Objectives

• Analyze the nursing process in the promotion and maintenance of system stability for individuals with vascular problems (aneurysms).

• Analyze peripheral vascular disease (PVD), the types, risk factors, signs and symptoms, complication, treatment and related nursing care.

Aneurysms

• Aortic Aneurysms
  – Most common cause is atherosclerosis
  – Lined by thrombi
  – ↑ 3cm risk for rupture
  – Growth unpredictable
Aneurysms Risk factors

- Male
- 65 years old are more
- Tobacco use
- ↑ BP
- Artery disease
- ↑ cholesterol
- Genetics/Congenital

Types

- True aneurysm
  - At least one vessel layer intact
    - Fusiform – widening with uniform shape
    - Saccular – pouch like bulge

Aneurysms Types (cont.)

- False aneurysm/Pseudoaneurysm
  - Disruption of all arterial wall layers
  - With bleeding
Abdominal (AAA)

– Most common (75%)

– Most develop below renal arteries

– May be in more than one location

Signs and Symptoms of AAA

• Most asymptomatic

• May have a pulsatile mass
  – Do not palpate
  
  http://www.youtube.com/watch?v=PrlTdsJ7Iw

• Mimic back and abdominal problems
  – Lower back pain
  – epigastric pain
  – Change in bowel elimination
  – Possible “blue toe syndrome”

Thoracic Aortic Aneurysms

– Occurrence (25%)

– Ascending aorta/Aortic arch
Signs and Symptoms of Thoracic Aortic Aneurysms

- Most Asymptomatic
- Mimic angina
  - Deep chest pain
- May develop
  - Hoarseness
  - Dysphagia
  - JVD
  - Edema in face and arms

Complications of aneurysm

- Rupture
- Massive hemorrhage → Hypovolemic Shock
  → Death

Diagnostics

- Most Aneurysm are found by accident
  - Chest and abdominal X-rays
  - Ruling out MI
- Abnormal labs
  - Fibrinogen
  - D-dimer
Diagnostics (cont.)

- Once found aneurysms are monitored by
  - CT scan
  - MRI
  - Angiography

Interventions

- Goal – Prevent rupture
  - Helpful drugs
    - Statins
    - B blockers
    - Antibiotics
  - Surgical
    - When ≥ 5.5 cm in men and ≥ 5.0 cm in women

Open surgery

1. Incises the diseased aortic segment
2. Remove plaque/thrombus
3. Suture in synthetic graft
4. Suture aortic walls around graft
Endovascular Graft Procedure

- Complications
  - Rupture, stent migration, growth of aneurysm around stent graft.
  - Need CT monitoring for life

http://www.youtube.com/watch?v=2q8P1_kw5wQ

RN Interventions

- Baseline assessment

- Health promotion
  - Reduce cardio disease risk factors

Postoperative

- Graft patency
- Infection
- Gastrointestinal status
- Neuro status
- Peripheral perfusion
- Renal perfusion
Home care

– Gradually increase activities
– Avoid heavy lifting for 6 weeks
– Sexual dysfunction common in males

Aortic Dissection

• Not a true aneurysm

• Creation of a false lumen between the intima and media vessel walls
  – Acute onset
  – Commonly ascending aorta
  – Can be chronic

Aortic Dissection (cont.)

• Cause
  – Degeneration of elastic fibers → intimal tears
  – In areas of highest rise in BP
    • Aortic arch
    • Subclavian artery
  – Dissection can progress down the aorta to lower extremities
Aortic Dissection (cont.)

- Risk factors
  - Male
  - Age
  - Congenital heart disease
  - Connective tissue disorders
  - Cocaine use
  - Cardiac surgery
  - ↑ BP
  - Atherosclerosis
  - Pregnancy

Signs and symptoms of Dissection

- Sudden excruciating chest/back pain
- Noted as “sharp”, “worst ever”, “tearing”, “ripping”
- Older adults more likely develop ↓ BP, and vague symptoms

Symptoms by location of Dissection

- Aortic arch
  - Neuro deficits
    - Absent carotid/temporal pulses
    - Dizziness/syncope
- Subclavian
  - Differences in between left and right side upper extremity pulses
- Below aorta
  - Decreased tissue perfusion to the abdominal organs and lower extremities
### Complications

Can develop
- angina
- MI
- Cardiac murmur
- Left side CHF

- Cardiac tamponade
- Rupture
  - Massive hemorrhage → Hypovolemic Shock
  → Death

### Interventions

- BP Control
  - IV B-blocker (esmolol)
  - Calcium channel blockers
  - Ace inhibitors

- Pain control

### Interventions (cont.)

- Surgery
  - Delayed as long as possible for false lumen to clot
  - Women have poorer surgical outcomes than men

- Endovascular repair
RN Interventions

- Rx in ICU
  - Semi-fowler’s
  - ↓ stimuli
  - ↓ BP
    - IV antihypertensives
  - Pain control/sedation
  - Neuro assessments
  - Constant cardiac monitoring

Home/discharge

- Long term BP management
- Regular follow-up CT/MRI
- EMS if symptoms occur

Peripheral Artery Disease (PAD)

- Cause - obstruction of the peripheral arteries and a lack of collateral circulation

- Risk factors
  - Smoking/tobacco
  - ↑ lipids
  - ↑ BP
  - Diabetes
Symptoms of PAD

- Intermittent claudication
  - Muscle ache/pain with activity

- Location related symptoms
  - Aortoiliac – buttocks and thighs pain
  - Femoral/popliteal – calf pain
  - Internal iliac – sexual dysfunction (men)

Clinical Manifestations

- Paresthesia

- Neuropathy

- Skin
  - Thin, shiny, taut
  - Hair loss
  - Leg ↑ - pallor, leg ↓ - redness of foot

Clinical Manifestations (cont.)

- Progression of disease
  - Rest pain
  - Improved Pain relief with dangling

- Critical ischemia
  - Chronic rest pain, ulcerations, gangrene
  - Amputation
Diagnostics

- Doppler ultrasound
- Ankle-brachial index (ABI)
- Pulse-ox assessment
- Angiography

Treatment goals

- ↑ tissue perfusion
- Relief of pain
- ↑ exercise tolerance
- Intact healthy skin

Treatments

- Drug therapy
  - Antiplatelets
  - ACE inhibitors
  - Statins
  - Pletal – first line for intermittent claudication
  - Trental – second line for intermittent claudication
- Exercise therapy
Treatments (cont.)

- Nutrition
- Angiography
  - Stents
  - Atherectomy
  - Cryoplasty

Treatments (cont.)

- Surgical bypass
- Endarterectomy
- Amputation

Nursing Interventions

- Acute care post-op
  - Post Angiography/Surgery assessments
    - 6 “P”
    - ABI measurements
    - Hemorrhage
    - Hematoma
    - Compartment syndrome
    - Thrombosis
  - Repositioning/ambulation
  - Compression stockings
Home care teaching

- No Nicotine
- Diet
- ↑ physical activity
- Circulation assessment
- Foot care

Acute arterial ischemia

• Sudden interruption of blood flow
  – Thrombosis, embolism
  – May progress to tissue death within hours

• Assessment
  – Sudden on-set
  – 6 “P” in extremities
  – MI, Stroke, PE, etc

Acute arterial ischemia (cont.)

• Goal
  – Restore tissue perfusion
• Interventions
  – Anticoagulant
  – Thromboectomy
  – Catheter-directed thrombolytic
  – Amputation if unable to restore perfusion in limbs
  – Long term oral anticoagulants after event
Thromboangiitis Obliterans (Buerger’s Disease)

- **Cause**
  - Inflammation of the small to medium arteries in the upper and lower extremities
  - Inflammation → ↑thrombosis and fibrosis of arteries

- **Symptoms**
  - Intermittent claudication → rest pain → ulceration
  - Cold sensitive, thrombosis, color/temp changes, paresthesia

- **Risks**
  - Male ↓ 40 y/o
  - HX of smoking

- **Treatment**
  - Stop tobacco or loss limb
  - Sympathectomy
  - Spinal cord stimulator
  - Amputation

Raynaud’s Phenomenon

- **Cause**
  - Vasospasms of small arteries of fingers and toes
  - Unknown why, associated with autoimmune disease

- **Symptoms**
  - Color changes pallor → cyanotic → red
  - Last minutes to hours
  - Change in skin (thicken), change in nails (brittle), Small holes
Patient Teaching

- Warm cloths, gloves, avoid temp extremes
- Soak hands in warm water
- Stop use of vasoconstrictive agents
- Relaxation techniques
- calcium channel blockers in extreme cases
- Follow-ups

Venous Thrombosis

- From DVT to PE

- Cause
  - Venous stasis
  - Damage of the endothelium
    - Direct (iv, trauma, burn)
    - Indirect (chemo, DM)
  - ↑ coagulability
    - Smoking, estrogen, corticosteroids

Pathophysiology

- Platelet aggregation and fibrin → trap RBCs →
  attracted WBCs → attracted more platelets →
  thrombosis → grows larger and forms “Tail”

- Breaks off at tail

- Lysis in 5 to 7 days
Deep Vein Thrombosis (DVT)

- Lower extremity
- Symptoms
  - One or both lower extremities
  - Pain
  - Color change = red, purple
  - Edema
  - Warm
  - Temp (100.4)
  - Homan’s very unreliable

Prevention

- In bed exercises
  - Flex and extend feet, legs and hips every 2 to 4 hours
- Walking
  - 4 to 6 times a day
- Compression stockings
- SCDs

Prevention (cont.)

- Drugs
  - Warfarin – vit k antagonist
  - Heparin – indirect thrombin inhibitor
- Dx
  - ultrasound
**Treatment**

- Prevention of growth with anticoagulants
- Lysis in 5 to 7 days
- Heparin bridge to Warfarin
  - INR ≥ 2.0 for 24 hours
- Thrombolytics
- Surgical placement of filter in vena cava

http://www.youtube.com/watch?v=qlA6a_FRA48

**Superficial Vein Thrombosis (SVT)**

- Is a benign disorder
- Symptoms
  - Firm, palpable, cordlike vein, with mild temp
  - Rare infections
- Cause
  - Vein trauma – extended IV placement, caustic IV solutions
  - Recent sclerotherapy

**Treatment for SVT**

- Remove IV
- Warm moist heat
- NSAIDs
- Varicose veins
  - Compression stockings
  - walking
Nursing Interventions Acute Care

• Goals
  – Pain relief
  – Decrease edema
  – No skin ulcerations
  – No bleeding
  – No PE

Nursing Interventions Home Care

• Goal – Risk reduction
  – Compression stockings
  – No nicotine
  – No constrictive clothing
  – Anticoagulation medications
    • Labs, follow-up appointments, diet, etc.
    • ↓ bleeding risks
  – ↓↓ of PE
  – ↑ activity – walking, swimming
  – ↓ weight

Varicose veins

• Patho
  – Veins become dilated and tortuous due to increase venous pressure

• Risk factors
  – Female
  – Age
  – Obesity
  – Pregnancy
  – Prolonged standing/sitting
Varicose veins (cont.)

- Symptoms
  - SVT
  - Cosmetic
  - Feelings of heaviness, aching, itching, edema, cramping

- Rx
  - Compression stockings,
  - Rest with elevation
  - Walking/changing positions/ weight loss

http://www.youtube.com/watch?v=ski6ROh5d4

Chronic Venous Insufficiency (CVI)

- Cause
  - Valvular destruction
  - Leads to retrograde blood flow

- Symptoms
  - Edema, ↑ pigmentation, varicosities, ulcerations, leathery skin, itching,

Venous Ulcers

- Acute Care
  - Compression stockings
  - Compression bandages
    - Moist environment
  - Prevent/treat infection
  - Nutrition
  - Skin graft

http://www.youtube.com/watch?v=esO_29qG2zU
Home Care

- Avoid trauma
- Proper skin care
  - Daily moisture
- Compression stockings
- No prolonged standing/sitting
- Elevate lower extremity
- Walking once ulcer is healed

Artery vs. Venous
TABLE 38-2 (p.875)
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