Fluoroscopic-Guided Lumbar Puncture
Preparation Guidelines

Pre-Procedure Assessment:

1. Anticoagulation: Please see separate document "Perioperative Management of Antithrombotic Therapy."
2. Imaging: at a minimum, MRI or CT of the head must be performed within 30 days of the procedure and any images and report available to the radiologist. If there has been a change in neurologic status or new onset of neurologic symptoms, repeat head imaging should be performed prior to the procedure.
    a. Established patients (i.e. stable patients returning for therapeutic LP for intracranial hypertension or intrathecal chemotherapy) if there has been no interval neurologic change and no break in neurologic care, repeat imaging is not required.
    b. Questionable cases (i.e. imaging greater than 30-days or report available but not images) may be reviewed with the performing Neuroradiologist on a case-by-case basis.
    c. Uncomplicated myelogram request with an indication of "back pain" or "radiculopathy" does not warrant head imaging prior to a myelogram.
3. Pregnancy: Fluoroscopic-guided lumbar puncture uses ionizing radiation centered over the abdomen and is therefore unsuitable for patients who are pregnant.
4. Need for CSF studies and data: CSF laboratory studies requested, volume of fluid, need for opening or closing pressure, or other requested test results must be clearly documented and conveyed to Radiology staff prior to the procedure.

Non-Image Guided Attempts:

1. Fluoroscopy requires additional staff and complexity and incurs additional cost above the level of the bedside lumbar puncture and may not be tolerated as well by some patients.
    a. If there is a clinician with suitable training, 3 attempts at bedside lumbar puncture may be performed. If bedside lumbar puncture is attempted and unsuccessful, clear communication of number of attempts and level(s) of attempts should be communicated to the Radiology staff.
    b. If there is no clinician with suitable training available, or if patient condition or preference is otherwise, bedside attempts are not required prior to fluoroscopic-guided lumbar puncture but should be clearly documented.

Unstable Patients:

1. Unstable patients may be unsuitable for fluoroscopic-guided lumbar puncture.
    a. Fluoroscopic-guide lumbar puncture requires the patient to be positioned prone on the fluoroscopy table. The space available for additional staff in the fluoroscopy suite is limited, and additional staff must be prepared for prolonged time in shielded ("lead") gowns.
    b. Patients who are ventilated require clearance by Anesthesiology, as well as appropriate staff to monitor ventilation status during the procedure as well as patient transfer to and from the fluoroscopy suite.
    c. Patients who are agitated or unable to cooperate with positioning requirements during the procedure may need additional medication, nursing, or other staff as appropriate to successfully perform a fluoroscopic-guided lumbar puncture.

Myelography:

Myelography entails additional risk beyond the routine lumbar puncture, including the risk of contrast reaction or seizure. Certain medications may lower the seizure threshold and result in minimally elevated risk of seizure over the general population and are held prior to myelography. For outpatients, these medications should be held both before and after the procedure for the recommended 48/24 hours. If the patient has not held the meds, they should be rescheduled. Please see separately maintained document for medications held prior to myelography.

- Cervical Myelogram: 10 cc Isovue M 300
- Thoracic Myelogram: 10 cc Isovue M 300
- Lumbar Myelogram: 12-13 cc (but can go up to 15cc) Isovue M **200**
- Total spine Myelogram: 10 cc Isovue M 300
- Should not exceed 3 grams iodine for single myelographic procedure

Contraindications to Lumbar Puncture:

- Absolute:
  - Uncorrected coagulopathy; except in an emergent setting where benefit outweighs the risk, at the discretion of the performing radiologist.
  - Chiari 1 malformation, except in an emergent setting where benefit outweighs the risk, at the discretion of the performing radiologist.
  - Obstructive hydrocephalus or obstruction to CSF flow

- Relative:
  - Lack of informed consent
  - Medically unstable/unable to cooperate
  - Infection at site or epidural abscess
  - Pregnancy
  - Patient weight greater than table limits
  - Low-lying conus, tethered cord, myelomeningocele

- Risks of Lumbar puncture:
  - Cerebral herniation
  - Cord compression
  - Nerve injury
  - Infection/meningitis
  - Headache
  - Epidermoid tumor

APPENDIX I: Preprocedure Checklist for Inpatients Scheduled to Undergo Fluoroscopically Guided Lumbar Puncture (LP)

1. What is the patient's name and medical record number?
2. What is the name of the contact person or team member who requested LP?
3. What is the indication for LP?
4. Why is fluoroscopic guidance needed in this case? Has someone else already attempted LP at bedside in this patient?
5. What is the patient's coagulation profile? Is the patient taking any anticoagulant medication (i.e., heparin, warfarin [Coumadin, Bristol-Myers Squibb], aspirin, or newer anticoagulants)?
6. How much does the patient weigh? Is the patient's weight more than the weight limit for the fluoroscopy table?
7. Is the patient medically stable?
8. Can the patient provide consent for the procedure? If the consent form needs to be signed by a guardian or health care proxy, can that person be contacted to provide consent?
9. If there is any chance that the patient could be pregnant, has there been a recent pregnancy test?
10. Will the procedure require patient sedation or anesthesia? If so, who will coordinate the procedure time slot with the anesthesia personnel?
11. Are previous head imaging examinations available for review?
12. Are previous spinal imaging examinations available for review?"
13. Have all the absolute and relative contraindications for LP been reviewed?

References:

- Cauley KA. Fluoroscopically Guided Lumbar Puncture. AJR 2015; 205:W442–W450
- Hudgins PA, Fountain AJ, Chapman PR, Shah LM. Difficult Lumbar Puncture: Pitfalls and Tips from the Trenches. AJNR Am J Neuroradiol Jul 2017; 38:1276 –83
- Engelborghs et al. Consensus guidelines for lumbar puncture in patients with neurological diseases. Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring 2017; 8:111-126
- Adult Lumbar Puncture, MD Anderson Cancer Center. Department of Clinical Effectiveness, Approved by the Executive Committee of the Medical Staff 7/25/2017

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