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Botulinum Toxin Type A Injections for Refractory Abdominal Dystonia: A Case Report

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Abstract

Background: A 58-year-old male with chronic bilateral treatment resistant abdominal spasms secondary complications of ascites/ alcoholic cirrhosis. Spasms would occur 4-5 times/day, lasting minutes to hours despite a 2-year course of therapeutic and pharmacological interventions. Due to treatment refraction, 6 uniformly spaced botulinum toxin type A (BTX-A) injections were placed per side, using electromyography for audible intramuscular syringe placement confirmation, while visual confirmation was made via ultrasound. During the initial trial, 6 evenly spaced injections were performed bilaterally, uniformly distributing 80U/side. Injections began bilaterally just medial to the junction of the inferior rib cage border/ anterior axillary line and progressed in a handpocket direction to the inferomedial abdomen just below the umbilicus. Subsequent dose titration followed the same injection protocol.

Methods: Per Bon Secours Mercy Health IRB policy, this case report does not qualify for Mercy Health North IRB, and a formal statement from them has been obtained.

Results: When compared to baseline, the patient's abdominal pain and spasms reduced 33%, with a simultaneous 50% reduction total daily duration by week 1. On week 12, the patient reported exceptional functionality, sleep improvement, and no reduction of postural stability. With symptoms worsening days prior to week 12 follow up, BTX-A dosage was increased to 240U (120U each side). By week 24 follow-up, the patient has an 88% pain reduction from baseline, and eradication of spasms. During this visit, 360U (180U each side) was injected for longer therapeutic relief. The patient will now only return as needed for subsequent injections.

Conclusion: To our knowledge, this is the first case reporting the use of BTX-A injection therapy for cirrhosis induced abdominal spasms refractory to traditional interventions. BTX-A injection under electromyography and ultrasound guidance appears to be a safe and effective treatment for refractory chronic abdominal spasms.

Keywords

Musculoskeletal Conditions, Neuromuscular Diseases, Pain, Posture, Spasticity, Ultrasound/ Ultrasonography, Electromyography

Botulinum Toxin Type A Injections for Refractory Abdominal Dystonia: A Case Report

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Abstract

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Introduction

Muscular spasms and cramping in the setting of liver cirrhosis affects 22-88% of cirrhotic patients.[1] Although usually self-limiting, muscle spasms in cirrhosis can cause considerable pain, discomfort, and reduced quality of life. Standard treatments focus on reduction in number, duration, and severity of the spasms while maintaining a favorable side effect profile in cirrhosis. Botulinum Toxin A (BTX-A) is safe and effective treatment for refractory muscular spasm; however, few studies have characterized its use in the setting of cirrhosis. We present a case of refractory cirrhotic abdominal spasms successfully managed with BTX-A under a uniform protocol to introduce a possibly safe and effective treatment alternative.

Case

A 58-year-old male with protuberant abdominal ascites secondary to alcoholic cirrhosis had a 2-year history of severe abdominal spasms believed to be a byproduct of chronic distension, worsening alcoholic polyneuropathy, and repeat paracentesis. These spasms occurred 4-5 times-a-day lasting minutes to hours, drastically reducing his quality of life. As shown in Figure 1, spasms began bilaterally in the upper quadrants and radiated infero-medially to his umbilical hernia. Over a 2-year course, trials of abdominal binders, muscle relaxers, neuropathic agents, and opioids provided no benefit.

Due to treatment refraction, the patient agreed to trial BTX-A injections into his spasmodic abdominal musculature. While under electromyography (EMG) syringe and in-plane ultrasound (US) guidance, 6 evenly spaced injections were placed bilaterally just medial to the junction of the inferior rib cage border/anterior axillary line and progressed in a hand-pocket direction to the to just below the umbilicus, following the abdominal spasm pattern. A total of 160U BTX-A were used (80 each side) on the initial trial.

Each injection accessed the skin at a 30-45 degree angle, allowing for safer modulation of depth should the patient change position. Upon US confirmation of intramuscular

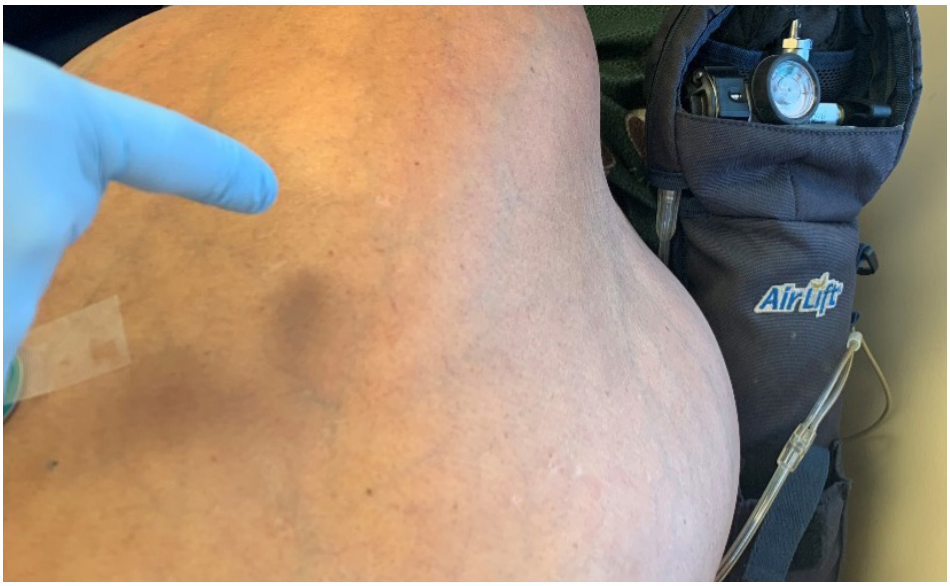

Figure 1. Right abdominal spontaneous spasm prior to first injection.

needle placement, the patient performed head lifts to engage his abdominal musculature, allowing for precise visual and auditory confirmation of needle placement. This injection process was well tolerated by the patient with no complications. All follow-up injections were performed according to the same protocol.

Discussion

Liver cirrhosis affects over 600,000 Americans, with 69% reporting they were unaware of their liver disease.[2] Common symptoms of end-stage liver disease include pain, breathlessness, muscle cramps, erectile dysfunction, insomnia, daytime sleepiness, fatigue, pruritus, anxiety and depression.[3] The majority of muscle cramps are reported to be in the lower half of the body (thighs, calves, toes), with less common sites including fingers (47%), neck (9%), and the abdominal wall (12%).[2]

Spasms can be debilitating and drastically reduce quality of life in cirrhotic patients. Proposed pathophysiological mechanisms include cirrhosis induced nerve damage, excessive liver metabolite buildup, and electrolyte abnormalities.[1] Medical treatments attempting to treat the causation of one of these etiologies, including supplementation of amino-acids, taurine, quinidine, vitamin E, or IV albumin have limited evidence supporting their long term efficacy and safety.[4] As a result, medications more targeted at palliating symptoms, like neuropathic agents and muscle relaxers, are more commonly used.

Btx-A injections were chosen as adjuvant therapy to reduce the severity, number, and associated pain of his refractory spasms to direct treat his spastic musculature. From his ascites, the distended abdominal musculature thinned to 1-1.5 cm, making accurate administration of Btx-A essential to the treatment's safety and efficacy. This is why a 30-45 deg syringe approach with dual needle placement confirmation (EMG/US) was utilized (Figure. 2).

After reviewing Comella et. all's multicenter dystonia rating assessment, pain, severity, and duration of system were used to track symptom progression.[5] Compared to week 0 (baseline), When compared to baseline, the patient's abdominal pain and spasms reduced 33%, with a simultaneous 50% reduction total daily duration by the end of week 1. On week 12, the patient reported exceptional functionality and sleep improvement. He also has no reduction of postural stability, changes in bowel function, or other adverse effects. Days prior to week 13 follow up, his symptoms began to progress towards his pre-injection baseline. BTX-A dosage was subsequently increased to 240 U (120 U each side) and placed under the same protocol as before. By week 24 follow-up, the patient has an 88.89% pain reduction from baseline, and eradication of spasms. 360 U (180 U eachside) was injected during this visit to target longer therapeutic relief. The patient now only returns as needed for subsequent injections.

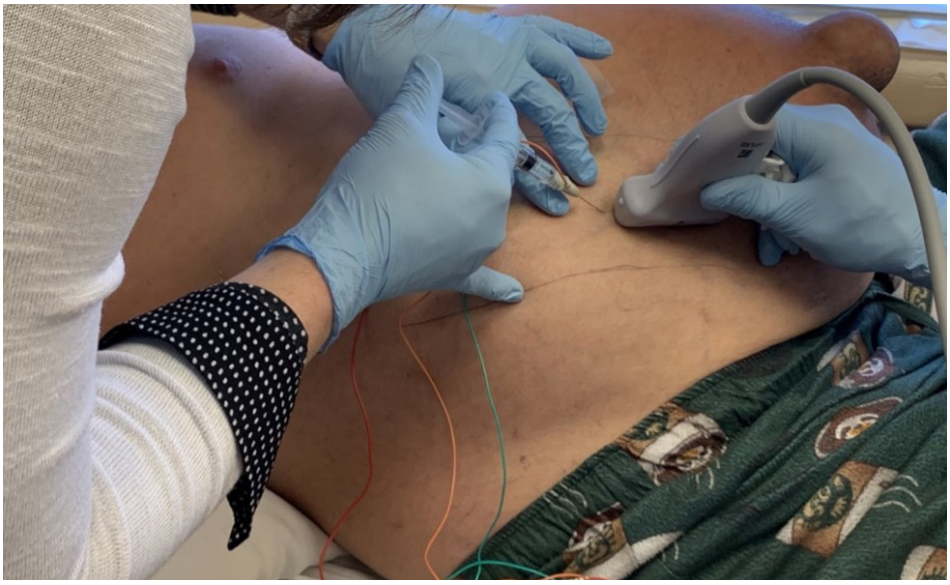

Figure 2. In-plane US injection technique with EMG syringe.

Table 1: Patient's post-injection symptom log.

Dystonia Case Data		Pain (10)	Severity (4)	Duration (4)
160 U (80/side)	Week 0	9	3	1
	Week 1-4	6	2	0.5
	Week 5-12	5	2	0.5
240 U (120/side)	Week 13	8	3	3.5
	Week 14-18	2	2	0.5
	Week 19-23	1	0	0
380 U (180 U/side)	Week 24	1	0	0

Rating criteria
Pain: Visual Analogue Scale pain scaling (VAS)
Severity: (0)-No spasm, (1)- Mild, barely noticeable (2)- Mild, without functional impairment, (3)- Moderate spasm, moderate functional impairment, (4)- Severe, incapacitating spasm
Duration: Cumulative hours per day with muscle spasm on average

Conclusion

With the high prevalence of abdominal spasms in cirrhotic patients, there needs to be further investigation into patients with symptoms refractory to common therapies. Our case shows how properly titrated BTX-A appears to drastically reduce pain, severity, and duration of cirrhotic muscle spasms with little or negligible side effects, like truncal instability. Additionally, we demonstrated a safe and effective way an experienced clinician can administer intraabdominal BTX-A. From this case, we highlight the need for further research on treating refractory cirrhotic abdominal spasms while presenting a novel approach to do so. ■

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