## DIAGNOSTIC TESTS of Cardiac Disorders (continued)

<table>
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<tr>
<th>NAME OF TEST</th>
<th>PURPOSE AND DESCRIPTION</th>
<th>RELATED NURSING CARE</th>
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<tr>
<td>Computed tomography (CT) scan</td>
<td>A CT scan may be conducted to quantify calcium deposits in coronary arteries.</td>
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<tr>
<td>Cardiolite scan</td>
<td>Used to evaluate blood flow in different parts of the heart. Cardiolite (technetium 99m sestamibi) is injected IV. In a dipyridamole cardiolite scan, dipyridamole (Persantine) is injected to increase blood flow to coronary arteries. These scans may be done in conjunction with a treadmill test.</td>
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<td>Positron emission tomography (PET)</td>
<td>Two scans are performed following injection of radionuclides, and the resulting images compared for myocardial perfusion and myocardial metabolic function. A stress test (treadmill) may be a part of the test. If the myocardium is ischemic or damaged, the images will be different. Normally, the images will be the same.</td>
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<tr>
<td>Blood pool imaging</td>
<td>Following intravenous injection of technetium 99m pertechnetate, sequential evaluation of the heart can be performed for several hours.</td>
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<td>Echocardiogram</td>
<td>Echocardiograms use a transducer to record waves that are bounced off the heart, and to record the direction and flow of blood through the heart in audio and graphic data. An M(motion)-mode echocardiogram records the motion, wall thickness, and chamber size of the heart. A 2-D echocardiogram provides a cross-sectional view of the heart. Color flow imaging combines 2-D echocardiography and Doppler technology to evaluate the speed and direction of blood flow through the heart, which can identify pathology such as leaky valves. Stress echocardiography combines a treadmill test with ultrasound images to evaluate segmental function and wall motion. If the client is not physically able to exercise, IV dobutamine may be administered and ultrasound images taken.</td>
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<td>Transesophageal echocardiography (TEE)</td>
<td>Allows visualization of adjacent cardiac and extracardiac structures to identify or monitor mitral and aortic valve pathology, left atrium intracardiac thrombus, acute dissection of the aorta, endocarditis, perioperative left ventricular function, and intracardiac repairs during surgery. A transducer (probe) attached to an endoscope is inserted into the esophagus, and images are taken. Concurrent IV contrast medium, Doppler ultrasound, and color flow imaging may be used.</td>
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<td>Cardiac catheterization (coronary angiography, coronary arteriography)</td>
<td>A cardiac catheterization may be performed to identify CAD or cardiac valvular disease, to determine pulmonary artery or heart chamber pressures, to obtain a myocardial biopsy, to evaluate artificial valves, or to perform angioplasty or stent an area of CAD. The test is performed by inserting a long catheter into a vein or artery (depending on whether the right side or the left side of the heart is being examined) in the arm or leg. Using fluoroscopy, the catheter is then threaded to the heart chambers or coronary arteries or both. Contrast dye is injected and heart structures are visualized and heart activity is filmed. The test is done for diagnosis and before heart surgery.</td>
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**Right cardiac catheterization:** The catheter is inserted into the femoral vein or antecubital vein and then threaded through the inferior vena cava into the right atrium to the pulmonary artery. Pressures are measured at each site and blood samples can be obtained for the right side of the heart. The functions of the tricuspid and pulmonary valves can be observed. *Left cardiac catheterization:* The catheter is inserted into the brachial or femoral artery and advanced retrograde through the aorta to the coronary arteries and/or left ventricle. The patency of the coronary arteries and/or functions of the aortic and mitral valves and left ventricle can be observed.

**NURSING CARE: CARDIAC CATHETERIZATION**

**Before the Procedure**
- Explain the procedure to the client.
- No food or fluids are allowed for 6 to 8 hours before the test.

(continued)
Assess for allergies to seafood, iodine, or iodine contrast dyes (if previous tests have been done). If an allergic response to the dye is possible, antihistamines (such as Benadryl) or steroids may be administered the evening before and the morning of the test.

- Assess for use of aspirin or NSAIDs (risk of bleeding), Viagra (risk of heart problems), or history of kidney disease (dye used may be toxic to the kidneys).
- Discontinue oral anticoagulant medications. Heparin may be ordered to prevent thrombi.
- An IV of 5% D₅W is started at a keep-vein-open rate (to be available if emergency drugs have to be administered).
- Establish baseline of peripheral pulses.
- Take and record baseline vital signs.

**Procedure**

- Client is positioned on a padded table that tilts. A local anesthetic is used at the site of catheter insertion. ECG leads are applied and vital signs are monitored during the procedure.

  The client lies supine and is asked to cough and deep breathe frequently. The procedure takes 1/2 to 3 hours.

  Tell the client that a hot, flushing sensation may be felt for a minute or two when the dye is injected.

**After the Procedure**

- Monitor vital signs every 15 minutes for the first hour and then every 30 minutes until stable. Assess cardiac rhythm and rate for alterations. Assess peripheral pulses distal to the insertion site.
- Assess client for complaints of chest heaviness, shortness of breath, and abdominal or groin pain.
- Monitor catheter insertion site for bleeding or hematoma.
- Administer pain medications as prescribed.
- Instruct client to remain on bed rest for 6 to 12 hours (or as ordered). If a collagen-like plug was inserted after removal of the catheter, only a 2- to 3-hour bed rest is necessary.
- Encourage oral fluids unless contraindicated (i.e., if the client has congestive heart failure).

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**NAME OF TEST** Pericardiocentesis

**PURPOSE AND DESCRIPTION** This procedure is performed to remove fluid from the pericardial sac for diagnostic or therapeutic purposes. It may also be done as an emergency procedure for the client with cardiac tamponade (which may result in death). A large-gauge (16 to 18) needle is inserted to the left of the xiphoid process into the pericardial sac and excess fluid is withdrawn (see Figure 30–9). The needle is attached to an ECG lead to help determine if the needle is touching the epicardial surface, thus preventing piercing of the myocardium.

**NURSING CARE: PERICARDIOCENTESIS**

**Before the Procedure**

- Gather all supplies:
  - Pericardiocentesis tray
  - ECG machine and electrode patches
  - Emergency cart with defibrillator
  - Dressing
  - Culture bottles (if indicated)
- Reinforce teaching and answer questions about the procedure or associated care. Provide emotional support.
- Ensure that informed consent has been obtained.
- Provide for privacy.
- Obtain and document baseline vital signs.
- Connect the client to a cardiac monitor; obtain a baseline rhythm strip for comparison during and after the procedure.
- Connect the precordial ECG lead of the hub of the aspiration needle using an alligator clamp.

**During the Procedure**

- Follow standard precautions.
- Position seated at a 45- to 60-degree angle. Place a dry towel under the rib cage to catch blood or fluid leakage.
- Observe the ST segment for elevation and the ECG monitor for signs of myocardial irritability (PVCs) during the procedure. These indicate that the needle is touching the myocardium and should be withdrawn slightly.
- Notify the physician of changes in cardiac rhythm, blood pressure, heart rate, level of consciousness, and urine output. These may indicate cardiac complications.
- Monitor central venous pressure (CVP) and blood pressure closely. As the effusion is relieved, CVP will decrease, and BP will increase.

**After the Procedure**

- Document the procedure and the client’s response to and tolerance of the procedure.
- Continue to monitor vital signs and cardiac rhythm every 15 min during the first hour, every 30 min during the next hour, every hour for the next 24 hours.
- Record the amount of fluid removed as output on the intake and output record.
- If indicated, send a sample of aspirated fluid for culture and sensitivity and laboratory analysis.
- Assess heart and breath sounds.