Adult health Nursing **Cardiovascular Disorders**
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Assessment of Cardiovascular Disorders

1. **Health History**
    - **Chief Complaint**: Document the primary concern, specifying the nature and duration of symptoms.
    - **History of Present Illness**: Assess associated symptoms, including any triggers, alleviating factors, and the impact on daily activities.
    - **Past Medical History**: Note any history of cardiovascular conditions (e.g., hypertension, coronary artery disease), surgeries, and comorbidities (e.g., diabetes, hyperlipidemia).
    - **Family History**: Evaluate genetic predispositions to heart diseases, noting early-onset cases in relatives.
    - **Social History**: Gather information on lifestyle factors, including smoking, alcohol use, diet, exercise habits, and stress levels.
2. **Physical Examination**
    - **Vital Signs**: Monitor for hypertension, tachycardia, or bradycardia; observe for irregularities.
    - **Cardiac Exam**:
        - **Auscultation**: Listen for abnormal heart sounds (murmurs, clicks, rubs), and note the rhythm.
        - **Palpation**: Assess for thrills or heaves, and check peripheral pulses for symmetry and strength.
    - **Assessment for Edema**: Evaluate for peripheral edema, noting location and severity, and inspect for signs of venous insufficiency.

Signs and Symptoms

1. **Common Cardiac Symptoms**
    - **Chest Pain**: Quality (sharp, dull), location, radiation, and relation to activity or rest.
    - **Shortness of Breath (Dyspnea)**: Assess if it occurs at rest, with exertion, or in specific positions (orthopnea).
    - **Fatigue**: Evaluate unusual tiredness, especially in patients with heart failure.
    - **Palpitations**: Document frequency, duration, and any associated symptoms like dizziness.
2. **Peripheral Signs**
    - **Cyanosis**: Peripheral or central, indicating hypoxemia.
    - **Jugular Venous Distention (JVD)**: Suggests right-sided heart failure or fluid overload.

- **Clubbing**: May indicate chronic hypoxia or heart defects.

Diagnostic Tests

1. **Electrocardiogram (ECG)**
   - Essential for identifying arrhythmias, ischemic changes, and previous myocardial infarctions. Continuous monitoring may be indicated in acute settings.
2. **Echocardiogram**
   - Non-invasive imaging technique to evaluate cardiac function, structure (ventricular size, wall motion), and ejection fraction.
3. **Stress Testing**
   - Evaluates exercise tolerance and identifies ischemic changes through exercise or pharmacological means.
4. **Chest X-ray**
   - Assesses heart size, shape, and any pulmonary congestion or pleural effusions.
5. **Blood Tests**
   - **Lipid Profile**: Assesses cholesterol levels to evaluate cardiovascular risk.
   - **Cardiac Biomarkers**: Troponin for myocardial injury; BNP for heart failure assessment.
6. **Coronary Angiography**
   - Invasive procedure to visualize coronary artery patency, often coupled with interventions like angioplasty or stenting.
7. **CT and MRI**
   - Advanced imaging techniques for assessing vascular anatomy and function, particularly in complex cases.

CARDIAC CATHETERIZATION

Cardiac catheterization is an invasive diagnostic procedure in which radiopaque arterial and venous catheters are introduced into selected blood vessels of the right and left sides of the heart. Catheter advancement is guided by fluoroscopy. Most commonly, the catheters are inserted percutaneously through the blood vessels, or via a cutdown procedure if the patient has poor vascular access. Pressures and oxygen saturations in the four heart chambers are measured. Cardiac catheterization is used to diagnose CAD, assess coronary artery patency, and determine the extent of atherosclerosis based on the percentage of coronary artery obstruction.

These results determine whether revascularization procedures including PTCA or coronary artery bypass surgery may be of benefit to the patient .

During cardiac catheterization, the patient has an intravenous line in place for the administration of sedatives, fluids, heparin, and other medications.

Noninvasive hemodynamic monitoring that includes BP and multiple ECG tracings is necessary to continuously observe for dysrhythmias or hemodynamic instability.

The myocardium can become ischemic and trigger dysrhythmias as catheters are positioned in the coronary arteries or during injection of contrast agents. Resuscitation equipment must be readily available during the procedure.

Staff must be prepared to provide advanced cardiac life support measures as necessary. Radiopaque contrast agents are used to visualize the coronary arteries; some contrast agents contain iodine.

The patient is assessed before the procedure for previous reactions to contrast agents or allergies to iodine-containing substances (eg, seafood). If the patient has a suspected or known allergy to the substance, antihistamines or methylprednisolone (Solu-Medrol) may be administered before the procedure. In addition, the following blood tests are performed to identify abnormalities that may complicate recovery:

BUN and creatinine levels, INR or PT, a PTT, hematocrit and hemoglobin values, platelet count, and electrolyte levels. Diagnostic cardiac catheterizations are commonly performed on an

outpatient basis and require 2 to 6 hours of bed rest before ambulation. For most patients, bed rest for 6 hours compared to 2 hours has no advantage with regard to groin bleeding complications. However, variations in time to ambulation are most often related to the size of the catheter used during the procedure, the anticoagulation status of the patient, other patient variables (eg, advanced age, obesity, bleeding disorder), the method used for hemostasis of the arterial puncture site after the procedure, and institutional policies.

The use of smaller (4 or 6 Fr) catheters, which are more amenable to shorter recovery times, is common in diagnostic cardiac catheterizations. There are several methods available to achieve arterial hemostasis after catheter removal, including manual pressure, mechanical compression (placed over puncture site for 30 minutes).

Patients hospitalized for angina or acute MI may also require Patients hospitalized for angina or acute MI may also require cardiac catheterization. After the procedure, these patients usually return to their hospital rooms for recovery. In some cardiac catheterization laboratories, an angioplasty may be performed immediately after the catheterization if indicated.

NURSING INTERVENTIONS

Nursing responsibilities before cardiac catheterization include the following:

• Instruct the patient to fast, usually for 8 to 12 hours, before the procedure. If catheterization is to be performed as an outpatient procedure, explain that a friend, family member, or other responsible person must transport the patient home.

• Prepare the patient for the expected duration of the procedure; indicate that it will involve lying on a hard table for less than 2 hours.

• Reassure the patient that mild sedatives or moderate sedation will be given intravenously.

• Prepare the patient to experience certain sensations during the catheterization. Knowing what to expect can help the patient cope with the experience. Explain that an occasional pounding sensation (palpitation) may be felt in the chest because of extrasystoles that almost always occur, particularly when the catheter tip touches the myocardium. The patient may be asked to cough and to breathe deeply, especially after the injection of contrast agent. Coughing may help to disrupt a dysrhythmia and to clear the contrast agent from the arteries. Breathing deeply and holding the breath helps to lower the diaphragm for better visualization of heart structures. The injection of a contrast agent into either side of the heart may produce a flushed feeling throughout the body and a sensation similar to the need to void, which subsides in 1 minute or less.

• Encourage the patient to express fears and anxieties. Provide teaching and reassurance to reduce apprehension.

Nursing responsibilities after cardiac catheterization may include the following:

1. Observe the catheter access site for bleeding or hematoma formation, and assess the peripheral pulses in the affected extremity (dorsalis pedis and posterior tibial pulses in the lower extremity, radial pulse in the upper extremity) every 15 minutes for 1 hour, and then every 1 to 2 hours until the pulses are stable.

2. Evaluate temperature and color of the affected extremity and any patient complaints of pain, numbness, or tingling sensations to determine signs of arterial insufficiency. Report changes promptly.

3. Monitor for dysrhythmias by observing the cardiac monitor or by assessing the apical and peripheral pulses for changes in rate and rhythm. A vasovagal reaction, consisting of bradycardia, hypotension, and nausea, can be precipitated by a distended bladder or by discomfort during removal of the arterial catheter, especially if a femoral site has been used. Prompt intervention is critical; this includes raising the feet and legs above the head, administering intravenous fluids, and administering intravenous atropine.

4. Inform the patient that if the procedure is performed percutaneously through the femoral artery , the patient will remain on bed rest for 2 to 6 hours with the affected leg straight and the head elevated to 30 degrees . For comfort, the patient may be turned from side to side with the affected extremity straight. If the cardiologist uses deployed devices, check local nursing care standards, but anticipate that the patient will have less restrictions on elevation of the head of the bed and will be allowed to ambulate in 2 hours or less . Analgesic medication is administered as prescribed for discomfort.

5. Instruct the patient to report chest pain and bleeding or sudden discomfort from the catheter insertion sites immediately.
6. Encourage fluids to increase urinary output and flush out the dye.

7. Ensure safety by instructing the patient to ask for help when getting out of bed the first time after the procedure, because orthostatic hypotension may occur and the patient may feel dizzy and lightheaded.

Patient education after catheterization

After discharge from the hospital for cardiac catheterization, guidelines for self-care include the following:

- For the next 24 hours, do not bend at the waist (to lift anything), strain, or lift heavy objects.
- Avoid tub baths, but shower as desired.
- Talk with your physician about when you may return to work, drive, or resume strenuous activities.

• Call your physician if any of the following occur: bleeding, swelling, new bruising or pain from your procedure puncture site, temperature of 101.5°F (38.6°C) or more.
• If test results show that you have coronary artery disease, talk with your physician about options for treatment, including cardiac rehabilitation programs in your community.
• Talk with your physician and nurse about lifestyle changes to reduce your risk for further or future heart problems, such as quitting smoking, lowering your cholesterol level, initiating dietary changes, beginning an exercise program, or losing weight.

Exercise Stress Testing

In an exercise stress test, the patient walks on a treadmill (most common) or pedals a stationary bicycle or arm crank. Exercise intensity progresses according to established protocols.

The Bruce protocol, for example, is a common treadmill protocol in which the speed and grade of the treadmill are increased every 3 minutes.The goal of the test is to increase the heart rate to the “target heart rate.” This is 80% to 90% of the maximum predicted heart rate and is based on

the age and gender of the patient. During the test,the following are monitored: two or more ECG leads for heart rate, rhythm, and ischemic changes; BP; skin temperature; physical appearance; perceived exertion; and symptoms including chest pain, dyspnea, dizziness, leg cramping, and fatigue.

The test is terminated when the target heart rate is achieved or when the patient experiences chest pain, extreme fatigue, a decrease in BP or pulse rate, serious dysrhythmias or ST segment changes on ECG, or other complications. When significant ECG abnormalities occur during the stress test (ST segment depressions), the test result is reported as positive and further diagnostic testing is required.

NURSING INTERVENTIONS

In preparation for the exercise stress test, the patient is instructed to fast for 4 hours before the test and to avoid stimulants such as tobacco and caffeine. Medications may be taken with sips of water. The physician may instruct patients not to take certain cardiac medications, such as beta-blockers, before the test. Clothes and sneakers or rubber-soled shoes suitable for exercising are to be worn. Women are advised to wear a bra that provides adequate support. The nurse describes the equipment used and the sensations and experiences that the patient may have during the test. The nurse explains the monitoring equipment used, the need to have an intravenous line placed, and the symptoms to report. The type of exercise is reviewed, and patients are asked to put forth their best exercise effort. If the test is to be performed with echocardiography or radionuclide imaging, this information is reviewed as well. After the test, patients are monitored for 10 to 15 minutes. Once stable, they may resume their usual activities.

CONTINUOUS AMBULATORY MONITORING (Holter)

In ambulatory ECG monitoring, which may occur in the hospital but is more commonly prescribed for outpatients, one lead of the patient's ECG can be monitored by a Holter monitor.

This monitor is a small tape recorder that continuously (for 10 to 24 hours) documents the heart's electrical activity on a magnetic tape. The tape recorder weighs approximately 2 pounds and can be carried over the shoulder or worn around the waist day and night to detect dysrhythmias or evidence of myocardial ischemia during activities of daily living.

The patient keeps a diary of activity, noting the time of any symptoms, experiences, or unusual activities performed. The tape recording is then examined with a special scanner, analyzed, and interpreted. Evidence obtained in this way helps the physician diagnose dysrhythmias and myocardial ischemia and evaluate therapy, such as antiarrhythmic and antianginal medications or pacemaker function.