SPINE INTERVENTION SOCIETY
SAFETY PRACTICES FOR INTERVENTIONAL PAIN PROCEDURES

LATERAL ATLANTO-AXIAL JOINT INJECTIONS

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These safety practices have been developed to highlight the important elements in the safe performance of interventional pain procedures. Adherence to these practices will help decrease the risk of preventable complications. For additional information about the indications and technical aspects that yield improved treatment outcomes, refer to the *SIS Practice Guidelines for Spinal Diagnostic and Treatment Procedures.*

PERSONNEL

- Only physicians trained in the performance and interpretation of lateral atlanto-axial joint injections should perform this procedure.
- Appropriately trained personnel are needed for the operation of the fluoroscopy unit and to assist the physician.

CONTRAINDICATIONS

- An active systemic infection or a localized infection within the procedural field
- Allergy to medication(s) that cannot safely be mitigated by pre-treatment
- Uncooperative patient
- Concurrent treatment with anticoagulants constitutes a relative contraindication for atlanto-axial joint injections due to regional anatomy and variability in anatomy of the vascular structures. Further, the risk of a serious thromboembolic event when discontinuing anticoagulation can potentially outweigh the risk of a clinically-significant bleeding complication when continuing anticoagulation for a lateral atlanto-axial joint procedure. Risks, benefits, and alternatives should be discussed with the patient. If the anticoagulant is to be stopped in advance of an injection, prior approval from the patient's cardiologist and/or primary care provider is recommended.
- Pregnancy

SEDATION

- Sedation is not intrinsically necessary for lateral atlanto-axial joint injections, but if employed in unique circumstances (e.g. movement disorder, cases of extreme anxiety, previous vasovagal response), the patient should remain able to communicate pain or other adverse sensations or events.
- Use of sedation may alter diagnostic conclusions.
- The decision to use sedation should be made on a case-by-case basis.
- If the physician performing the procedure decides to administer and supervise the sedation, they should be trained and qualified to do so. In these situations, a separate healthcare provider is required to assist with the administration of the medications and monitoring of the patient.
- Resuscitation drugs, monitoring equipment, and oxygen must be available if sedation is utilized.

SAFE, ASEPTIC PRACTICES

- Strict aseptic technique should be followed at all times as they pertain to the facilities, materials, patient preparation, physician preparation, personnel, and injectate/syringe preparation. Examples include, but are not limited to:
  - o Skin overlying the target region should be prepared for an aseptic procedure, preferably using chlorhexidine in alcohol. The area should then be draped to create a sterile procedural field.
  - o A face mask and sterile gloves must be worn during the procedure.
  - o Sterile single-use syringes and needles are required, and single-dose vials should be utilized when available. Centers for Disease Control and Prevention (CDC) guidelines for safe injection practices must be followed.
  - o Acquisition, storage, and utilization of medications should be in accordance with relevant governmental guidelines such as those of the CDC in the United States.

IMAGING

- Review of imaging pertaining the target area is required and any anatomical barriers, anatomical variants, and associated risks need to be identified by the physician.
- Use of image guidance is critical to ensuring appropriate needle placement and monitoring injectate flow patterns. Image guidance reduces the risk of complications, allowing the physician to avoid vulnerable vascular or neural structures before any agent is injected or inserted, and to ensure injectate is delivered to the lateral atlanto-axial joint target.
- The imaging technique should follow the ALARA protocols (as low as reasonably achievable) to minimize x-ray exposure for both the patient and the healthcare team.
- Fluoroscopic guidance has been used in the primary literature validating the safety and efficacy of lateral atlanto-axial joint injections; if alternative imaging guidance is to be used (e.g. CT), it must be utilized so as to exclude vascular or intrathecal uptake and document flow reaching the target tissue. Given the lack of studies of ultrasound utilization for this high-risk procedure, ultrasound guidance is not appropriate for lateral atlanto-axial joint injections.
- All lateral atlanto-axial joint injections should be performed using image guidance (preferably fluoroscopy), with appropriate AP, lateral views, and a test dose of contrast medium.
  - o Lateral atlanto-axial joint injections may not be performed without contrast.
- Obtain image(s) documenting final needle position and satisfactory contrast spread.

GADOLINIUM-BASED CONTRAST AGENTS

- Gadolinium is a drug that should be used with caution in interventional pain procedures. It should be administered only when necessary. It is prudent to consider the clinical benefit of the interventional pain treatment against the unknown potential risk of gadolinium deposition in the brain for each individual patient.
- If it is deemed that gadolinium is necessary for an interventional pain procedure where there is a very low risk of possible unintentional intrathecal administration, then the low risk of intrathecal gadolinium administration should be adequately explained to the patient.

INJECTIONS

- Ultimately, the entry point into the joint will lie over the middle of the lateral third of the joint line, but initially the needle should be placed on bone immediately adjacent to this entry point. The joint does not present a substantial AP depth at its lateral end and can be easily over-penetrated by the needle. Touching bone before insertion into the joint cavity guards against over-penetration of the joint. Insertion too deeply through the joint risks penetration of the internal carotid artery or the posterior oropharynx. The needle must be advanced in small increments, with frequent, intermittent screening to check for any deviations from a straight course.
  - o Insertion or misdirection too far medially risks piercing the dural sac or the nerve root sleeve of C2.
  - o Insertion or misdirection laterally risks encountering the vertebral artery.
  - o Slow advancement of the needle in small increments allows the patient to indicate if the C2 ganglion or rami are touched, whereupon the needle can be promptly withdrawn and redirected.
- Lateral atlanto-axial joint injections should be performed by injecting contrast medium under real-time fluoroscopy and/or DSI (digital subtraction imaging), using an AP view, before injecting any substance that may be hazardous to the patient. Prior to the injection of contrast medium, the needle should be aspirated. The tip of the needle may have lodged in a posterior meniscoid of the joint. Since this is a vascular structure, blood might be drawn from it. In that event, the needle should be advanced, using lateral view, further into the joint so as to leave the meniscoid.
- The volume of contrast medium should not exceed 0.3ml thereby leaving enough capacity to accommodate subsequent injection of local anesthetic and/or steroid. The total volume of the injectate should not exceed 0.8ml in order not to overfill the joint.
- A non-particulate steroid (e.g. dexamethasone) is recommended to be used for lateral atlanto-axial joint injections.
- Dexamethasone should not be mixed with ropivacaine because of the risk of precipitating the steroid so it acts as a particulate.
- Extension tubing is recommended for all lateral atlanto-axial joint injections to minimize movement of the needle tip once it has reached its appropriate target.

POST-PROCEDURE MONITORING/FOLLOW-UP

- Patients should be monitored for an appropriate time following the procedure depending upon the nature of the intervention and the agents utilized.
- Provide detailed oral and written discharge instructions to patients that outline:
  - o activity restrictions for the immediate post-injection period (e.g. not to operate a motor vehicle or machinery for the remainder of the day of the procedure),
  - o potential expected side effects that may occur immediately post-injection and in the first few days following the procedure (e.g. pain at injection site, increased blood glucose level),
  - o symptoms that merit immediate medical attention,
  - o when to resume usual medications and anticoagulants if discontinued for the procedure, and
  - o special instructions for diabetic patients if corticosteroids were utilized.
- Ensure patients have a follow-up plan.

SOURCES

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DISCLOSURES

Stojanovic, Milan P.:
Any position in a healthcare, medical, or physician society/association (committee, board, workgroup/taskforce, etc.): World Institute of Pain, Education Committee.
Travel Expenses: World Institute of Pain - FIPP Exam Travel Expenses.
Other: Pain Practice Journal - Editorial Work Reimbursement.

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DISCLAIMER

While these Safety Practices are intended to identify elements critical to the safe performance of interventional spine procedures, they are not intended to be inclusive of all proper methods relevant to the safe performance of spine procedures, or exclusive of other methods of care reasonably utilized to obtain the same results. Nothing contained in these documents is intended to be used as a substitute for the care and knowledge of the individual clinician. They are guidelines based on evidence-informed expert consensus. SIS makes no representation and assumes no responsibility for the accuracy of the information contained or available through this website, and such information is subject to change without notice. The clinician's independent medical judgment, given the individual patient's clinical circumstances and preferences, should always determine patient care and treatment. Practitioners are advised to consider management options in the context of their own training and background and institutional capabilities when selecting recommended treatment options. SIS is not responsible nor does it assume any legal liability or responsibility for the accuracy, completeness, clinical efficacy, or value of any such information or any apparatus, product, or process described or referenced through this website or the information contained therein.

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THE INTERVENTIONAL SPECIALISTS' FREE RESOURCE TO HELP DECREASE THE RISK OF PREVENTABLE COMPLICATIONS

For additional information about the indications and technical aspects that yield improved treatment outcomes, refer to the *SIS Practice Guidelines for Spinal Diagnostic and Treatment Procedures*.

PRACTICE GUIDELINES
FOR SPINAL DIAGNOSTIC AND TREATMENT PROCEDURES

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