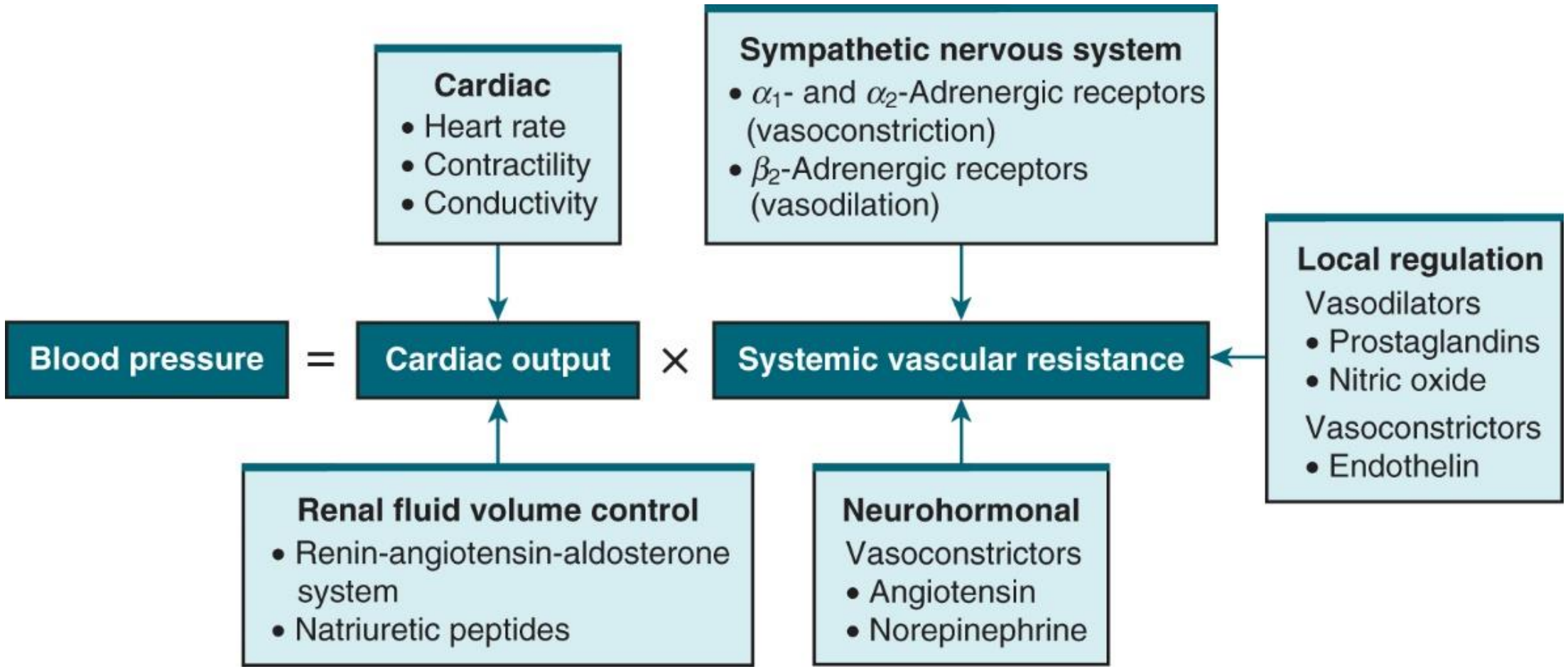
Hypertension

2021

Hypertension

- As BP increases, so does the risk of
  - _____
  - _____
  - _____
  - _____
- Affects 1 in 3 adults in the US
- High priority health concern identified in *Healthy People 2020*
- 83% of people >/= age 20 with HTN are aware they have high BP
  - 76% are being treated
  - 48% of those aware do not currently have well controlled BP

Factors Influencing BP



Factors Influencing BP

- Sympathetic Nervous System (SNS)
  - Activation increases HR and cardiac contractility
  - Vasoconstriction and renin release
  - _____ CO and SVR
- Baroreceptors
  - Sensitive to stretching
  - Send impulses to sympathetic vasomotor center
- Vascular Endothelium
  - Essential to regulation of vasodilating and vasoconstricting substances

- Renal System
  - Control sodium excretion and extracellular fluid volume
  - RAAS system
    - https://youtu.be/B-38AI_1voE
  - Prostaglandins
- Endocrine System
  - Epinephrine and norepinephrine from adrenal medulla
  - Aldosterone from adrenal cortex
  - Antidiuretic hormone from posterior pituitary

Hypertension: Classifications

CATEGORY	SBP (mmHg)		DBP (mmHg)
NORMAL	<120	and	<80
ELEVATED	120 - 129	and	<80
HYPERTENSION stage 1	130 - 139	or	80 - 89
HYPERTENSION stage 2	140 or higher	or	90 or higher

Blood pressure classification is based on 2 or more readings, accurately performed on both arms, on 2 separate occasions.

Question

- The nurse determines that the patient has Stage 2 HTN when the patient’s average blood pressure is (select all that apply)
- A. 130/86mmHg
- B. 135/88mmHg
- C. 142/82mmHg
- D. 130/110mmHg
- E. 182/106mmHg

- Also called essential or _____ HTN
- Elevated BP without identified cause
- 90 – 95% of all cases
- Exact cause unknown but several contributing factors
- Persistently increased SVR
- Abnormalities in any mechanisms involved in maintenance of normal BP

Etiology of Secondary HTN

- Elevated BP with a specific cause
- 5-10% of adult cases
- Clinical findings relate to underlying cause
- Treatment aimed at removing or treating cause
- Secondary HTN is a contributing factor to Hypertensive Crisis

Risk Factors for Primary HTN

- Positive family history
- Excessive sodium intake
- Physical inactivity
- Obesity
- High ETOH consumption
- African American
- Smoking
- HLD
- Stress
- Socioeconomic status
- Men vs women

Question

- While performing blood pressure screening at a health fair, the nurse counsels which person as having the greatest risk for developing hypertension?
- A. A 56-year-old man whose father died at age 62 from a stroke
- B. A 30-year-old female advertising agent who is unmarried and lives alone
- C. A 68-year-old man who uses herbal remedies to treat his prostate gland
- D. A 43-year-old man who travels extensively with his job and exercises only on weekends

Expected Findings

- May have few or no manifestations
- AKA “Silent Killer”
- Monitor for the following:
  - Headaches, particularly in AM
  - Facial flushing
  - Dizziness
  - Fainting
  - Retinal changes, visual disturbances
  - Nocturia

The s/s of Hypotension are: _____
_____

Complications

- Target organ diseases occur most frequently in:
  - Heart
  - Brain
  - Peripheral vasculature
  - Kidneys
  - Eyes

Hypertrophy

- Compensatory hypertrophy of LV muscle to pump against increased SVR caused by HTN

Diagnostic Studies

- Measurement of BP
- Urinalysis
- BUN and serum creatinine
- Creatinine Clearance
- Serum electrolytes, glucose
- Serum lipid profile
- Uric acid levels
- EKG
- Echocardiogram

- Ambulatory Blood Pressure Monitoring
  - Noninvasive, fully automated system that measures BP at preset intervals over 24-hour period
  - Teach patient to hold arm still and keep diary
  - Many applications for use

Interprofessional Care

- Overall Goals:
  - Control BP
  - Reduce CV risk factors and target organ disease

- Goals & when to start therapy:
  - Over 60yoa – start with _____, to maintain BP less than these thresholds
  - Under 60yoa – initiation and goals are _____. Same for those 18 and older with either CKD or DM

Lifestyle Modifications

- Weight reduction
  - Weight loss of 22lb may decrease SBP by up to 10mmHg
  - Calorie restriction and physical activity
- DASH eating plan
  - Fruits, vegetables, fat-free or low-fat milk, whole grains, fish, poultry, beans, seeds, and nuts
  - Less red meat, salt, sweets, added sugars, and sugar containing beverages than average American diet
- Dietary sodium reduction
  - <2300mg/day for healthy adults
  - <1500mg/day for African Americans, middle aged and older, those with HTN, DM, or CKD
- Moderation of ETOH intake
- Physical Activity
  - Moderate intensity aerobic activity most days, vigorous activity 3x/week, muscle strengthening and flexibility/balance activity 2x/week
- Avoid Tobacco Products
  - Potent vasoconstrictor
  - Smoking cessation reduces risk factors within 1 year
- Psychosocial risk factors
  - Low socioeconomic status, social isolation and lack of support, stress, negative emotions
  - Activate SNS and stress hormones

Drug Therapy

- Follow up care
- Identify, report, and minimize side effects
  - Orthostatic hypotension
  - Sexual dysfunction
  - Dry mouth
  - Frequent urination
- Time of day to take drug

- Types of drugs:
  - Diuretics
  - Calcium-Channel Blockers
  - Angiotensin-Converting Enzyme Inhibitors
  - Angiotensin-II receptor Antagonists
  - Aldosterone-Receptor Antagonists
  - Beta Blockers
  - Central-alpha2 Agonists
  - Alpha-Adrenergic Antagonists

Diuretics

- Thiazide Diuretics- inhibit water and sodium reabsorption and increase potassium excretion (hydrochlorothiazide)
- Loop Diuretics- decrease _____and increase _____(furosemide)
- Potassium Sparing Diuretics- affect the distal tubule and prevent water reabsorption of sodium in exchange for potassium (spironolactone)
- Nursing Considerations
  - Monitor
    - K levels
    - Muscle weakness
    - Irregular pulse
    - Dehydration
- Client Education
  - Keep all appointments with HCP to monitor efficacy of tx and possible electrolyte imbalances
  - If taking potassium depleting diuretic, encourage consumption of potassium rich foods
  - Encourage taking diuretics _____decrease getting up multiple times at night

Calcium Channel Blockers

- Alters the movement of calcium ions through the cell membrane, causing vasodilation and lowering blood pressure (-PINES- amlodipine, nifedipine) (verapamil, diltiazem)
- Nursing Considerations
  - Monitor BP and pulse and change position slowly
  - Hypotension is common adverse effect
  - Use cautiously with clients who have HF
- Client Education
  - Constipation can occur with Verapamil, so encourage high fiber foods
  - A decrease or increase in HR and atrioventricular (AV) block can occur. Teach client how to monitor pulse and call HCP if irregular or slower than baseline HR
  - Instruct to avoid grapefruit juice, which potentiates the medication's effects, increases hypotensive effects, and increases risk of medication toxicity

Angiotensin-Converting Enzyme (ACE) Inhibitors

- Prevent conversion of Angiotensin I to Angiotensin II, which prevents vasoconstriction (-PRILs- lisinopril and enalapril)
- Nursing Considerations
  - Monitor BP and pulse- hypotension is adverse effect
  - Monitor for evidence of HF - such as _____.
  - Can cause heart and kidney complications
- Client Education
  - Notify provider of a persistent cough
    - Can have a relationship to angioedema (swelling of tissues in mouth and throat)
    - Teach client to report manifestations of HF

Angiotensin II Receptor Antagonists (ARBs)

- Good option for clients taking ACE inhibitors who report cough. No dosage adjustment for older adults. (-SARTANs- Valsartan and losartan)
- Nursing Considerations
  - Monitor for angioedema and heart failure
- Client Education
  - Change position slowly
  - Report signs of angioedema
    - _____
  - Report signs of HF
  - Avoid foods high in potassium and have _____levels checked

Aldosterone-Receptor Antagonists

- Block aldosterone action. (eplerenone)
- The blocking effect of Eplerenone on aldosterone receptors promotes the _____ of potassium and _____ of sodium and water
- Nursing Considerations
  - Monitor kidney function, triglycerides, sodium, and potassium levels
    - Risk of adverse effects increases with deteriorating kidney function
      - Hypertriglyceridemia, hyponatremia, and hyperkalemia can occur as dose increases
  - Monitor K levels q 2 weeks for first few months, then q 2 months after
- Client Education
  - Potential food, medication, and herbal interactions
    - Grapefruit juice and St. John's wort increase adverse effects
  - No salt substitutes with potassium or other foods rich in potassium.
  - Avoid taking K supplements or _____diuretics

Beta Blockers

- Indicated for clients who have unstable angina or MI.
- Decrease CO and block release of renin, subsequently decreasing vasoconstriction of peripheral vasculature (-OLOLs- metoprolol and atenolol)
- Nursing considerations
  - Monitor BP and pulse
  - Can mask _____ in clients with DM
- Client Education
  - Side effects include fatigue, weakness, depression, sexual dysfunction
  - Do not abruptly stop taking without consulting HCP - can cause rebound hypertension
  - Teach manifestations of hypoglycemia that do not include tachycardia because beta blockers suppress _____

Central-Alpha2 Agonists

- Reduces peripheral vascular resistance and decreases blood pressure by inhibiting the reuptake of norepinephrine (clonidine)
- Nursing Considerations
  - Monitor BP and pulse
  - Not used for first line management
- Client Education
  - Adverse effects including sedation, orthostatic hypotension, and impotence

Alpha-Adrenergic Antagonists

- Cause vasodilation (prazosin)
- Nursing Considerations
  - Start with low dose, usually at night
  - Monitor BP for 2 hours after initiation of treatment
- Client Education
  - Rise slowly to prevent orthostatic hypotension
  - Use caution when driving until effects of med are known

Nursing Diagnoses

- Ineffective health maintenance behaviors related to lack of knowledge of pathology, complications, and management of hypertension
- Anxiety related to complexity of management regimen
- Sexual dysfunction related to side effects of antihypertensive medication
- Risk for decreased cardiac tissue perfusion
- Risk for ineffective cerebral tissue perfusion

- Potential complications: stroke, MI

Nursing Planning (EOs)

- Patient will:
  - Achieve and maintain goal BP
  - Understand, accept, implement, and follow treatment plan
    - Including HCP appointments
  - Report minimal side effects of therapy
  - Manage and cope with this condition

Nursing Implementation

- Health Promotion
  - Primary prevention via _____
  - Individual patient eval. and education
  - Screening programs
  - CV risk factor modification
- Ambulatory care
  - Evaluate therapeutic effectiveness
  - Detect and report adverse effects
  - Assess and enhance compliance
  - Patient and caregiver teaching
- Home BP monitoring
  - Patient teaching is critical for accuracy
    - Proper equipment
    - Proper procedure
    - Frequency
    - Accurate recording and reporting
    - Target BP
- Reasons for poor adherence to treatment plan are complex
  - Inadequate teaching
  - Low health literacy
  - Unpleasant SE of drugs
  - Return to normal BP with meds
  - High dose of meds
  - Lack of insurance

Measures to Enhance Compliance

- Individualize plan
- Active patient participation
- Select affordable drugs
- Involve caregivers
- Combination drugs
- Patient teaching

Question

- A patient's BP has not responded consistently to prescribed drugs for hypertension. The *first* cause of this lack of responsiveness the nurse should explore is
- A. Progressive target organ damage
- B. The possibility of drug interactions
- C. The patient not adhering to therapy
- D. The patient's possible use of recreational drugs

Hypertension and the Elderly

- Increased incidence with age
- Isolated Systolic HTN is most common
- More likely to have white coat syndrome
- Age-related physical changes contribute to HTN
  - Loss of elasticity in large arteries from atherosclerosis
  - _____ collagen content and stiffness of myocardium
  - Increased peripheral vascular resistance
  - Decreased adrenergic receptor sensitivity
  - Blunting of baroreceptor reflexes
  - Decreased renal function
    - Decreased renin response to sodium and water depletion

Hypertension and the Elderly

- Altered drug absorption, metabolism, and excretion
- Auscultatory gap
  - Failure to inflate cuff high enough may result in underestimating BP
- Increased risk of orthostatic hypotension
  - Monitor for this at every visit
- Postprandial hypotension
  - Greatest decrease occurs about 1 hour after meals, returns to normal 3-4 hours after eating.
  - Avoid giving vasoactive drugs with meals

Hypertension and the Elderly

- BP goal for people >60 is <150/90
- Preferred antihypertensive drugs
  - Thiazide diuretics
  - Calcium channel blockers
  - ACE inhibitors or ARBs
- Caution use of NSAIDs

Hypertensive Crisis

- SBP >180mmHg and/or DBP >120mmHg
  - Hypertensive urgency
    - Develops over hours to days
    - May not require hospitalization
  - Hypertensive emergency
    - Very severe problems can result if prompt tx is not obtained
      - encephalopathy, intracranial or subarachnoid _____, heart failure, MI, renal failure, dissecting aortic aneurysm, and retinopathy
- Rate of rise is more important that the actual value
  - Some can get up to 220/140
  - BUT! How fast did it get that high?

Hypertensive Crisis: Clinical Manifestations

- Hypertensive encephalopathy
  - HA, N/V, seizure, confusion, coma
- Renal insufficiency
- Cardiac decompensation
  - MI, HF, pulmonary edema
- Aortic dissection

Hypertensive Crisis: Nursing and Interprofessional Management

- Hospitalization
  - IV drug therapy: titrated to MAP
    - IV antihypertensives and intensive care monitoring
    - Mean Arterial Pressure is often used instead of BP to evaluate and guide therapy
    - Goal is to decrease MAP no more than 20-25% over next 24 hours. Lowering too quickly may _____ to vital organs.
  - Monitor cardiac and renal function
    - Monitor BP and HR q2-3 minutes during initial administration
    - Can use intraarterial line or automated, noninvasive BP machine
    - Monitor EKG for _____and signs of _____
  - Neurologic checks
    - LOC, pupillary size and reaction, movement of extremities
  - Determine cause
  - Education to avoid future crisis

Question

- The nurse determines that which blood pressure would meet the criteria for a diagnosis of Stage I hypertension (select all that apply)
- A. 134/84 mmHg
- B. 138/88 mmHg
- C. 144/92 mmHg
- D. 156/96 mmHg
- E. 182/100 mmHg