

NCBI Bookshelf. A service of the National Library of Medicine, National Institutes of Health.

StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018 Jan-.

Lumbar Sympathetic Block

Authors

Christopher E. Alexander¹; Matthew Varacallo².

Affiliations

¹ University of Miami

² Department of Orthopaedic Surgery, University of Kentucky School of Medicine

Last Update: October 27, 2018.

Introduction

The autonomic nervous system consists of the sympathetic and parasympathetic divisions. As the name implies, the lumbar sympathetic block can be utilized to disrupt the nerve supply from the sympathetic chain to the lower extremities. This is useful in treating sympathetic mediators of pain. Specifically, lumbar sympathetic blocks can be used for the treatment of painful conditions such as complex regional pain syndrome, phantom limb pain, hyperhidrosis, vascular insufficiencies, and pain from herpes zoster/shingles.

Anatomy

The sympathetic trunk is comprised of a nerve bundle that runs from the skull base to the coccyx. Its main function is to mediate the body's "fight or flight" response, and it also plays an integral role in maintaining homeostasis in conjunction with the parasympathetic nervous system. The lumbar sympathetic trunk is located along the anterolateral aspect of the first through fourth lumbar vertebra. The preganglionic neurons exit the spinal cord via white rami of the ventral roots of spinal nerves L1 to L4 and then synapse at the appropriate lumbar sympathetic ganglion. From there, the postganglionic neurons extend distally and innervate specific sites. The densest portion of lumbar sympathetic ganglia resides in L2 and L3. Because of this, lumbar sympathetic blocks are most commonly performed along the lower third of L2 or the upper third of L3.

Indications

According to the practice guidelines for chronic pain management by the American Society of Anesthesiologists, lumbar sympathetic blocks are indicated for the treatment of a multitude of sympathetic mediated pain disorders. One of those disorders includes complex regional pain syndrome (CRPS). Formerly referred to as reflex sympathetic dystrophy, complex regional pain syndrome is characterized by dysregulation of the central and autonomic nervous system causing unregulated pain and temperature control to the affected extremity. It is most commonly seen in patients who sustain an injury to the soft tissue or peripheral nerves of an extremity. Clinical features include vasomotor dysfunction, swelling, allodynia, and hyperalgesia. Affected limbs are often swollen, edematous, and may display trophic changes of the skin due to aberrant vasomotor activity.

The National Institute for Health and Clinical Excellence (NICE) states that approximately one out of five patients with painful ischemia of the lower limbs secondary to vascular disease are not candidates for surgical intervention due to either the pattern of their disease or medical co-morbidities. In these patients, lumbar sympathetic blocks may be utilized to reduce pain, improve wound healing, and potentially delay or avoid limb amputation. In these cases, lumbar sympathetic block serves to disrupt the sympathetic innervation to the vascular supply of the lower extremity, thus causing vasodilation and subsequently improved blood flow to the limb.

Another indication for lumbar sympathetic blockade includes phantom limb pain, a phenomenon in which pain is perceived from a limb that is no longer present. Although the mechanism is poorly understood, studies report an

incidence of phantom limb pain in amputee patients between 42% to 78%. Case studies have found lumbar sympathetic blocks to be safe and effective for the alleviation of phantom limb pain.

Additionally, lumbar sympathetic blocks may be used for management of neuropathic pain in special instances. There are case studies demonstrating improvement in pain, function, and quality of life after lumbar sympathetic block in patients with postherpetic neuralgia secondary to zoster. Cheng et al. found that lumbar sympathetic block provided sustained pain relief in a patient with intractable diabetic neuropathy.

Contraindications

Lumbar sympathetic blocks are minimally invasive and safe. However, contraindications include being on an anticoagulant, allergies to any of the medications that are injected during the procedure, uncontrolled diabetes, and poorly controlled heart disease.

Equipment

Required equipment includes a mobile c-arm x-ray device. Additionally, the practitioner will need epidural spinal needles, sterile gloves, medications, contrast, sterile drapes, and betadine solution to clean the target insertion site. Moreover, the patient's vitals should be monitored. Thus, it is necessary to carry blood pressure cuffs, cardiac monitors, and pulse oximeters as well.

Personnel

Staff typically consists of a nurse or assistant, a c-arm operator, and a physician. The clinician should always be cognizant of the protocol for an emergency response should unexpected complications occur during the procedure.

Preparation

Before starting, a time-out should be performed at which time the staff should pause to discuss which procedure will be performed and on what side of the body. During the time-out, patient identifiers such as name and date of birth should be confirmed. Once the identity of the patient and correct scheduled procedure have been confirmed, the patient should be placed on the fluoroscopy table in the prone position. Some clinicians choose to provide the patient with IV sedation at this time. After ensuring patient comfort, articles of clothing over the target region should be removed to expose the skin. Once the target area has been identified, the area should be cleaned thoroughly with betadine solution and then covered with sterile draping. After the patient has been positioned appropriately and the skin has been sterilized, the clinician may proceed.

Technique

The fluoroscope's imaging projector should be positioned such that the L2 and L3 vertebrae are easily visualized, and the superior endplates are aligned. From there, rotate the c-arm ipsilaterally in the oblique plane until the end of the transverse process is aligned with the anterior aspect of the vertebral body. The needle should be aimed towards the anterior aspect of the vertebral bodies of L2 or L3 (of note, some clinicians perform lumbar sympathetic blocks at both levels simultaneously). The needle should be placed coaxially to the fluoroscopy beam.

Once the trajectory has been confirmed, the c-arm should be returned to an anteroposterior view. From here, the needle may be advanced. It should approach the target vertebral body in the mid pedicular position. The needle should be in contact with the vertebra and "walked along" the vertebral body to ensure correct placement.

Of note, the great vessels are located ventral to the vertebral bodies. A lateral image should be obtained to verify the depth of the needle. The needle should be adjusted so that it is three to five millimeters dorsal to the most ventral portion of the vertebral body.

Finally, once in the correct position, inject contrast to ensure adequate flow. The clinician should be able to visualize the contrast cover the anterior portion of the vertebral body with the inferior and superior spread. Ideally, this should

cover L1 to L3. From here, medication may be injected to complete the lumbar sympathetic blockade. The greatest indication of a successful lumbar sympathetic block is a two to three degree Celcius rise in the temperature of the affected limb. The patient might also note that the skin of the extremity on the injected side will become flushed as a result of blood vessel dilation.

Complications

The most common complications include bleeding, bruising, swelling, and soreness at the site of injection. This is usually self-limited and resolves within hours to days of having the procedure. Some patients have also reported dizziness and transient numbness and weakness of the leg on the side that was injected. More serious complications include infection, intravascular injection, and allergic reaction to the medication, although these occurrences are exceedingly rare.

Clinical Significance

Overall, the lumbar sympathetic block is a safe and effective procedure that can be used to alleviate pain in the appropriate patient population. This includes people with vascular insufficiency of the lower extremities, complex regional pain syndrome, phantom limb pain, postherpetic neuralgia, and other neuropathic pain syndromes that are refractory to medical management.

Questions

To access free multiple choice questions on this topic, [click here](#).

References

1. An JW, Koh JC, Sun JM, Park JY, Choi JB, Shin MJ, Lee YW. Clinical Identification of the Vertebral Level at Which the Lumbar Sympathetic Ganglia Aggregate. *Korean J Pain*. 2016 Apr;29(2):103-9. [PMC free article: PMC4837115] [PubMed: 27103965]
2. Awal S, Madabushi R, Agarwal A, Singla V. CRPS: Early Lumbar Sympathetic Block is Better Compared to Other Interventions. *Pain Physician*. 2016 Feb;19(2):E363. [PubMed: 26815268]
3. Barreto Junior EPS, Nascimento JDS, de Castro APCR. [Neurolytic block of the lumbar sympathetic chain improves chronic pain in a patient with critical lower limb ischemia]. *Rev Bras Anesthesiol*. 2018 Jan - Feb;68(1):100-103. [PubMed: 26809966]
4. Gupta A, Portonova B, Dadachanji C. Successful treatment of post thrombotic syndrome with sequential lumbar sympathetic block. *Pain Physician*. 2015 Jan-Feb;18(1):E65-9. [PubMed: 25675072]
5. Abramov R. Lumbar sympathetic treatment in the management of lower limb pain. *Curr Pain Headache Rep*. 2014 Apr;18(4):403. [PubMed: 24643353]
6. Cerci FB, Kapural L, Yosipovitch G. Intractable erythromelalgia of the lower extremities successfully treated with lumbar sympathetic block. *J. Am. Acad. Dermatol*. 2013 Nov;69(5):e270-e272. [PubMed: 24124862]
7. Feigl GC, Kastner M, Ulz H, Breschan C, Pixner T, Dreu M, Umschaden HW, Likar R. The lumbar sympathetic trunk: its visibility and distance to two anatomical landmarks. *Surg Radiol Anat*. 2013 Mar;35(2):99-106. [PubMed: 22983730]
8. Gulati A, Khelemsky Y, Loh J, Puttanniah V, Malhotra V, Cubert K. The use of lumbar sympathetic blockade at L4 for management of malignancy-related bladder spasms. *Pain Physician*. 2011 May-Jun;14(3):305-10. [PubMed: 21587335]
9. Rigaud J, Delavierre D, Sibert L, Labat JJ. [Sympathetic nerve block in the management of chronic pelvic and perineal pain]. *Prog. Urol*. 2010 Nov;20(12):1124-31. [PubMed: 21056394]
10. van Eijls F, Stanton-Hicks M, Van Zundert J, Faber CG, Lubenow TR, Mekhail N, van Kleef M, Huygen F. Evidence-based interventional pain medicine according to clinical diagnoses. 16. Complex regional pain syndrome. *Pain Pract*. 2011 Jan-Feb;11(1):70-87. [PubMed: 20807353]
11. Hong JH, Kim AR, Lee MY, Kim YC, Oh MJ. A prospective evaluation of psoas muscle and intravascular

- injection in lumbar sympathetic ganglion block. *Anesth. Analg.* 2010 Sep;111(3):802-7. [PubMed: 20686003]
12. Govedarski V, Petrov I, Zahariev T, Nachev G. [Adjuvant and individual application of lumbar sympathectomy at patient with arterial disease in lower limb]. *Khirurgiia (Sofia)*. 2010;(1):19-23. [PubMed: 21972699]
 13. Meier PM, Zurakowski D, Berde CB, Sethna NF. Lumbar sympathetic blockade in children with complex regional pain syndromes: a double blind placebo-controlled crossover trial. *Anesthesiology*. 2009 Aug;111(2):372-80. [PMC free article: PMC2724014] [PubMed: 19602962]
 14. Carroll I, Clark JD, Mackey S. Sympathetic block with botulinum toxin to treat complex regional pain syndrome. *Ann. Neurol.* 2009 Mar;65(3):348-51. [PMC free article: PMC2763598] [PubMed: 19334078]
 15. Aşık ZS, Orbey BC, Aşık I. Sympathetic radiofrequency neurolysis for unilateral lumbar hyperhidrosis: a case report. *Agri*. 2008 Jul;20(3):37-9. [PubMed: 19085180]
 16. Manjunath PS, Jayalakshmi TS, Dureja GP, Prevost AT. Management of lower limb complex regional pain syndrome type 1: an evaluation of percutaneous radiofrequency thermal lumbar sympathectomy versus phenol lumbar sympathetic neurolysis--a pilot study. *Anesth. Analg.* 2008 Feb;106(2):647-9, table of contents. [PubMed: 18227328]
 17. Manchikanti L, Abdi S, Atluri S, Benyamin RM, Boswell MV, Buenaventura RM, Bryce DA, Burks PA, Caraway DL, Calodney AK, Cash KA, Christo PJ, Cohen SP, Colson J, Conn A, Cordner H, Coubarous S, Datta S, Deer TR, Diwan S, Falco FJ, Fellows B, Geffert S, Grider JS, Gupta S, Hameed H, Hameed M, Hansen H, Helm S, Janata JW, Justiz R, Kaye AD, Lee M, Manchikanti KN, McManus CD, Onyewu O, Parr AT, Patel VB, Racz GB, Sehgal N, Sharma ML, Simopoulos TT, Singh V, Smith HS, Snook LT, Swicegood JR, Vallejo R, Ward SP, Wargo BW, Zhu J, Hirsch JA. An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. *Pain Physician*. 2013 Apr;16(2 Suppl):S49-283. [PubMed: 23615883]
 18. Bornemann-Cimenti H, Dorn C, Rumpold-Seitlinger G. Early Onset and Treatment of Phantom Limb Pain Following Surgical Amputation. *Pain Med.* 2017 Dec 01;18(12):2510-2512. [PubMed: 28475751]
 19. Richardson C, Glenn S, Nurmikko T, Horgan M. Incidence of phantom phenomena including phantom limb pain 6 months after major lower limb amputation in patients with peripheral vascular disease. *Clin J Pain.* 2006 May;22(4):353-8. [PubMed: 16691088]
 20. Dworkin RH, O'Connor AB, Kent J, Mackey SC, Raja SN, Stacey BR, Levy RM, Backonja M, Baron R, Harke H, Loeser JD, Treede RD, Turk DC, Wells CD., International Association for the Study of Pain Neuropathic Pain Special Interest Group. Interventional management of neuropathic pain: NeuPSIG recommendations. *Pain.* 2013 Nov;154(11):2249-61. [PMC free article: PMC4484720] [PubMed: 23748119]
 21. Cheng J, Daftari A, Zhou L. Sympathetic blocks provided sustained pain relief in a patient with refractory painful diabetic neuropathy. *Case Rep Anesthesiol.* 2012;2012:285328. [PMC free article: PMC3350298] [PubMed: 22606406]

Copyright © 2018, StatPearls Publishing LLC.

This book is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, duplication, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, a link is provided to the Creative Commons license, and any changes made are indicated.

Bookshelf ID: NBK431107 PMID: 28613759