had previous back surgery or if more than one disk is involved, a CT scan may not clearly identify the ruptured disk.

- **MRI** is used to image the vertebral elements, thecal sac, disks, cerebrospinal fluid, nerve roots, and spinal cord. This noninvasive examination is increasingly being used to provide initial diagnosis.

- **Myelography** with contrast medium illustrates areas of herniation but does not provide the detail found with CT or MRI. However, myelography is diagnostic in 80% to 90% of all cases and is used both to rule out tumors and locate the herniation.

This examination is a radiologic examination of the subarachnoid space of the spinal canal, using a contrast agent. A myelogram is performed to visualize the lumbar, thoracic, or cervical area, or the whole spinal axis. It is used in the diagnosis of a spinal cord tumor, a herniated intervertebral disk, or a ruptured disk. Any obstruction of the flow of the contrast medium can be seen on X-ray film.

To perform a myelogram, a lumbar puncture is performed and about 10 mL of cerebrospinal fluid (CSF) is removed. A water-based contrast medium such as iopamidol (Isovue) is injected into the subarachnoid space. When the medium is injected, it diffuses up through the CSF and penetrates the nerve root sleeves, nerve rootlets, and narrow areas of the subarachnoid space. The head of the X-ray table is kept elevated at 30 degrees and the client is kept quiet to prevent rapid upward dispersion. If the contrast medium entered the cranial vault, it could cause seizures. The contrast medium is absorbed through the bloodstream and eliminated by the kidneys. Nursing implications for the care of a client having a myelogram are outlined in the box below.

- **Electromyography (EMG),** which measures electrical activity of skeletal muscles at rest and during voluntary contraction, may be conducted to identify specific muscles affected by the pressure of the herniation on the nerve roots.

### Medications

The client with a ruptured intervertebral disk is treated with medications to relieve pain and reduce swelling and muscle spasms. Pain is usually managed with nonsteroidal anti-inflammatory drugs (see Chapter 4). Muscle spasms are treated with muscle relaxants.

### Conservative Treatment

A ruptured intervertebral disk is usually managed conservatively with bed rest and medication unless the client is experiencing severe neurologic deficits. The goals of treatment are

### Nursing Implications for Diagnostic Tests

#### Myelography

**Preparation of the Client**

- Ensure a signed informed consent.
- The meal prior to the procedure is usually omitted.
- The client should be well hydrated.
- Administer enemas or laxatives as ordered to ensure visualization of lumbar spine.
- Administer prescribed pretest medications, such as a sedative or diazepam (Valium).

**Client and Family Teaching**

- Remain NPO several hours before the test.
- The examination lasts about 1 hour.
- The position used to perform the examination will depend on the physician. You may have to lie on your stomach, sit and lean forward, or sit with the knees to the chest.
- A strap may be used to prevent falls, and the table will be tilted during the examination.
- A lumbar puncture ("spinal tap") is performed to inject the dye. A local anesthetic is used where the needle will be inserted. There may be a feeling of pressure during needle insertion. The needle is inserted below the level of the spinal cord.
- Tell the physician if you experience pain.
- It is important to stay in bed with the head of the bed elevated for at least 6 to 12 hours (the length of time will depend on physician preference and hospital policy).
- The nurse will check your blood pressure, pulse, and respirations. The nurse will also check your ability to feel and move at least every 4 hours (more often) after the examination.

**Postexamination Nursing Care**

- Take and record vital signs and assess neurologic status as prescribed (and at least every 4 hours) for 24 hours postexamination. Record and report any changes.
- Assess the site of the lumbar puncture for leakage of cerebrospinal fluid or bleeding every 4 hours. Notify the physician of leakage or bleeding.
- Encourage increased intake of oral fluids to replace that withdrawn during the examination. (This may also help decrease a postmyelogram headache).
- Make sure that the client voids within 8 hours after the examination. If policy permits, allow male clients to stand at the bedside, or clients of either gender to use the bathroom. Notify the physician if the client has not voided within 8 hours.
- Administer analgesics as prescribed for postexamination pain, headache, or muscle spasms.
- Keep the client's head elevated at least 30 degrees (in bed or in a chair) for 12 hours, or as ordered.
- Resume diet if there is no nausea or vomiting.
- Force oral fluids to 2400 to 3000 mL in 24 hours, beginning immediately after the procedure.
- Administer prescribed medications for nausea.
- Do not give any phenothiazine derivatives for 48 hours (to reduce the possibility of seizures).