**Eligibility for image guided LP/myelography**

1. Radiology performs myelograms and lumbar punctures (LP) requiring image guidance when indicated.
	1. **Please note** that fluoroscopic guidance for LP adds ionizing radiation and substantial cost and cannot be justified by staffing concerns alone.
	2. An attempt at the bedside is expected before requesting fluoroscopic guidance.
		1. Please note that if there are issues with a bedside LP (such as coagulopathy, immune compromise or an anxious/combative patient) these will be issues under fluoroscopy as well.
	3. If there is a contraindication to a bedside attempt (i.e. severe scoliosis, extensive posterior fusion, unhealed surgical wound limiting level options, morbid obesity), please call the radiologist to discuss the case.

**Coordinating an LP/myelogram for an inpatient/ ER patient at Meriter**

1. Call the radiologist at the fluoroscopy seat during normal hours, M-F 7:30a-4:30p at 417-5946. After hours and on the weekend, call the radiology reading room (417-5945 or 417-7651) or page the on call diagnostic radiologist via the hospital operator.
2. State that you would like to order a lumbar puncture on an inpatient/ER patient.
	1. **Simply placing the order through EPIC without communicating directly with the radiologist will delay the procedure.**
3. It is best to call first thing in the morning when resources and staffing are readily available.
4. The radiologist will ask the following questions:
	1. What is the indication/reason for the LP?
	2. Has the patient had a head CT/MR? (if indicated- see attached)
	3. Has someone on the floor/ER attempted to perform the LP?
	4. Is the patient able to provide consent? If not, who is the power of attorney and what is their contact information?
	5. What is the INR, PTT and PLT count? We require labs on all inpatients/ER patients. Please refer to lab/medication guidelines for cutoff values (attached).
	6. Are there any potential issues that the radiologist should know prior to performing the LP? For example, does the LP need to be performed with conscious sedation or under general anesthesia? If so, expect to coordinate with anesthesia as well.
	7. Are there any special requests? For example, measure pressures, large volume tap etc.
5. Place the order for the LP through Epic/Healthlink.
6. Make sure to also place lab orders for the CSF fluid analysis if needed.
	1. The Radiology department WILL NOT place orders for CSF analysis.
7. Once the lumbar puncture is complete, the patient will be transferred back to the floor/ER. The patient should lay flat for at least 1 hour.

**How to handle post-procedure headaches?**

1. Conservative measures include:
	1. Recommendations for bed rest:
		1. For the first 12 hours after the LP, lie flat, NO lifting, NO straining
		2. If patient gets a headache after getting up, recommend again lying flat for an additional 12 hours
		3. If headaches do not improve after lying flat this may indicate a more serious complication and the patient should be evaluated by the ordering physician
	2. Instructions for hydration: Recommend hydration. Caffeine may be helpful.
	3. Pain management: If headaches persist despite conservative measures, pain medication such as Tramadol may be indicated. Prescriptions for this type of medication should be coordinated through the hospitalist or clinician who ordered the procedure. Please note, the radiology staff will not prescribe medications.

**How to coordinate a blood patch?**

1. A blood patch may be indicated for patients who have persistent unrelenting headaches after conservative measures have been attempted
2. Blood patches are performed by the anesthesiology department. Page the anesthesiologist via the hospital operator to arrange.

**References for lab guidelines and additional reading:**

1. Roos KL. Lumbar Puncture. Semin Neurology, 2003 March; (23) 1:105-114
2. ACR-ASNR practice guidelines on Myelography, 2008.
3. Layton KF, Kallmes DF, MD, and Horlocker TT. Recommendations for Anticoagulated Patients Undergoing Image-Guided Spinal Procedures. AJNR Mar 2006 27:467–71.
4. From Neuroradiology Requisites. Third edition, 2010. Page 19.
5. American College of Physicians: Practice Guidelines Lumbar Puncture. Physician Information and Education Resource. 2010.
6. Sandow BA and Donnal JF. Myelography Complications and Current Practice Patterns. AJR 2005; 185:768–771.
7. Healthcare provider information for Pradaxa (dabigatran etexilate); University of Utah Health Care System.
8. Healthcare provider information for Apizaban (Eliquis): Meriter Antithrombotic Service, May 2014.

N Kim, adapted from UW Neuroradiology Image Guided LP and Myelography Guidelines, Kennedy/Grayev/Rowley/Field, 2/2017.

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| Critical Laboratory Values for Lumbar Puncture/Myelography |
| **Lab Test** | PLT | INR | PTT |
| **Lab Value** | >25,000 | <1.5 | Within normal range |
| **When to check labs?** **Inpatients/ER:** Check INR, PLT, PTT within 1 week of LP **(or within 24 hours if on chemo with low plts)** **Outpatients:** If patient has a history of cancer, bleeding disorder or liver disease, follow guidelines for  inpatients/ER patients If patient is on Coumadin, see below for specific recommendations.  Otherwise, outpatients do **not** need labs. |
| Pregnancy: Women of child bearing age should confirm negative pregnancy status |

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| Medication Guidelines for LP/Myelograms |
| **Medication** | **Recommendation** | **Comments** |
| Plavix, Ticlid, other antiplatelet meds | Stop 5 days prior to procedure | **MUST** be coordinated with referring MD. Each patient is coordinated individually.  |
| Warfarin (Coumadin) | Stop 3 days prior to procedure, Check INR day of procedure | **MUST** be coordinated with referring MD. May need to be bridged with heparin. Each patient is coordinated individually. |
| Dabigatran (Pradaxa) | Stop 5 days prior to procedure  | **MUST** be coordinated with referring MD. INR not sensitive; dependent on CrCl |
| Aprixaban (Eliquis) | Stop 48 hours prior to procedure | **MUST** be coordinated with referring MDRestart 5 hours after procedure |
| Rivaroxaban, Edoxaban, Fondaparinux, Cilostazol, Bivalrudin, Argatroban, Abciximab, Eptifibatide, Tirofibran |  | **MUST** be coordinated with referring MD. Each patient/medication coordinated individually. |
| IV Heparin | Stop 6 hours prior to procedure | Restart 1 hour after procedure |
| Low Molecular Weight Heparin | Stop 12 hours prior to procedure | Restart 24 hours after procedure |
| SQ Heparin | May continue if dose <10,000 u. If dose is > 10 K, follow IV Heparin Guidelines |  |
| ASA | May continue |  |
| NSAIDS | May continue |  |

Spinal Procedures. AJNR Mar 2006 27:467–71; ACR – ASNR – SPR Practice Guideline for the Performance of Myelography and Cisternography 2013

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| Guidelines for Head CT/MR prior to LP 5 |
| Recommend Head CT in patients with signs/symptoms of increased intracranial pressure: * New onset seizure
* Papilledema
* Focal neurologic findings
* Altered mental status
 |

American College of Physicians: Practice Guidelines Lumbar Puncture. Physician Information and Education Resource. 2010.