LASER THERAPY

Volume 10, Issue 7

Contraindications for Use of Therapeutic Laser

Of the relatively few contraindications for the use of therapeutic laser, many are relative rather than absolute and a skilled clinician, together with careful patient selection, should minimize any risks.

CITE THIS ARTICLE
Contraindications for Use of Therapeutic Laser. Pract Pain Manag. 2010;10(7).

Jan 28, 2012

While I have written a number of articles over the past years discussing the benefits of utilizing therapeutic laser for a variety of conditions, I would like to take the opportunity to discuss contraindications in greater depth. While laser therapy has relatively few contraindications associated with it when compared with some other therapeutic modalities, some cautions are worth noting. Likewise, it is also worth noting that some contraindications are assumed when they are not—or are relative rather than absolute.

Pacemakers

According to Tuner and Hode, the use of therapeutic laser over internal pacemakers (illustrated in Figure 1) is mistakenly considered to be contraindicated. They are encased in metal and cannot be influenced by photons.[1] The only exception is any light therapy device that also uses electrical stimulation—such as the LaserStimTM from Multi Radiance Medical.

Figure 1. *An example of an internal artificial cardiac pacemaker*

Pregnancy

Pregnancy is an alleged contraindication largely because extreme caution has historically been exercised with any modality during pregnancy—especially during the first trimester. It would be prudent to avoid large doses over the pregnant uterus. However, there is no evidence to support the idea of there being any risk in treating distant regions of the body relative to the uterus.[2]

While Avila observed cell damage in chicken embryos after irradiation with a HeNe laser through an opening in the egg, it is important to keep in mind that the dosage

represented a very high dose of laser irradiation for the size and weight of the chicken egg compared with a human fetus inside a pregnant abdomen of an adult female.

Nevertheless, it would be wise to note that if any complication occurred subsequent to the use of a therapeutic laser, it would automatically be suspect and leave the clinician with the burden of proof.[3]

Epileptic Seizures

It is known that pulsing visible red light in the 5–10 Hz range can trigger epileptic seizures. Many light therapy devices utilize flashing visible light so it should be used with extreme caution in epileptics. There is nothing in the scientific literature on the subject of pulsing invisible light therapy such as infrared—except for one study by Simunovic. He observed a patient that could only tolerate frequencies below 800 Hz with a GaAs laser.[4]

Thyroid Gland

The thyroid gland is considered to be a delicate structure. It may be prudent to avoid treating over the thyroid with therapeutic laser. Rat studies have demonstrated the development of thyroid disorders in rats treated with large doses of light radiation.

Hernandez found that GaAs laser therapy reduced mRNA levels of thyro-globulin, changes in the cytoskeleton of thyroid cells and a reduction in thyroid hormone plasma levels. This was associated with an increase in thyroid-stimulating hormone (TSH).[5]

Mikhailov performed an interesting study in which he utilized an 890 nm infrared laser in treating 42 patients with autoimmune thyroiditis. Each patient received 10 treatments at 2.4J/cm2. The thymus projection, vascular junction, and thyroid itself were irradiated. A control group of similar size was given 100mg of L-thyroxin. The clinical effect in all laser-treated patients was a decreased feeling of squeezing in the field of the thyroid, as well as a decrease in facial edema. The thyroid gland became palpably soft and decreased in size as observed on ultrasound. The number of winter colds decreased. The immunoregulatory index (Th/Ts) normalized decreasing from 7.5 to 4.2%. These effects were still observable in 78% of the patients after four months.[6]

Children

There is concern over the treatment of children with therapeutic laser, especially over bone growth plates. Cheetham irradiated healthy growth plates in young rats. One knee of each animal in the experimental group was irradiated three times/week at 5J/cm2. The animals were examined histologically after 6 to 12 treatments. There were no observable differences between the treated group and the control group.[7]

Renstrom successfully treated 30 children with Osgood Schlatter disease (aged 11 to 15). Their knees and lower legs were treated with a 60 mW GaAs laser at 30 Hz and 0.1J/cm2 dosage.[8]

Paolini also successfully treated 15 children with Osgood-Schlatter disease with 30 sessions of GaAs laser. These patients were compared with 15 patients who underwent conventional care including surgery. The laser group obtained the best results.[9]

Cancer

Tuner and Hode caution that cancer should not be treated by anyone but an oncologist or other appropriate specialist because of legal regulations, especially in the United States.[10]

Laser therapy is commonly considered to be contraindicated in patients undergoing radiation therapy yet recent scientific research paints a more positive view. Tamachi studied the effect of therapeutic laser on cytoxin, 5-florouracil (5-FU) uptake in various experiments on rats. The rats received 6J/cm2 of HeNe laser. They demonstrated a greater uptake of cytoxin, 5-FU than a group that only received cytoxin, 5-FU. The laser irradiation caused blood vessel to dilate allowing more chemotherapy to accumulate in the lesion. This may allow lower doses of anti-cancer drugs.[11]

Podalskaya has used an HeNe laser on post-radiation reactions and injuries on lips and oral mucosa. This treatment has had better results than any previous treatment approaches.[12]

Soldo studied the effect of GaAs laser irradiation on murine sarcoma. There was an anti-tumor effect on small tumors probably due to increased immune defense.[13]

Funk investigated cytokine production after HeNe laser irradiation to cultures of human PMN cells The cells were irradiated for various periods at selected intensities then stimulated with various mit-ogens. When these cells were stimulated after irradiation at 18.9J/cm2, significantly higher levels of all cytokines were observed. Cells that received 37.8J/cm2 of laser irradiation showed significantly decreased cytokine levels.[14]

Diabetes

There has been debate about whether or not diabetes is a contraindication for therapeutic laser. Several studies have shown positive results in diabetic patients.

Radelli performed an experiment on rats utilizing a 904nm GaAs laser. There was no observable affect on insulin-glycemic balance.[15]

Schindl carried out thermographic studies on patients with microanginopathic disorders. Blood flow began to improve within 15 minutes after the initiation of laser therapy and persisted for 45 minutes after ending the treatment session. A maximum temperature in-crease of 2.5 degrees was observed.[16]

Kotani compared wound healing rates on three groups of rats: 1) normal rats, 2) rats with experimentally-induced diabetes mellitus, and 3) rats receiving doxorubicin (Adriamycin®). Adriamycin inhibits the proliferation of fibroblasts and is used as an anti-cancer drug. A dose of 5.4J/cm2 from a HeNe laser was applied daily. Wound healing was faster in the diabetic group that received laser treatment when compared with the untreated group. The Adriamycin group healed similarly to the non-laser therapy group.[17]

Conclusion

There are relatively few contraindications for the use of therapeutic laser and many of them are relative rather than absolute. A high degree of clinical knowledge and careful patient selection when considering laser therapy should minimize the risks.

SEE OUR REFERENCES

Notes: This article was originally published February 21, 2011 and most recently updated January 28, 2012.

LOW BACK PAIN

Volume 10, Issue 7

Occipito-Atlanto (C0-C1) Joints as a Source of Spinal Pain

Fluoroscopic-guided injection of anesthetic and corticosteroids into the occipito-atlanto joints may successfully treat occipital headaches and upper spine pain.

CITE THIS ARTICLE
Occipito-Atlanto (C0-C1) Joints as a Source of Spinal Pain. Pract Pain Manag. 2010;10(7).

Dec 20, 2011

Pain arising from the joints of the upper spine can occur from arthritic changes or trauma such as a whiplash injury. The joints of the upper spine are also thought to be a potential source of occipital headaches. Dreyfuss first showed the occipito-atlanto pain pattern in healthy volunteers.[1] Since then there have been case reports of successful treatment of occipital headaches and neck pain with a fluoroscopically-guided injection of anesthetic and corticosteroids into the occipito-atlanto joints. This treatment however has not been formally enunciated and proven with randomized controlled trials. While no randomized controlled trials exist, there are case reports of successful pain control after successful injection of local anaesthetic or corticosteroid into the occipito-atlanto joint.

In a differential diagnosis, one would also explore non-articular sources of spinal pain. Various websites provide an exhaustive list of extra-articular (e.g., discovertebral, zygopophyseal) sources of spinal pain. An old familiar mnemonic from medical school "VINDICATE" provides a lattice to organize these various causes into vascular, inflammatory, neoplastic, degenerative, infectious, connective tissue disorders, autoimmune disorders, trauma and endocrinopathies. Perhaps a more useful approach is to categorize the same information as Macnab has done in chapter three of Macnab's Backache, 3rd Edition.[2] The broad categories listed include viscerogenic, neurogenic, vascular, spondylogenic, and psychogenic (see Appendix A). This has been further delineated in Kiraldy-Willis' Managing Low Back Pain, 3rd Edition and Harrisons' Textbook of Internal Medicine.[3,4]

This article will focus on the cases where occipito-atlanto (C0-C1) joints have been diagnosed as the source of occipital headaches or neck pain.

Special Considerations

Occipito-atlanto injections are demanding, technically intensive, and dangerous procedures. They should not be attempted by anyone of any specialty without extensive prior documented experience in fluoroscopically guided injection techniques. The ability to deal with a rapid onset of life-threatening central nervous system, haemodynamic, and respiratory complications is mandatory. Personnel trained for the task should constantly and directly monitor all patients during the procedure using pulse oximetry, ECG, and respiratory monitoring, as indicated and required. All equipment needed for the treatment of possible complications should be in the room. Knowledge of airway control and the equipment to provide it should be immediately at hand for every procedure.

Procedure

Occipito-atlanto (C0-C1) joint (craniocervical articulation) injection is performed under fluoroscopic guidance to place a needle into the occipito-atlanto joint for purposes of delivering an aliquot of medication into the joint such as local anaesthetic for diagnostic purposes and/or corticosteroid for putatively therapeutic purposes. The first C0-C1 intra-articular injection was reported in 1989[5] subsequent to which Dreyfus described three cases in 1994.[6] Pain referral patterns have been demonstrated by Dreyfuss[7] and Fukui[8] after joint capsule distension in normal volunteers generated ipsilateral superior posterior lateral neck pain with occasional temporal and occipital pain. The prevalence, however, is unknown since there has not been any reciprocal evidence of these joints as a pain source in patients with headaches. Except for technique modifications by Dreyfuss and Pauza,[9] there has been no further literature since 1994. Two discussions, none of which have been substantiated by prospective randomized controlled data, are that of Pulsed RF neurotomy of C1 by Racz et al and intra-articular prolotherapy.[10,11]

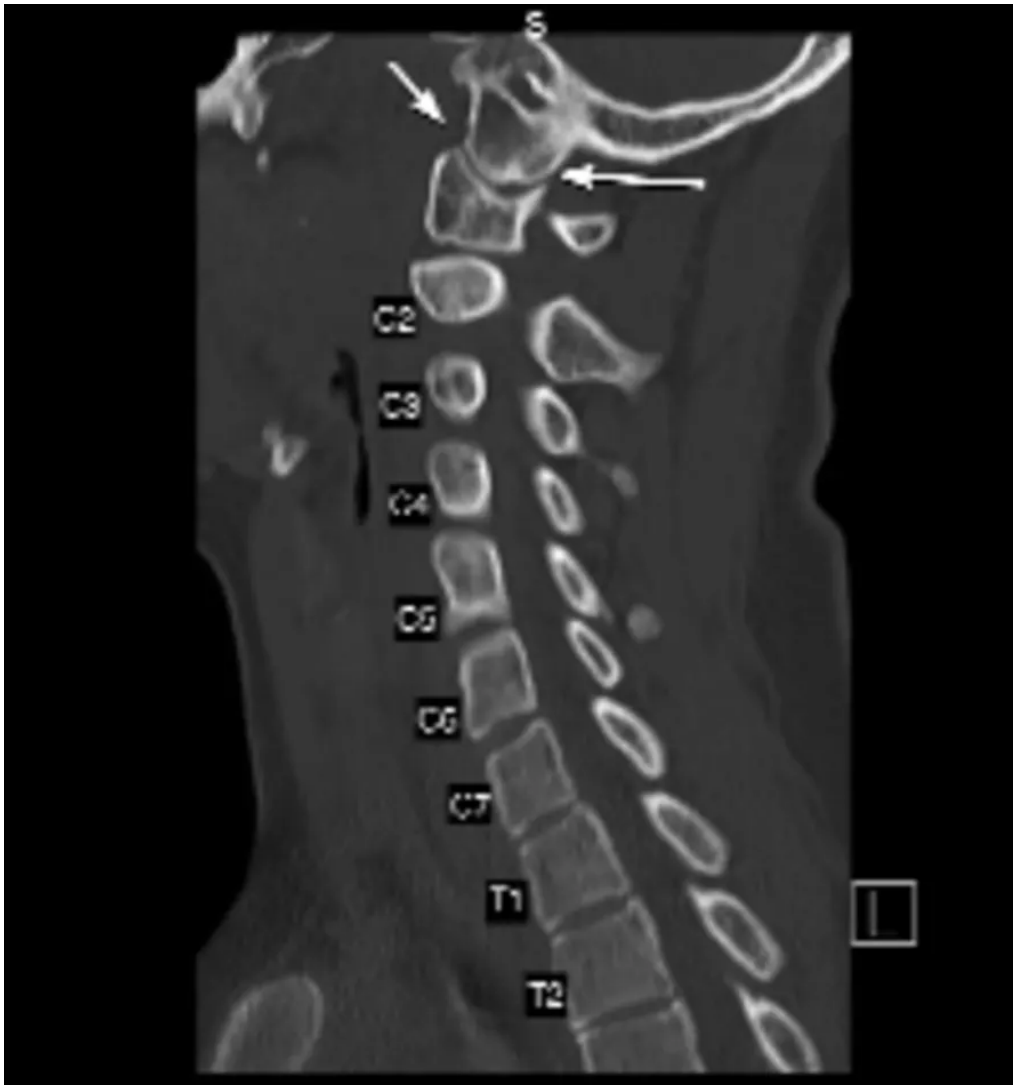

Figure 1. *Bean shapes visible on lateral view; note that just anterior to the arrowhead is the needle target location point.*

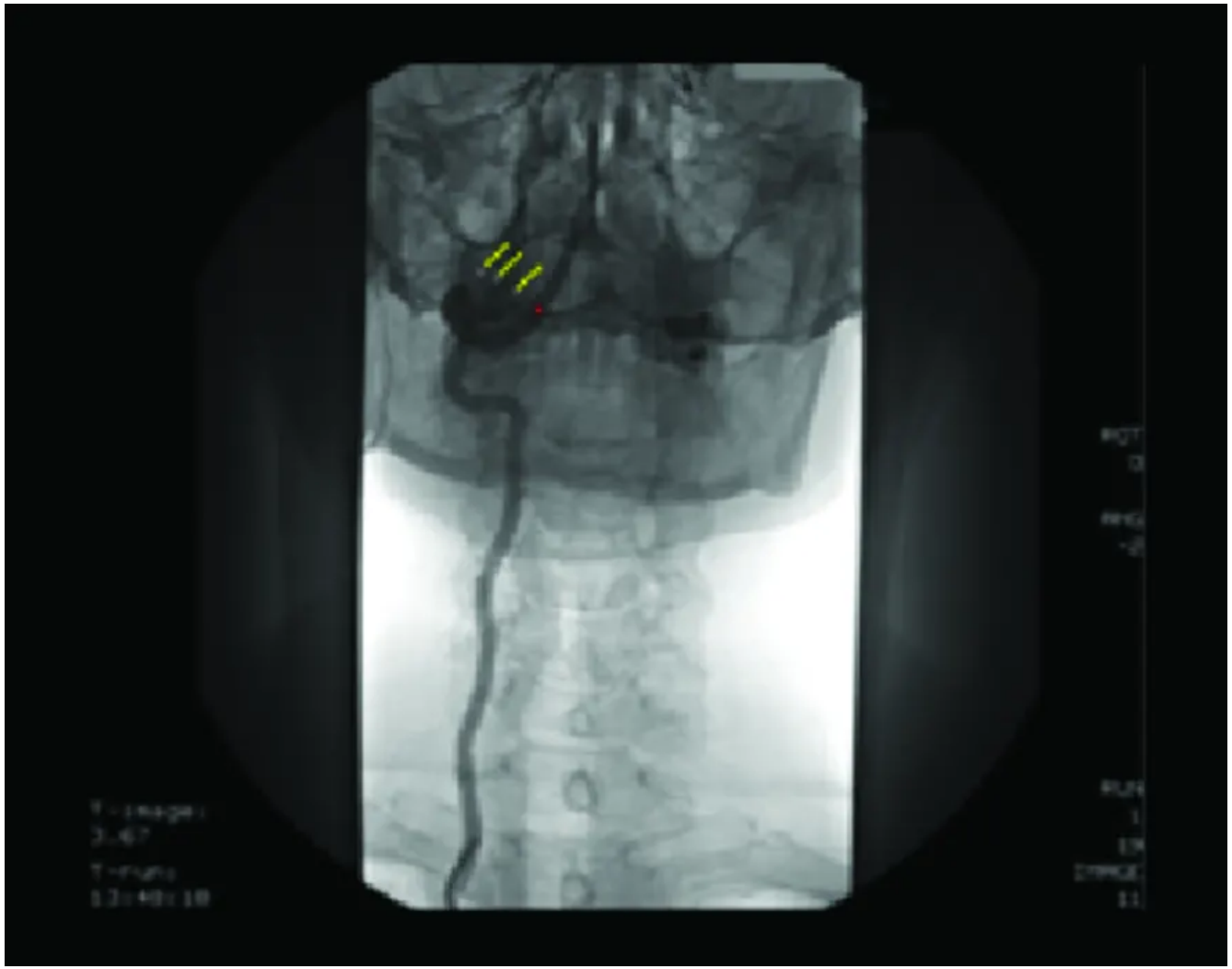

Figure 2. *Cervical A-P view arteriogram demonstrating the vertebral artery running over medial 1/3 of C0-C1 joint. The joint is to the left of the yellow lines. The red dot is the point where the artery crosses the joint.*

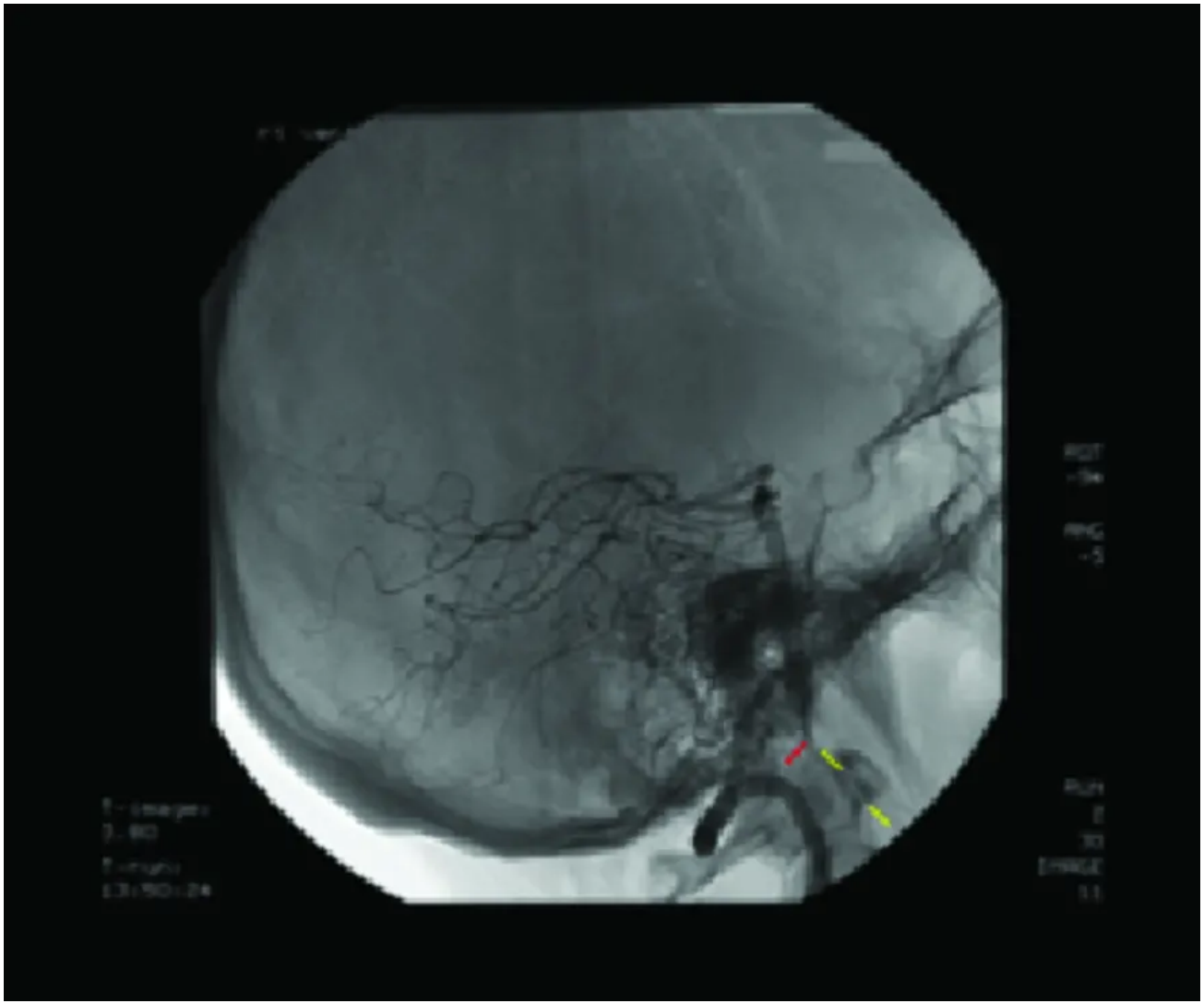

Figure 3. *Lateral cervical arteriogram demonstrating that needle placement too anterior increases risk of vertebral artery penetration. The left side of the red line is just anterior to the anterior-most aspect of the C0-C1 joint. Also, recognize the axial-dens interval between the two yellow lines. This joint must have crisp cortical lines to assure a true lateral; also make sure that the C2/3 joint has the same visual configuration.*

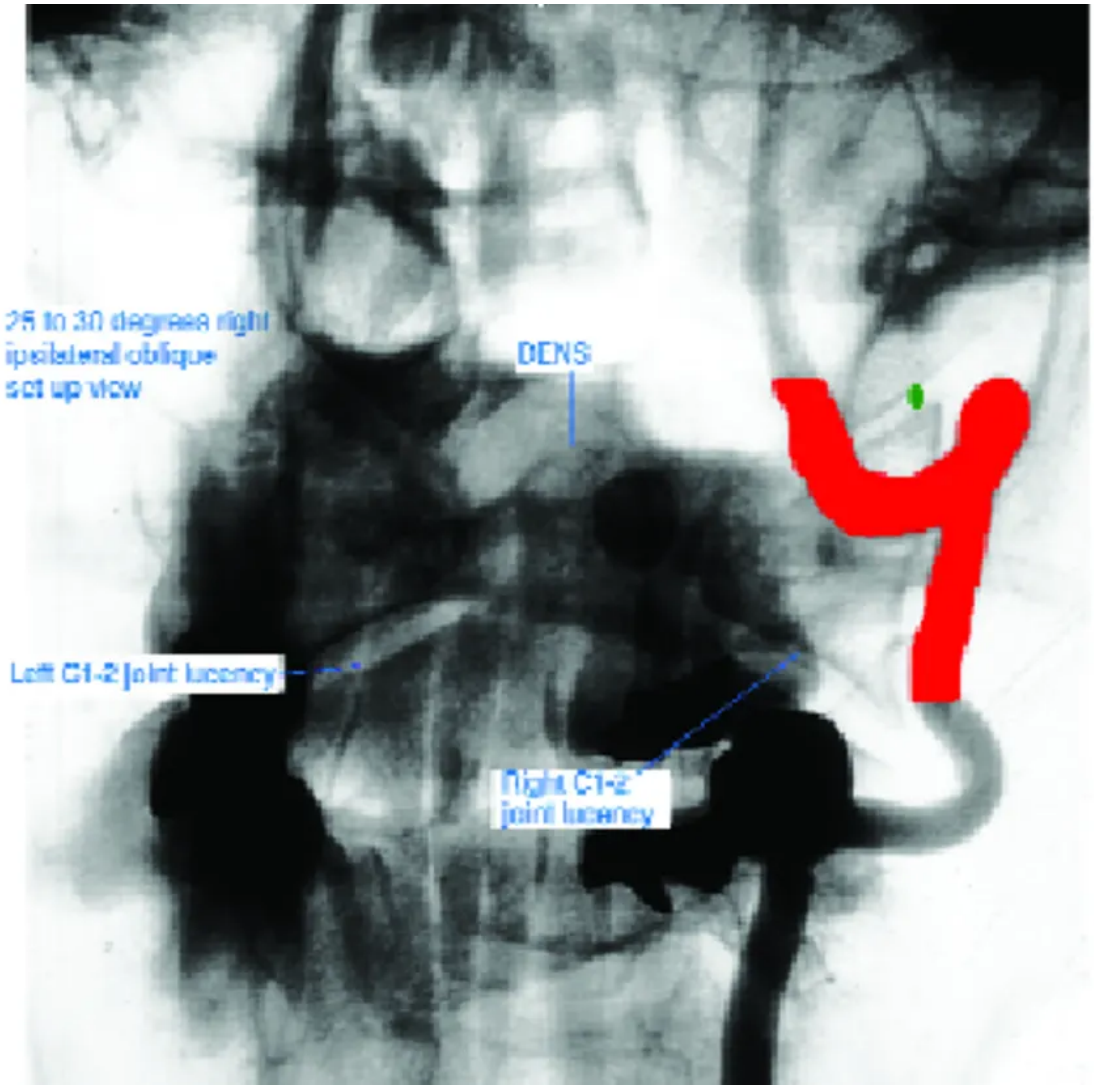

Figure 4. *Trajectory view of 20-25 ipsilateral oblique cervical arteriogram demonstrating medial and lateral vertebral artery loops relative to the C0-C1 joint. The green dot is the target location.*

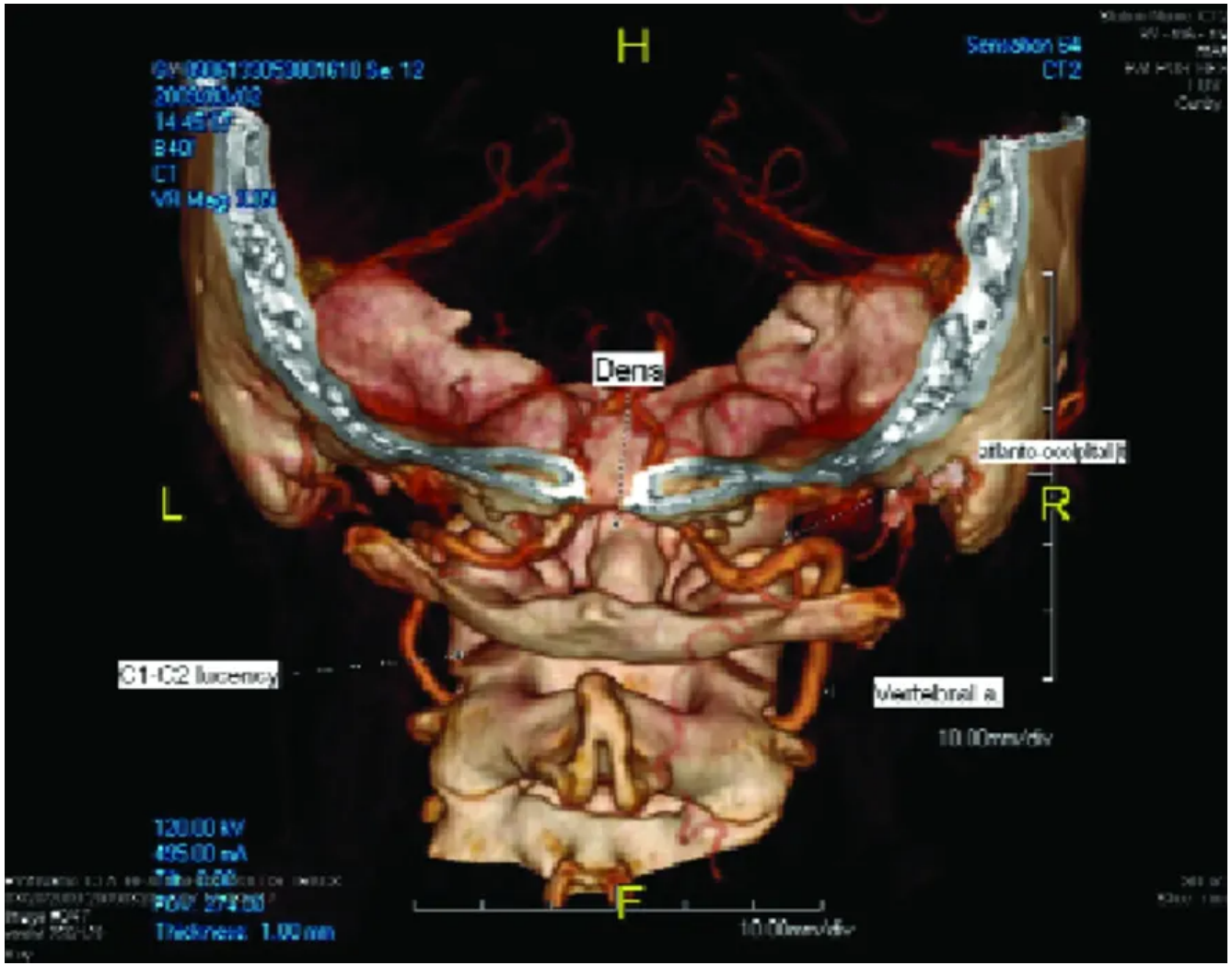

Figure 5. *Figure 5. Reformatted CT angiogram demonstrating location of lateral and medial loops of vertebral artery relative to C0-C1 joint.*

Anatomy

The occipito-atlanto joint is a true synovial joint that is formed by the articulation of the superior articular facet of the C1 vertebrae and the occiput, positioned anteriolateral to the spinal canal as opposed to true z-joints which are posterior-lateral to the same. More simply stated, it is formed by paired occipital condyles and superior articular facets of the atlas. This joint's main movement is forward and backward bending. Bogduk has show that it is innervated by the C1 ventral ramus.[12,13] The joint has a capsule and straddles the spinal cord and the foramen magnum on either side and is V or bean-shaped, slanting caudally and medially. The vertebral artery is often located overlying the medial one third of the joint and runs medially and diagonally to enter the foramen magnum.[14,15] Figures 1 through 5 illustrate the anatomy of the C0-C1 joint including needle target location, arteriograms from several perspectives, and a reformatted CT angiogram with the relative locations of the vertebral artery's lateral and medial loops.

artery's lateral and medial loops.

Patient Selection

Although there are no studies correlating specific motion provocation, the innate assumption based on the C0-C1 joint anatomy is that of painful nodding coupled with dominant unilateral occipital pain and possibly the previously-mentioned patterns above after C2/3, C1/2 and, finally, that C3/4 cephalgia has been ruled out despite 4-6 weeks of aggressive conservative care. The premise is to not only provide headache pain relief, but to facilitate rehabilitation of soft tissue restrictions and/or joint segmental motion abnormalities.

Potential Complications

Like all injection procedures, occipito-atlanto injections are subject to generic possible complications: infection, bleeding, allergy to injectate, and puncture of adjacent structures. In the context of occipito-atlanto injections, inadvertent injection of the vertebral artery, spinal cord and surrounding dura are significant risks. More specifically, the vertebral artery may be punctured if needle placement is too medial, inferior or lateral. The dural sac or spinal cord may be punctured if needle placement is too medial. Thus puncture of the dural sac and direct spinal cord penetration with the needle are rare complications whose incidence should be minimal if good technique is practiced. The proximity of the vertebral artery to the occipital atlantal joint makes its penetration a potential complication; however, it is an event that can be recognized promptly upon injecting a test-dose of contrast medium prior to administering any other agents. The incidence of inadvertent vertebral artery uptake during this procedure is unknown. Digital subtraction angiography has been shown to enhance detection of inadvertent arterial injection,[16] but there is not enough literature on its use in C0-C1 injections and thus there is currently no consensus as to whether or not it should be employed for this procedure. To the author's knowledge, there has been one reported case of locked-in syndrome while performing a C0-C1 injection.

Contraindications

Absolute

- Systemic infection.
- The patient is unable or unwilling to consent to the procedure.
- Inability to utilize contrast solution due to known anaphylactic reaction.
- Evidence of an untreated localized infection in the procedural field.
- Known bleeding diathesis (primary- hematologic or secondary-anticoagulation).
- Inability to assess patient response to the procedure.
- Patients unable to remain still during the procedure.

Relative

- Allergy to injectates (nonsteroidal anti-inflammatories and anesthetics).
- Pregnancy.

- Anatomical derangements—congenital or surgical—which compromise the safe and successful conduct of the procedure.
- Adrenal suppression.
- Congestive heart failure.
- Hyperglycemia.
- Coexisting disease producing significant respiratory or cardiovascular compromise.
- Immunosuppression.

Facilities Required

General. Because of the serious and life-threatening potential hazards associated with occipito-atlanto injections, the procedure must be performed in a room equipped with oxygen, suction, and resuscitative equipment to manage airway patency, blood pressure, and cardiac rhythm. Stretcher access and the ability to obtain immediate assistance from personnel skilled in emergency resuscitation are required.

Radiographic. Fluoroscopy is essential for the conduct of this procedure. Mobile (C-arm) fluoroscopy is preferred to fixed, vertical fluoroscopy. Computed tomography (CT) guidance is not appropriate for this procedure, as it does not allow for detection of intra-arterial injection through real-time visualization of contrast flow. The procedure requires a room equipped with a table that does not impede fluoroscopic visualization in multiple planes.

Emergency Materials and Medications. The operator must have the ability to recognize and appropriately treat complications that may arise during the procedure. Compromise of ventilation, oxygenation, perfusion, and airway patency must be addressed immediately. Medications to permit advanced cardiac life support protocols must also be readily available. Ready access to a cardiac defibrillator is required. Facilities for pulse oximetry, EKG, blood pressure monitoring, and respiratory monitoring are recommended.

Other Materials

- Intravenous cannula
- 25-gauge, short beveled needle, 2 to 3-1/2 inches in length
- Two 3.0 ml syringes
- Minimum volume extension tubing
- Skin preparation bacterial solutions and a standard sterile prep tray
- Sterile gloves
- Sterile drapes

Adjunct Medications

- Intravenous solution such as 0.9% sodium chloride, or lactated Ringers; used to maintain patency of the intravenous cannula.

- Short acting sedative such as Midazolam, if sedation is to be used.
- Antibiotics are not required.

Agents for Injection

- Water soluble, non-ionic contrast material suitable for intravascular and intrathecal use (Omnipaque or Isovue)
- Preservative free local anaesthetics (e.g. bupivacaine 0.125%)
- Corticosteroid (e.g. dexamethasone 10mg per ml, betamethasone 6.0 mg per ml, triamcinolone acetate 40 mg per ml)

Preliminary Procedures

Baseline Data. Baseline data documenting the severity of pain, its location, provoking movements, and activities of daily living that are affected by the pain should be recorded.

Informed Consent. The patient must understand why the procedure is being performed and understand all of the potential risks and benefits associated with the procedure. Informed consent must be obtained. Risks include, but are not limited to, infection, allergic reaction, haematoma, no change in pain or increased pain, dural puncture with spinal headache or arachnoiditis, spinal cord injury, seizure, stroke, and death.

The patient should be warned that they might experience numbness or weakness in the upper limb following the procedure. This is a normal effect of the local anaesthetic that is injected and should wear off once the local anaesthetic has ceased to act.

Patient Preparation and Premedication. The patient should know why they are having the procedure done, what to expect from the procedures, and what to expect of the medical team.

The patient should be given standard NPO orders (nothing by mouth) if IV sedative medications are given. These NPO standards are specific to the institution.

If the patient has a known allergy to contrast medium, they should be pre-treated with H1 and H2 blockers and corticosteroids prior to the procedure. Pre-medication standards are specific to the institution.

The patient's gown and hairline must allow aseptic skin preparation, use of non-invasive monitors, radiologic visualization, technical performance of the procedure, and any required patient care. Therefore it may be necessary to minimally shave the area to be prepped.

Once the patient is identified and a valid written informed consent has been obtained, the patient is brought to the procedure area. Intravenous access is established. Monitors are applied. Intravenous conscious sedation may be employed to reduce patient anxiety and aid in patient tolerance of the procedure but is not required. Supplemental nasal oxygen is recommended for sedated patients.

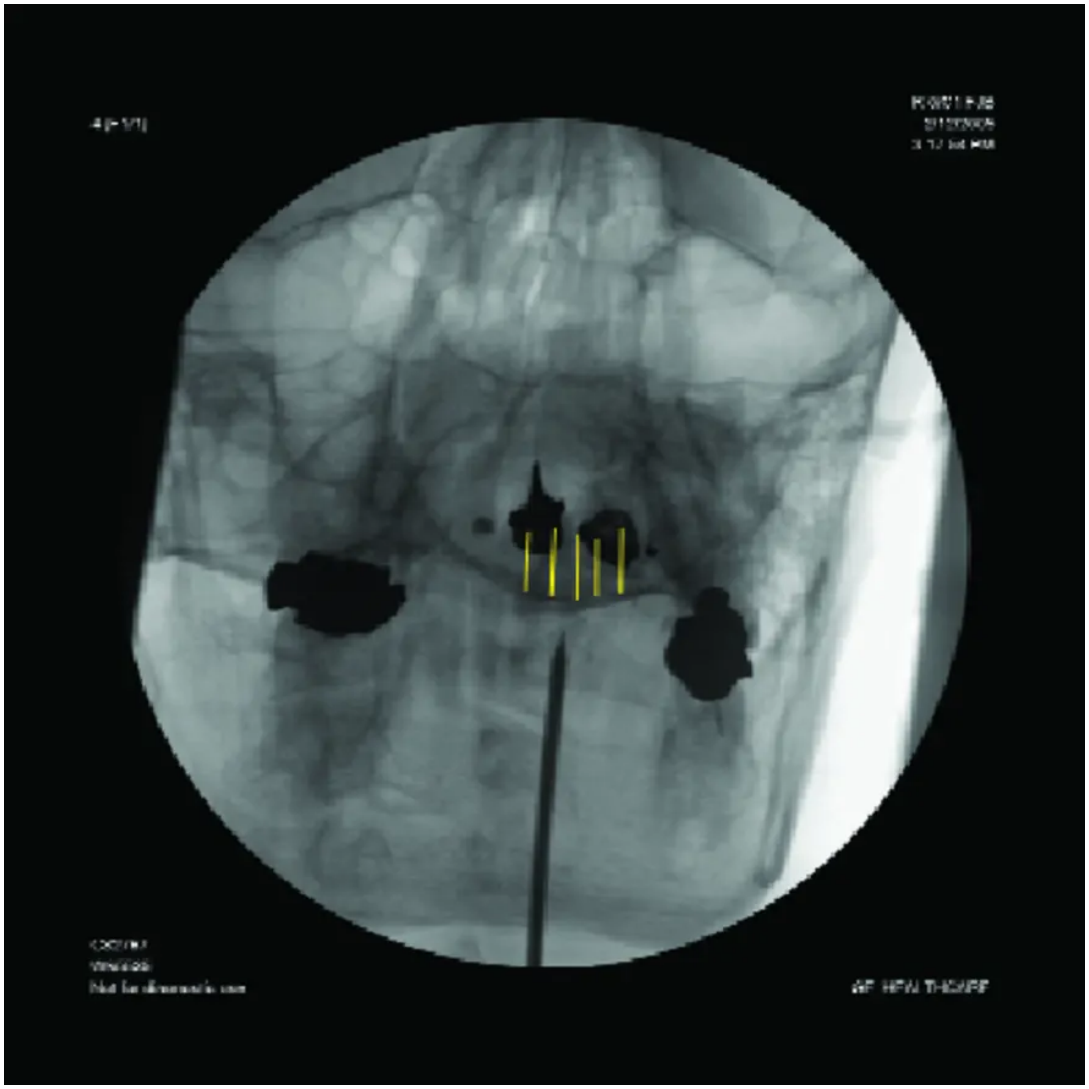

Figure 6. *Setup trajectory view: bottom of yellow lines are pointing to occipital brim.*

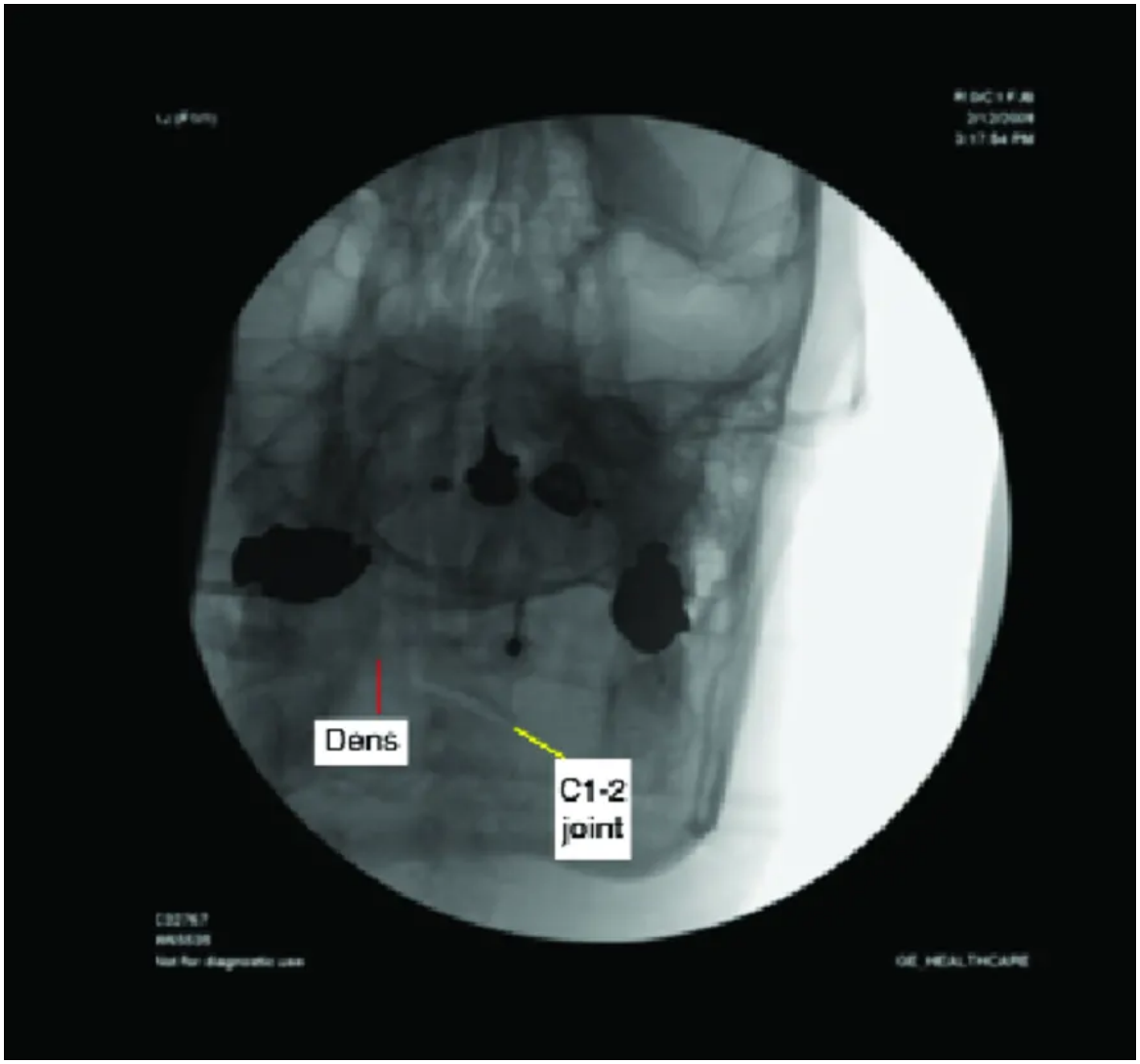

Figure 7. *Needle entering just medial to lateral portion of joint silhouette.*

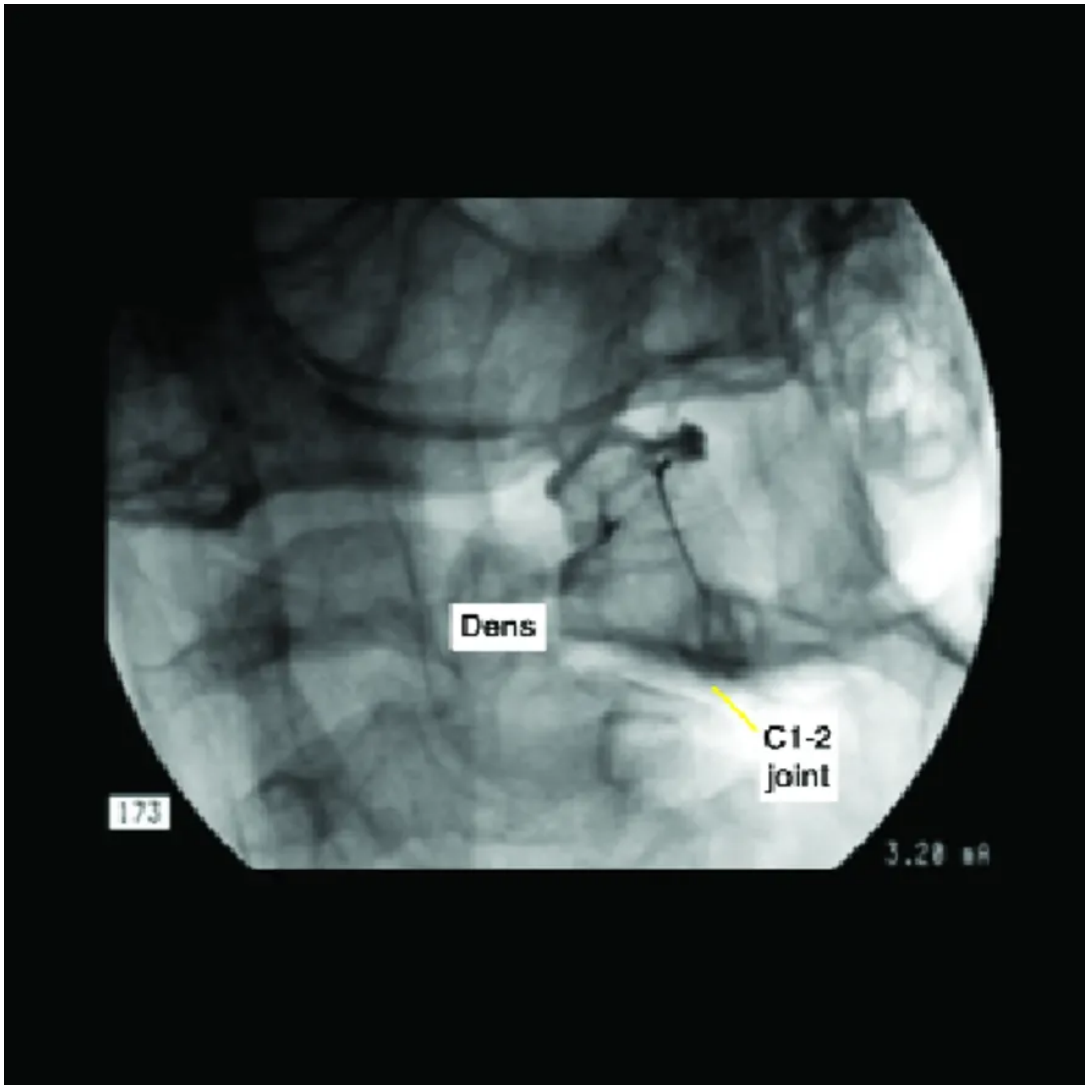

Figure 8. *Trajectory ipsilateral oblique view with contrast.*

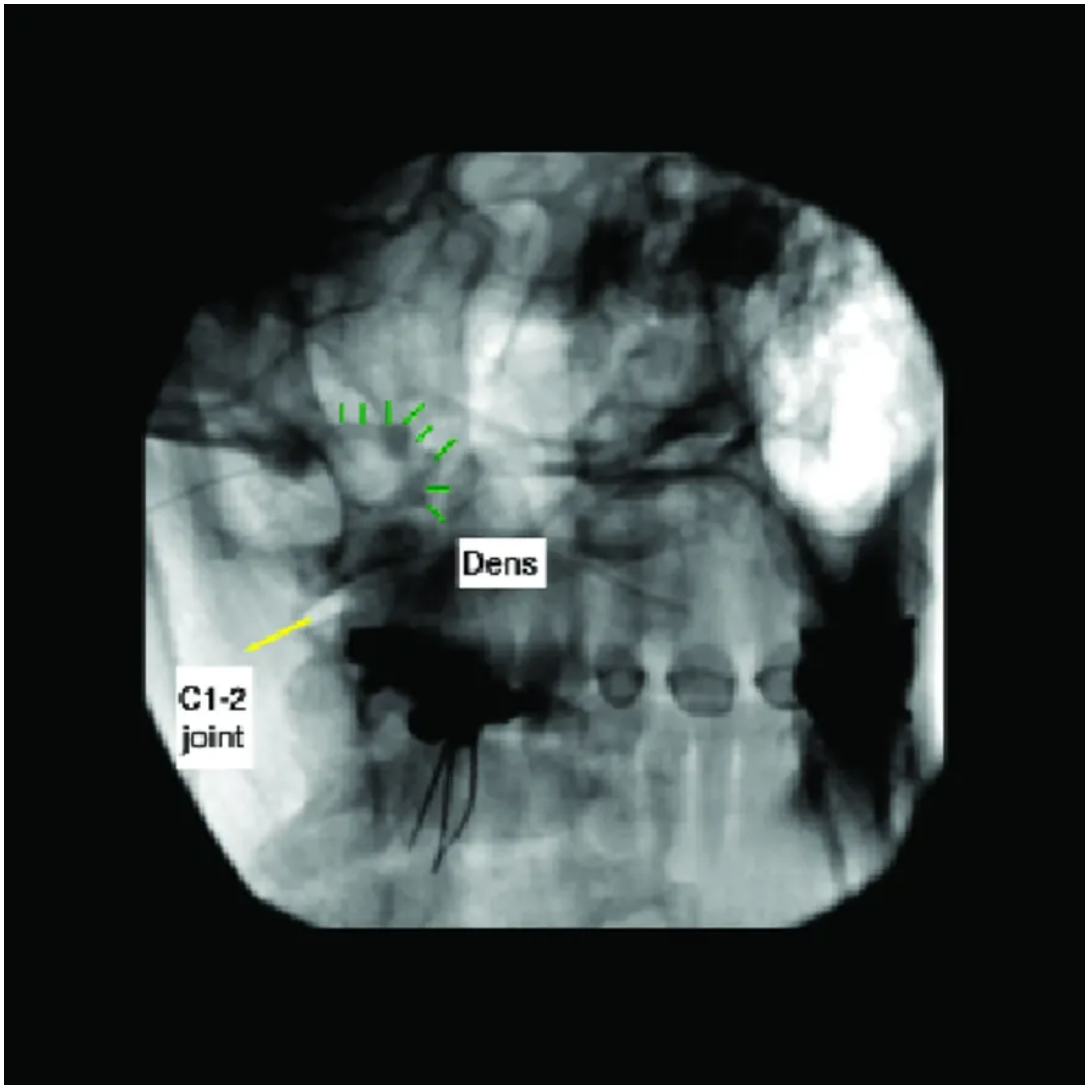

Figure 9. *Contralateral oblique with needle just entering joint. Note joint contrast on the concave side of green dashed lines.*

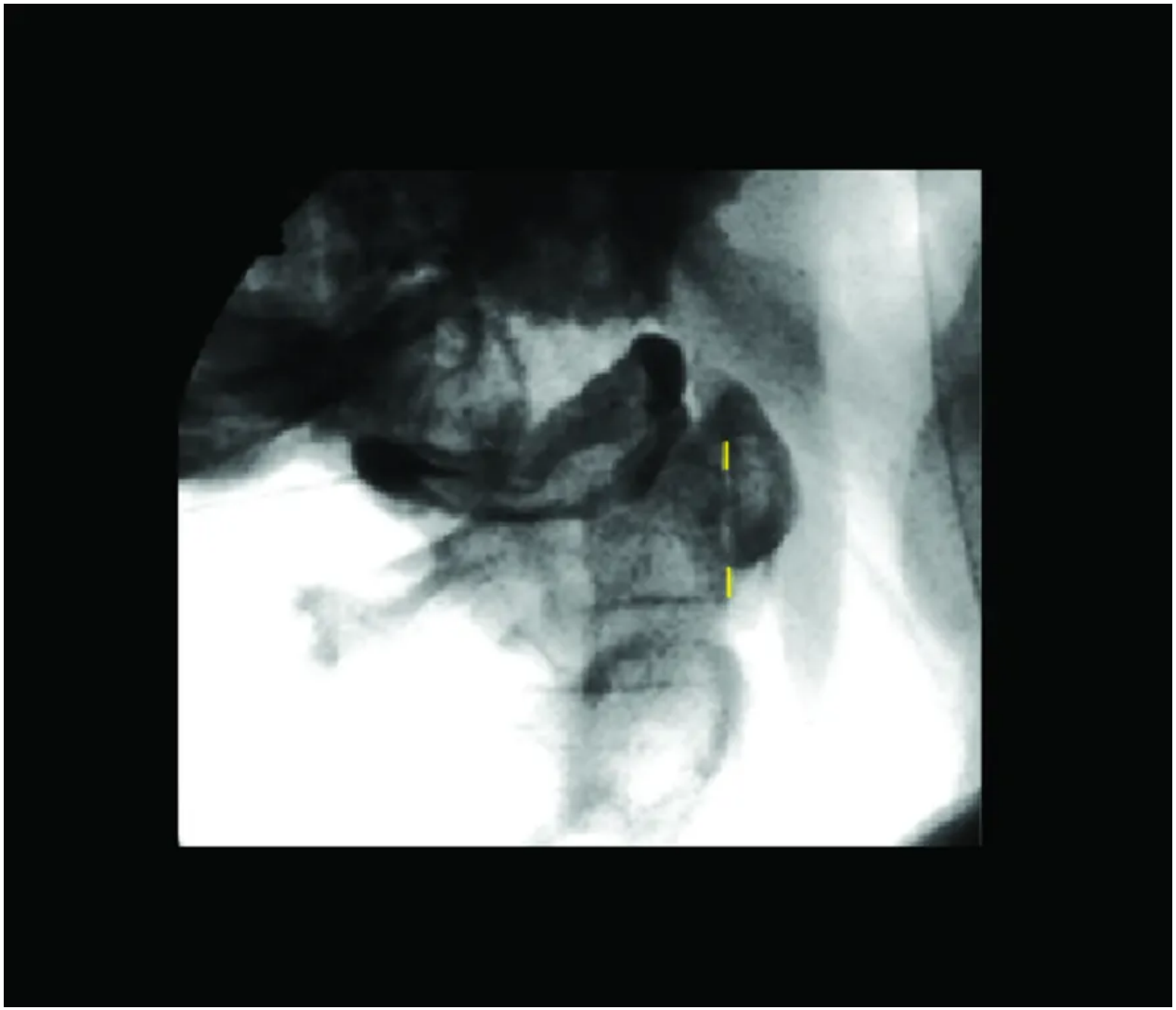

Figure 10. *Lateral with contrast outlining the bean shaped C0-C1 joint. Note the clear axial dens interval (ADI) as delineated between the two yellow lines, indicating a true lateral view of the upper most cervical spine.*

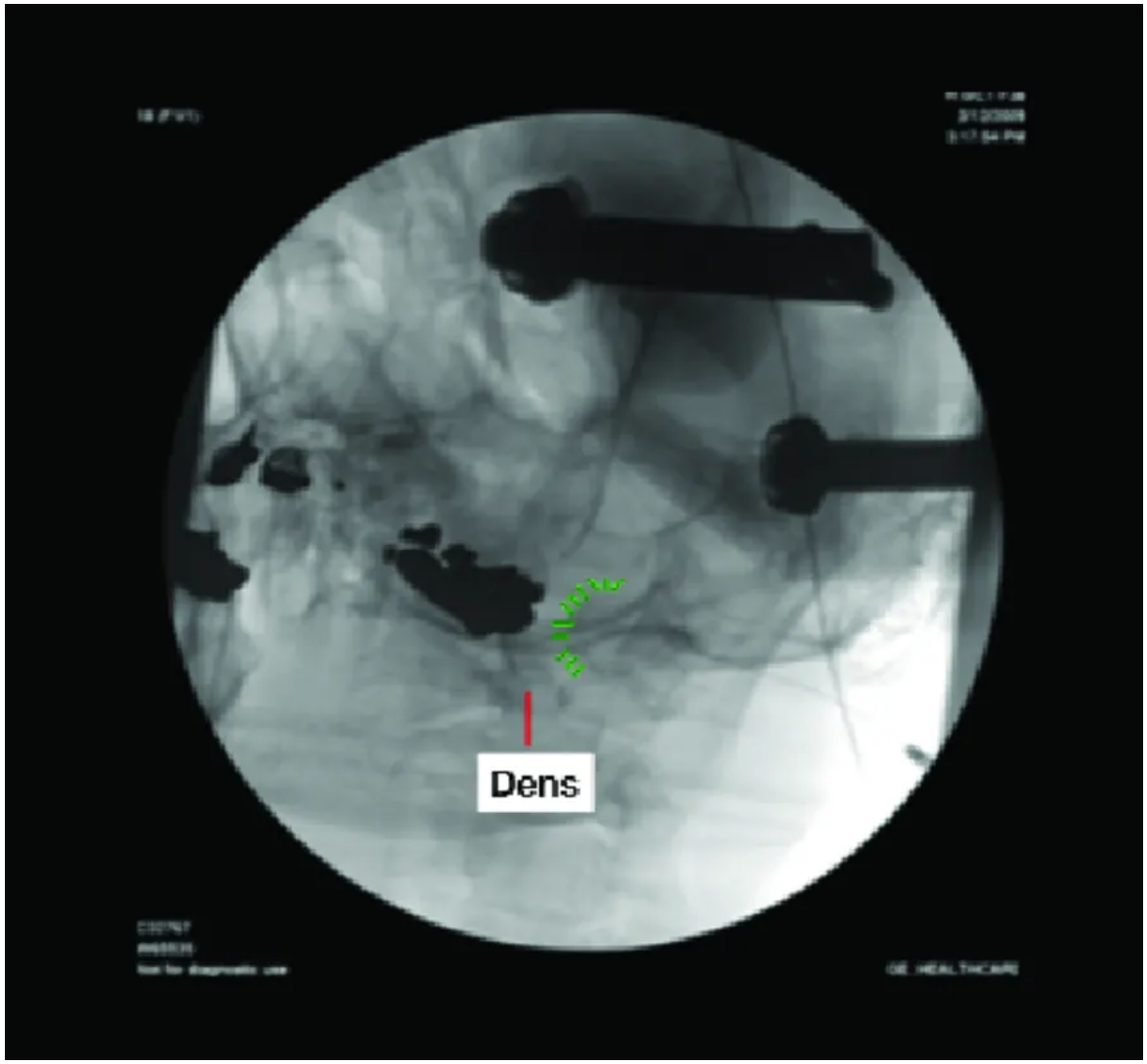

Figure 11. *Contralateral oblique to right-sided C0-C1 joint puncture. Note joint contrast on the concave side of green dashed lines*

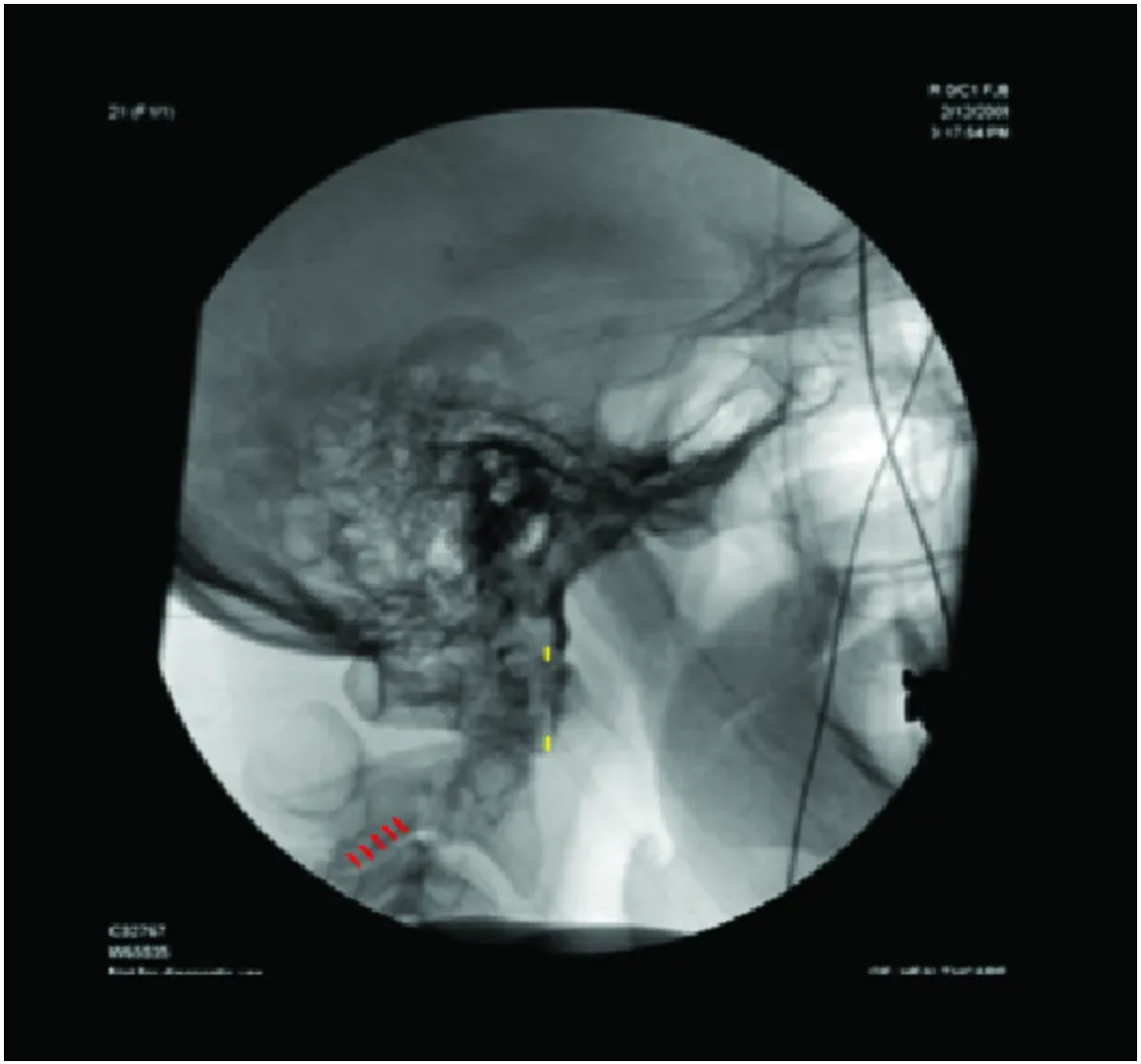

Figure 12. *Lateral view pitfall: this is not a true lateral as demonstrated by a lack of crisp C2-3 joint lines (see below red dashed lines) and a lack of clear axis dens interval (see between vertical yellow lines). This introduces error in interpretation of posterior to anterior depth.*

Needle Technique

Target Identification. The patient is placed prone with their head slightly flexed on a head support holder. The C-arm is then rotated 25-30 degrees ipsilaterally and caudally so that the occipital brim does not cover the joint proper, which will appear medial to the mastoid process. The actual target is above the visualized joint lucency, located inferior to the more cephalad posterior joint line. The needle is directed down the beam to the joint space below the occipital brim. It is advanced to a location just above the visualized joint lucency until osseous contact is made. At this point, the c-arm is rotated 25 degrees to the contralateral side in order to see the posterior target joint lucency as well as to see the needle's superior and inferior needle trajectory relative to the joint. While moving between these two views, the needle is advanced into

joint laxity as well as to see the needle's superior and inferior needle trajectory relative to the joint. While moving between these two views, the needle is advanced into the joint, which on a true lateral view should coincide to the posterior juncture of the occiput and atlas. This final view ensures that steering of the needle does not inadvertently move anterior and laterally towards the ascending vertebral artery loop. Figures 6 through 12 illustrate the various needle trajectory views—as well as ipsilateral oblique, contralateral oblique, and lateral views of the uppermost cervical spine.

For the injection of agents, a short length of low volume tubing is recommended. This allows change of syringes without the risk of moving the needle and prevents inadvertent advancement of the needle during the injection. Due to the small size of the procedure needle, blood or CSF may not be recovered on aspiration even if the needle is in a vessel or the subarachnoid space.

Under direct, real-time fluoroscopy, a small volume of non-ionic contrast material (1.0 ml or less) is injected. The solution should disperse in the joint.

It is essential to watch the injection of contrast material and look for inadvertent intra-arterial injection. If the needle has been misplaced, or if the vertebral artery has an aberrant course, the injection may be into the vertebral artery.

In the 25-30 degree view, intra-arterial injection is manifest by very rapid clearance of the injected contrast material in the aforementioned loops of vertebral artery distribution. In this instance, the needle should be withdrawn, and no further injections attempted. The procedure should be rescheduled until after a period long enough for the puncture to have healed. This precaution guards against any material that is subsequently injected from inadvertently penetrating the puncture and gaining access to the vessel.

Only a small volume of contrast material is required to opacify the occipito-atlanto joint. Once the injection of contrast material has been identified to be in an acceptable needle position with appropriate dispersal of the solution, spot films in the three planes described above (the ipsilateral oblique, contralateral oblique and true lateral views) are obtained. The therapeutic solutions (local anesthetic and corticosteroids) may then be delivered slowly. The joint space is quite small. Therefore, small volumes of solution are sufficient to achieve coverage of the target, up to 1 cc.

Post-Procedural Care. Following completion of injection, the needle is removed and the patient transferred to a holding area for observation. The recovery and observation time should be appropriate for any intravenous conscious sedation employed, as well as to facilitate the assessment of any impairment of intellectual function, tolerance of oral intake, assessment of the immediate results of the neural blockade and pain response to the procedure.

Post-procedure instructions including whom to call or where to go for any post-procedure urgent/emergent care, and routine follow-up instructions are provided to the patient prior to discharge from the facility. The patient should be discharged into the care of a responsible adult. Patients must not be allowed to drive themselves home following this procedure.

At the time of discharge, each patient should be interviewed regarding changes in symptoms occurring following the procedure. A pain rating using a visual analog scale and a post-procedure pain drawing should be obtained for comparison with the baseline data obtained before the procedure.

Pain diaries, both in the short term (hourly pain rating for the first six hours post-injection), and daily pain rating during the first ten days are helpful in assessing response. Evaluation of post-procedure response is best performed by a practitioner other than the injectionist. It is preferable that the same practitioner should evaluate the patient for pain-rating and pain diagram both before and after the procedure. Re-evaluation, at approximately two weeks, is appropriate to determine the early response to this intervention.

Complete relief of both local and referred pain during the patient's typical pain-provoking movement in the immediate post-procedure period is a favorable response. This implies that the anesthetic has been accurately and successfully delivered to the site responsible for the pain. However, this does not necessarily herald a good

therapeutic outcome. That is determined only by longer-term assessment of outcome.

Appendix A.

Non-Articular Spinal Pain

Psychogenic

Vascular

- Abdominal aortic aneurysm
- Peripheral vascular disease
- Renal artery and vein thrombosis

Neurogenic

- Nerve root tumors
  - Neurofibroma
  - Neurilemmoma
- Spinal cord tumors
- Diabetic neuropathy

Spondylogenic

- Multiple myeloma
- Secondary malignancy
- Osteoid osteoma
- Pathologic fracture (osteomyelitis)
- Anklylosing spondylitis

Viscerogenic4

- Stomach (posterior wall)-ulcer/tumor
- Gallbladder-gallstones
- Pancreas-tumor, cyst, pancreatitis

- Pancreas-tumor, cyst, pancreatitis
- Retroperitoneal-hemorrhage, tumor pyelonephritis
- Colon-colitis, diverticulitis, neoplasm
- Uterosacral ligaments-endometriosis, carcinoma
- Uterine malposition
- Menstrual pain
- Neoplastic infiltration of nerves
- Radiation neurosis of tumors/nerves
- Prostate-carcinoma, prostatis
- Kidney-renal stones, inflammatory disease, neoplasm, infection

Application

Complete relief of symptoms at the first follow up assessment is a favorable outcome. In that event, no further intervention is warranted.

Significant improvement in symptoms for a short term followed by gradual recurrence of symptoms over several weeks is a favorable but incomplete response and invites a repeat procedure. In that event, injection should not be repeated in less than two weeks.

Repeat injections should be predicated on response. Unless there is definite improvement in terms of decrease in severity of symptoms, reduced frequency and duration of recurrent episodes, and improvement in function, additional injections should not be performed. No fixed protocol such as a series of three injections performed at two-week intervals should be employed.

Pain relief in the immediate post-procedure period lasting only the duration of local anesthetic has some diagnostic value. It implies that the injection has delivered anaesthetic to a source of pain. The lack of prolonged response, however, indicates that repeat injections are not indicated. Whatever the cause and mechanism of pain, the failure to respond indicates that the pathology is not steroid-responsive and additional injections are not likely to be of any benefit.

Complete failure of the injection to provide any symptom relief implies that the source or mechanism of pain has not been addressed by this particular injection. In this event, another source of pain should be considered. If required, appropriate diagnostic studies may be undertaken.

Practice Parameters

must be knowledgeable about the relevant anatomy and spinal pathology, experienced in the use of fluoroscopy for visualization, and skilled in the performance of the precise needle placement. The physicians must be able to:

- Identify relevant cervical anatomy by palpation and inspection.

- Identify relevant structures on x-ray.
- Position the C-arm in the above described views and identify relevant anatomy.
- Maintain visualization and identification of relevant anatomy throughout the procedure.
- Obtain access to the occipito-atlanto joint with a maximum of two skin punctures.
- Obtain access to the occipito-atlanto joint with a maximum of ten adjustments of the needle.
- Perform final needle placement with fine manipulation of the needle within the allowable fluoroscopy time.
- Recognize and understand the significance of spread of contrast medium in the occipito-atlanto joint.
- Recognize and correctly interpret intravascular injections.
- Total fluoroscopy time should be limited to two minutes.

Occipito-atlanto needle placement should proceed with a minimum need to adjust the trajectory of the needle. There should be minimal patient discomfort. The procedure is performed slowly but does not take much time due to the limited distance that the needle must traverse. Satisfactory needle position should be achieved in less than two minutes employing no more than one minute of fluoroscopic exposure. Practitioners unable to spend the time required for precise set up of the fluoroscope for ideal visualization or who are unable to accomplish needle placement should not undertake this intervention. The potential for catastrophic complications in the event of a technical misadventure during the performance of occipito-atlanto injection requires that the practitioner be skilled and experienced in the performance of precise injection procedures. The experience and skill should necessarily be gained by performance of procedures with lesser potential for catastrophic complication such as transforaminal injections in the lumbar spine, lumbar or cervical facet injections, and medial branch blocks.

SEE OUR REFERENCES

Notes: This article was originally published February 21, 2011 and most recently updated December 20, 2011.