

Unanticipated elimination of bulimia symptoms following a cervical sympathetic block for treating Post-Traumatic Stress Disorder (PTSD) : A Case Report

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Case Report

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Abstract

Objective

Report the efficacy of cervical sympathetic block (CSB) in treating PTSD as well as bulimia symptoms and discuss possible mechanisms of action to explain these findings.

Background

Successful treatment of PTSD with CSB has been reported previously in several publications. Bulimia has been associated with comorbid PTSD and is often comorbid with PTSD. Treatment of PTSD could be an effective approach to treat bulimia.

Methods

The patient received bilateral CSB at C6 and C4 levels on the right side followed 1 day later by the left side, as per clinic protocol. The patient's PTSD symptoms were evaluated using the Post-Traumatic Stress Disorder Checklist (PCL-5). This checklist was administered one day before treatment and again 45 days later following treatment.

Results

CSB showed marked benefit for PTSD symptoms as demonstrated by significant reduction of PCL-5 scores following the bilateral CSB procedures. The patient spontaneously reported complete and persistent elimination of bulimia symptoms. Reduction of PTSD and bulimia symptoms were sustained at the 45-day follow-up.

Conclusion

CSB is a minimally invasive procedure with an excellent safety profile that may provide sustained relief of PTSD and bulimia symptoms. Considering the marked difficulties in treating bulimia, CSB may be a new ray of hope for the bulimia cohort. We believe CSB should be studied as a therapeutic approach for eating disorder patients with associated trauma in adequately powered studies.

PLAIN ENGLISH SUMMARY

Post-Traumatic Stress Disorder (PTSD) is commonly associated with eating disorders (ED), particularly the bulimia type. A possible cause of the condition is the over activation of the fight or flight system, known as the sympathetic nervous system. As the background efficacy of current ED and bulimia

treatments is limited, more effective approaches would be welcomed. Multiple studies have demonstrated efficacy of cervical sympathetic blocks (CSB) for treating PTSD. CSB involves the use of local anesthetic injection next to sympathetic ganglion in the neck and it seems to work by resetting the sympathetic nervous system. Cervical sympathetic block seems to have rapid and persistent elimination of bulimia and PTSD symptoms and may be a new ray of hope for ED populations.

1. INTRODUCTION

1.1 Bulimia

Prevalence of bulimia was estimated from a cross-sectional general population survey of 1498 adults, using the Diagnostic Interview Schedule (DIS). Lifetime prevalence has been reported as 1% of the US population in adults aged 18–64.¹ Trauma is commonly associated with Eating disorders (EDs), particularly among those with bulimic features.^{2,3} EDs have been associated with posttraumatic stress disorder (PTSD).²⁻⁴ Multiple traumas has been shown to lead to bulimia, classically childhood sexual abuse, but also bullying.⁵ Treatment modality for ED currently is psychotherapy, as pharmaceutical modalities do not seem to be effective.²

The hypothesis is that bulimic behaviors, such as vomiting, serve to facilitate numbing and avoidance of trauma-related memories, dreams, feelings, thoughts, and behaviors, as well as decrease associated hyperarousal.^{6,7} However, the use of pharmacotherapy without concomitant psychotherapy is generally ineffective in terms of producing complete and lasting abstinence in ED patients.²

1.2 PTSD

Post-traumatic stress disorder (PTSD) is a prevalent and potentially debilitating disorder typically occurring as a result of exposure to physical violence, natural disasters, or other severe stressors. The World Health Organization (WHO) World Mental Health Surveys determined the lifetime prevalence of PTSD to be approximately 3.9% in the general population and 5.6% among the trauma-exposed.⁸ Higher percentages are seen in populations who have experienced one or more forms of trauma, such as war-related trauma, physical or sexual violence, and accidents.⁹ Among veterans who begin PTSD treatment with psychotherapy or medication, drop-out rates are reported to be as high as 20%-40% in randomized clinical trials and considerably higher in routine practice.¹⁰ While therapeutic efficacy is reported to be achieved in 60%-80% among patients compliant with medical treatment, intention-to-treat analysis shows efficacy decreases to approximately 40% when accounting for patients not completing treatment.¹⁰ CSB has been shown to be successful in treating PTSD in multiple cohorts. In a 2022 publication, 21 types of self-reported trauma leading to PTSD were treated using CSB.¹¹ The average decrease in PCL scores for men and women was 28.59 and 29.2, respectively. Statistical analysis of the male population with a military background showed a significantly greater change in corresponding PCL scores than civilians (PCL-M change = -31.83 vs PCL-C change = -24.89). Likewise, women who had a

military background had a significantly greater reduction in PCL scores than civilians (39.15 vs 28.23). Statistically significant improvements in PTSD symptoms were noted independent of the causative trauma type, gender, age greater than 20, previous suicide attempts, or use of prescription medications for PTSD.¹¹ Among the 21 types of reported trauma, 19 types reached statistical significance.¹¹

2. METHODS

2.1 Patient and Setting

The patient was a 30-year-old male that was treated in our clinic for the diagnosis of PTSD. His trauma leading to PTSD was described as being bullied emotionally from the 2nd to 6th grade, with minimal physical abuse following. Patient received minimal psychiatric interventions since high school that included brief use of Prozac and was started on Adderall which he is currently taking. Patient denied psychiatric or medical admissions or suicide attempts. He further denied persistent GERD, as well as the history of Mallory-Weiss tears.

2.2 Cervical sympathetic block

The patient was given information concerning the risk/benefits of the procedure and a consent form was completed. Patients received local anesthetic or sedation as desired by the patient. The patient was positioned comfortably in the supine position, with the head rotated slightly contralaterally, routine monitoring was applied as per clinic protocol.

The skin over the anterior and right-side neck was widely cleaned with chlorhexidine-isopropyl alcohol preparation. Sterile ultrasound gel was applied. Appropriate ASA monitors were applied, and an intravenous line with a 22-Gauge IV was placed. The right-side anterior neck was scanned using a linear transducer (Mindray Ultrasound, China) from the level of the 7th to the 4th cervical vertebrae in transverse view. Power Doppler was utilized to identify vasculature in the planned needle track. The skin on the lateral neck was anesthetized with 1 mL of 1% lidocaine. Utilizing an in-plane approach, under real-time ultrasound guidance, a 22 Gauge echogenic needle was placed just dorsal to the ventral fascia of the longus colli, medial to the longus capitus, and approximated to the cervical sympathetic chain. After negative aspirations for blood or CSF, 0.5 mL of 0.5% bupivacaine was injected, and after observing the patient for 30 seconds, 7.5 cc of injectate was injected over 1 minute for a total injection volume at C6 level. The same procedure was performed at C4 level; the total volume use was 4 cc at this level. Due to the risk of serious airway compromise with inadvertent bilateral blockade of the recurrent laryngeal nerves, the left-sided SGB was performed 24 hours after the right-sided SGB to allow adequate time for local anesthetic effects to subside.

Both before and after the procedure, the patient was specifically informed as to the potential for and signs of life-threatening adverse events, including worsening neck pain which may indicate hematoma formation, and shortness of breath. All procedures were well tolerated. The patient exhibited Horner's syndrome (ptosis, miosis and anhidrosis) within 10 minutes of the injection. The patient was monitored

for an additional 30 minutes before discharge. No hospital admissions occurred, or persistent complications were observed.

2.3 Psychometric Testing:

The PTSD Checklist Version 5 (PCL-5)

The PTSD Checklist Version 5 is a 20-item self-reported questionnaire designed to assess PTSD symptomatology including symptoms of re-experiencing, avoidance, and hyperarousal. The PCL-5 has demonstrated excellent reliability and validity in primary care settings.¹² Non-response to the treatment was defined in patients who had obvious Horner's syndrome findings but failed to improve by at least 10 points on a PTSD Checklist Version 5 (PCL-5).¹²

3. RESULTS

One day prior to CSB, the patient's PCL-5 score was 39. He experienced significant relief of symptoms after the procedures and had marked Horner's syndrome demonstrating a dense sympathetic block following both procedures. At the 45-day follow-up, he acknowledged sustained benefit with a PCL-5 score of 6 (84.62% reduction). He reported complete resolution of bulimia symptoms one day following left CSB.

4. DISCUSSION

Noradrenaline (NE) is a catecholamine acting as both a neurotransmitter and a hormone, with relevant effects in modulating feeding behavior and satiety. Several studies have assessed the relationship between the noradrenergic system and eating disorders (EDs). Preclinical studies demonstrated an involvement of the noradrenergic pathways in binge-like behaviors. Clinical studies have shown alterations in plasma NE values in patients with Anorexia Nervosa (AN) and Bulimia Nervosa (BN). Pharmacological studies have documented the efficacy of noradrenaline-modulating therapies in the treatment of BN and Binge Eating Disorder (BED). Venlafaxine, which is a selective norepinephrine reuptake inhibitor (SNRI), helps modulate the impulsiveness of eating.¹³ Prior publications have reported NE as the main transmitter in PTSD pathophysiology.¹⁴ Specifically, a persistent increase in the urine concentration of NE has been shown in patients with PTSD.¹⁵ Thus, showing the common pathway for PTSD and BN.

Brain scans further demonstrate similarity of EDs and PTSD. Increased insula and amygdala activity during selective attention for negatively valenced body parts in binge eating disorder.¹⁶ Westerhaus and Loewy used pseudorabies virus injections to identify connections of the stellate ganglion.¹⁷ Pseudorabies virus allows identification of neural pathway connections that are 2–3 synapses from the point of injection of the virus. In this manner, the use of pseudorabies virus injection is used to identify cortical areas connected to the stellate ganglion. Early labeling was found in the hypothalamus and

central nucleus of the amygdala.^{14,17} With slightly longer time labeling was found in lateral, basolateral, and medial amygdala. After 6–8 days, injections of the stellate ganglion produced extensive transneuronal labeling in the infralimbic, insular, and ventromedial temporal cortical regions.^{14,17} The amygdala has been shown to be involved in the persistence of PTSD symptoms. CSB has been shown to deactivate the amygdala and reduce the symptoms of PTSD,¹⁸ a likely mechanism of the effect seen.

5. CONCLUSION

As found in prior studies, CSB is safe and effective in treating PTSD, with an unexpected benefit in reducing/ eliminating bulimia symptoms. Although the mechanism of effect is not known, the role of norepinephrine and amygdala seem to play a significant role in pathophysiology of PTSD and bulimia. Considering the difficulties in treating PTSD and comorbid bulimia, this case report can pave the way for effective treatments in this patient cohort.

Abbreviations

CSB

Cervical Sympathetic Block

ED

Eating Disorder

PCL

5-Post-Traumatic Stress Disorder Checklist – 5

PTSD

Post Traumatic Stress Disorder

DIS

Diagnostic Interview Schedule

WHO

World Health Organization

NE

Noradrenaline

AN

Anorexia Nervosa

BN

Bulimia Nervosa

BED

Binge Eating Disorder

SNRI

Selective Norepinephrine Reuptake Inhibitor

Declarations

Human Ethics and Consent to Participate declarations: not applicable

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