg bid	No upper limit
Spironolactone [3]	25 mg qd – bid	50 mg bid
ACE Inhibitor		
Enalapril	2.5 – 5 mg qd	40 mg qd
Lisinopril	10 mg qd	40 mg qd
Benazepril	10 mg qd	40 mg qd
Captopril	25 mg bid – tid	150 mg tid
Beta blockers[6]		
Atenolol	25 – 50 mg qd	50 mg bid/100 mg qd
Metoprolol	25 mg bid	450 mg per day
Propranolol	40 mg bid/80 mg SR qd	240 mg/day
Labetolol[4]	100 mg bid	400 mg bid
Calcium channel blocker		
Diltiazem CD[5]	180 – 240 mg qd	360 mg qd
Verapamil SR[5]	240 mg qd	240 mg bid
Nifedipine LA	30 – 60 mg qd	180 mg qd

1. Should be used with a potassium sparing agent
2. Should only be used if GFR < 60, or co morbid condition requires

3. Second line agent, useful if HCTZ contraindicated due to gout, can be used with HCTZ as a potassium sparing agent. It also has been shown to be useful in resistant hypertension when added to the existing regimen
4. Combined beta and alpha blocker, useful in resistant hypertension
5. Should be avoided with regular beta blockers, combination can cause heart block
6. Some authorities now feel that unless the patient has CAD that beta blockers should be considered a third line drug

viii) Compelling indications for Individual Drug Classes

Compelling indication	Initial therapy options
Heart failure	THIAZ, BB, ACE, ARB, ALDO ANT
Post MI	BB, ACE, ALDO ANT
High CVD Risk	THIAZ, BB, ACE, CCB
Diabetes	ACE, THIAZ, CCB, BB, ARB
Chronic kidney disease	ACE, ARB
Recurrent Stroke prevention	THIAZ, ACE

THIAZ = thiazide diuretic, ACEI= angiotensin converting enzyme inhibitor, ARB = angiotensin receptor blocker, BB = beta blocker, CCB = calcium channel blocker, ALDO ANT = aldosterone antagonist

b) Other therapies

i) The above evaluation and a good history and physical exam will reveal most treatable secondary causes of hypertension and in most cases if present should be treated prior to or in conjunction with treatment for hypertension.

ii) Identifiable causes of hypertension:

Sleep apnea	Chronic kidney disease	Primary aldosteronism
Renovascular disease	Cushing's syndrome	Pheochromocytoma
Coarctation of aorta	Thyroid disease	Parathyroid disease

iii) Drugs associated with elevated blood pressure:

Steroids	ACTH	Oral contraceptives[1]
Cyclosporine	Tacrolimus	Erythropoietin
Carbamazepine	Bromocriptine	Metoclopramide
Antidepressants[2]	Buspirone	Clonidine/BB combination
Clozepine	Methylphenidate	

1. Primarily ones with high estrogen activity
2. Particularly venlafaxine (Effexor)

iv) If the above evaluation is normal then further evaluation for secondary causes is usually not indicated.

6) Renal vascular hypertension:

a) Evaluation should be considered if one or more of the following is present:

i) Failure to control blood pressure with maximal doses of 3 – 4 or more classes of antihypertensive agents including adequate doses of a diuretic (**with compliance assured by having all the patients blood pressure medications DOT for 2 months).**

ii) Acute renal failure precipitated by drug treatment (particularly with ACE or ARB)

iii) Recurrent pulmonary edema

b) If indicated the initial evaluation for renal vascular is usually done via:

i) If renal function is normal

(1) MRA of abdomen with contrast or CTA of abdomen (rated 8 by American College of Radiology)
(2) ACE inhibitor-enhanced radionuclide renal scan, or US kidney with retroperitoneal doppler if done by an experienced team (rated 6 by American College of Radiology)

ii) If renal function is diminished
(1) US kidney with retroperitoneal doppler if done by an experienced team (rated 8 by American College of Radiology)
(2) MRA of abdomen with contrast (rated 8 by American College of Radiology**)**

7) Management of severe asymptomatic hypertension (hypertensive urgencies)

a) The rapidity with which blood pressure should be brought to safe levels (eg, <160/100 mmHg) is controversial.

b) There is **no proven benefit from rapid reduction** of the blood pressure in patients with severe asymptomatic hypertension

c) **Cerebral or myocardial ischemia or infarction can be induced** by aggressive antihypertensive therapy if the blood pressure falls below the range at which tissue perfusion can be maintained by autoregulation

d) In the absence of signs of acute end-organ damage, the goal of management is to **reduce the blood pressure to ≤160/100 mmHg over several hours to days**

e) Among patients **already treated with antihypertensive medications**, the following (depending on the circumstances) may be appropriate interventions:
i) Increase the dose of existing antihypertensive medications, or add another agent
ii) Reinstitution of medications in non-adherent patients
iii) Addition of a diuretic, and reinforcement of dietary sodium restriction, in patients who have worsening hypertension due to high sodium intake

f) In the **previously untreated patient**, several options are available. The approach should take into consideration the individual patient's risk with persistence of severe hypertension, the likely duration of severe hypertension, and of cerebrovascular or myocardial ischemia with rapid reduction in blood pressure
i) Relatively rapid initial blood pressure reduction (over several hours), if appropriate and indicated:
(1) Furosemide 20 mgs (higher if renal function is compromised)
(2) Clonidine 0.2 mg
(3) Captopril 6.25 – 12.5 mgs
ii) Blood pressure reduction over one to two days
(1) Do not begin therapy with extended release preparations or with a diuretic alone
(2) Initiate therapy with two agents or a combination agent, one of which is a thiazide diuretic
(3) A calcium channel blocker (but not sublingual nifedipine), beta blocker or angiotensin converting enzyme (ACE) inhibitor or receptor blocker can be started
(4) Choice of agent should take into consideration the type of antihypertensive agent that is most appropriate in the long term
iii) Follow up and management
(1) the patient can often be safely managed in the unit if the evaluation and management can be carried out

(2) If not the patient may need to be transferred to an infirmary until bp is stabilized.
(3) Ideally, the patient should be observed for a few hours to ascertain that the blood pressure is stable or improving
(4) If so, the patient can closely followed over the subsequent days at the unit

5/26/11

Paula Y. Smith, MD, Director of Health Services Date

SOR: Deputy Medical Director

References

American College of Radiology Appropriateness Criteria: The ACR Appropriateness Criteria® are evidence-based guidelines to assist referring physicians and other providers in making the most appropriate imaging or treatment decision for a specific clinical condition
http://www.acr.org/SecondaryMainMenuCategories/quality_safety/app_criteria.aspx

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