Can the use of Botulinum Toxin A be more beneficial than local anesthetic blocks when treating chronic pain syndromes?

Elyse Lesco, SAA
Advisor: Jason Kotun, CAA
Nova Southeastern University - Denver Anesthesiologist Assistant Program

Introduction

- Rikard et al. reported that 20.9% of American adults were affected by various forms of chronic pain disorders that caused a substantial decline in their quality of life.
- A common form of treatment includes sympathetic nerve blocks with local anesthetics that require patients to receive recurrent injections up to one to two times a week which can disrupt their daily lives, become expensive, and may not provide long-term relief.
- Researchers have begun looking into alternative forms of treatment including the use of Botulinum Toxin A as an adjuvant to local anesthetics in sympathetic nerve blocks to provide more efficacious and longer-acting analgesia.

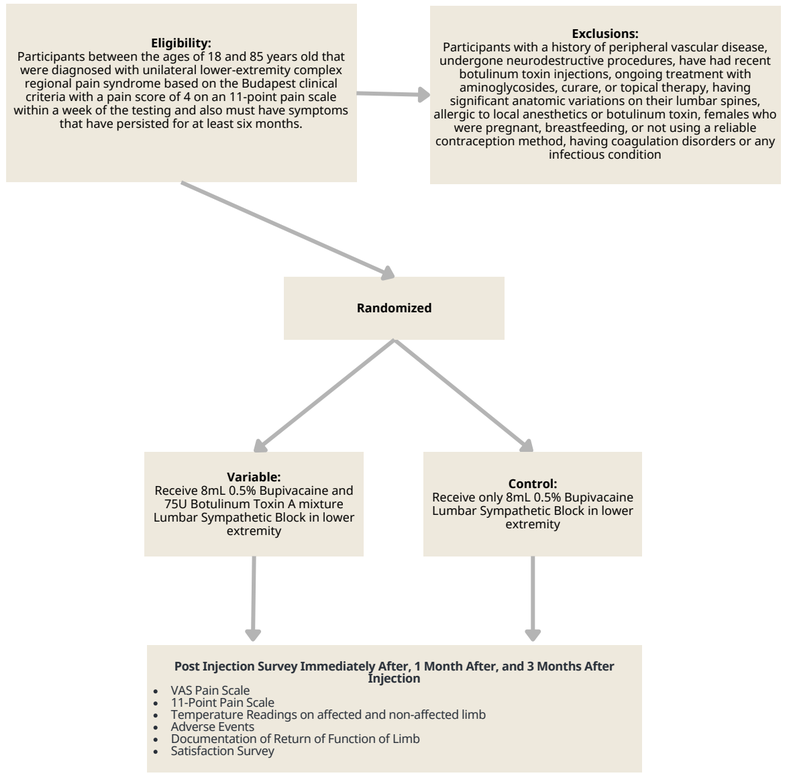
Materials

- Visual Analog Pain Scale
  - A measurement tool to assesses a person's pain intensity by asking them to mark a point on a horizontal line corresponding to their level of pain, with one end indicating "no pain" and the other end representing "worst pain imaginable."
- 11-Point Numerical Pain Scale
  - A measurement tool to assesses a person's pain intensity by asking them to mark a number corresponding to their level of pain, with 0 being indicating "no pain" and 10 representing "worst pain imaginable."
- Materials for Lumbar Sympathetic Block
  - Sterile gloves and prepping, 21-gauge 15-cm needle, 0.5% Bupivicaine, Normal Saline, Botulinum Toxin A, fluoroscopy and x-ray to confirm placement
- Temperature Probes
  - To gauge level and amount of block

Predicted Results

- Addition of Botulinum Toxin A or using it alone as a sympathetic nerve block will outperform common local anesthetics alone in providing pain relief in effectiveness and longevity in patients with chronic pain.
- Botulinum Toxin A's muscle relaxation, reduction of peripheral sensitization, and potential modulation of neurotransmitter release may lead to sustained and effective pain relief in order to provide more options for treatment.

Methodology



Adapted from Yoo et. al.

Discussion

- Current research suggests that adding Botulinum Toxin A to long-acting local anesthetics provides longer and more effective analgesic coverage in sympathetic nerve blocks compared to local anesthetic alone.
- Despite the benefits observed, the cost and stigma associated with Botulinum Toxin A still remains as a hinderance for patients to consider it as a secondary option for treatment.
- Physicians could consider these findings along with individualized treatment plans in consultation with patients, taking preferences, medical history, and cost into account while recognizing the growing evidence supporting the use of Botulinum Toxin A for chronic pain management.
- These findings could implicate a new standard of care which entails decreased clinic visits, decreased costs, and improved quality of life as well as further the understanding of treatment for different types of chronic pain disorders and Botulinum Toxin A's long term effects.

References

Barash, P. G. (2017). Clinical Anesthesia (8th ed.). Lippincott Williams & Wilkins.

Carroll, I. M., Clark, J. W., & Mackey, S. (2009). Sympathetic block with botulinum toxin to treat complex regional pain syndrome. Annals of Neurology, 65(3),348–351. https://doi.org/10.1002/ana.21601

Dressler, D., & Saberi, F. A. (2005). Botulinum Toxin: Mechanisms of Action. European Neurology, 53(1), 3–9. https://doi.org/10.1159/000083259

Frick, C. G., Richtsfeld, M., Sahani, N., Kaneki, M., Blobner, M., & Martyn, J. a. J. (2007). Long-term Effects of Botulinum Toxin on Neuromuscular Function. Anesthesiology,106(6), 1139–1146. https://doi.org/10.1097/01.anes.0000267597.65120.16

Goh, E. L., Chidambaram, S., & Ma, D. (2017). Complex regional pain syndrome: a recent update. Burns & Trauma, 5. https://doi.org/10.1186/s41038-016-0066-4

Graboski, C., Gray, D. S., & Burnham, R. S. (2005). Botulinum toxin A versus bupivacaine trigger point injections for the treatment of myofascial pain syndrome: A randomised double blind crossover study. Pain, 118(1), 170–175. https://doi.org/10.1016/ j.pain.2005.08.012

P, N., & Nigam, A. (2010). Botulinum toxin. Indian Journal of Dermatology, 55(1), 8. https:// doi.org/10.4103/0019 -5154.60343 Botulinum Toxin A Versus Local Anesthetic Blocks for Chronic Pain Syndromes 16

Rikard, S. M., Strahan, A. E., Schmit, K. M., & Guy, G. P. (2023). Chronic Pain Among Adults — United States, 2019–2021. Morbidity and Mortality Weekly Report, 72(15), 379–385. https://doi.org/10.15585/mmwr.mm7215a1

Tantanatip, A. (2022, July 4). Myofascial Pain Syndrome. StatPearls - NCBI Bookshelf. https:// www.ncbi.nlm.nih.gov/books/NBK499882/

Yoo, Y., Lee, C., Kim, J., Jo, D., & Moon, J. Y. (2022). Botulinum Toxin Type A for Lumbar Sympathetic Ganglion Block in Complex Regional Pain Syndrome: A Randomized Trial. Anesthesiology, 136(2), 314–325. https://doi.org/10.1097/aln.0000000000004084