



# Stellate Ganglion Blockade for Management of PTSD Symptoms

Justin Alino, DO; Brian McLean, MD; Donald Kosatka, MD;  
Tripler Army Medical Center, 1 Jarrett White Road, Honolulu, HI, 96859



## Abstract

Successful treatment of PTSD with SGB has been demonstrated and reported previously at Walter Reed Army Medical Center. An identical protocol was employed at Tripler Army Medical Center (TAMC) to treat four service members diagnosed with combat-related PTSD. The level of acuity and conventional treatment resistance was different among the individual service members however each displayed strong symptoms of PTSD as indicated by the Post-traumatic Stress Disorder Checklist (PCL).

## Statement of problem

PTSD is a significant problem, especially in the military population. Recent estimates show that one in five of combat deployed soldiers ends up with a diagnosis of PTSD. Yearly, billions of dollars are spent to address this issue with fewer than half of patients experiencing complete remission. This underscores need for refinement of current treatment options and the development of new treatment modalities

## Epidemiology of and Costs Associated with PTSD

### Yearly Costs

- Estimated 6.2 Billion Dollars spent (2008-2009) in treatment costs for PTSD in U.S. (not accounting for lost productivity)

### Prevalence in General Population in U.S.

- About 7-8% of the population will have PTSD at some point in their lives (5% of men, 10% of women)  
- Between 5.2 and 7.7 million adults have PTSD during a given year

### Prevalence in Military

- In about 11-20% of Veterans of the Iraq and Afghanistan wars  
- In as many as 10% of Gulf War (Desert Storm) Veterans  
- In about 30% of Vietnam Veterans

## Efficacy of Current Treatment options for PTSD

### Psychotherapy (EMDR, CPT, CBT and PET)

	Enrolled	Completed
<b>No longer met PTSD criteria</b>	<b>56%</b>	<b>67%</b>
<b>Clinically significant Improvement</b>	<b>44%</b>	<b>54%</b>

### Psychopharmacology (Sertraline or Paroxetine)

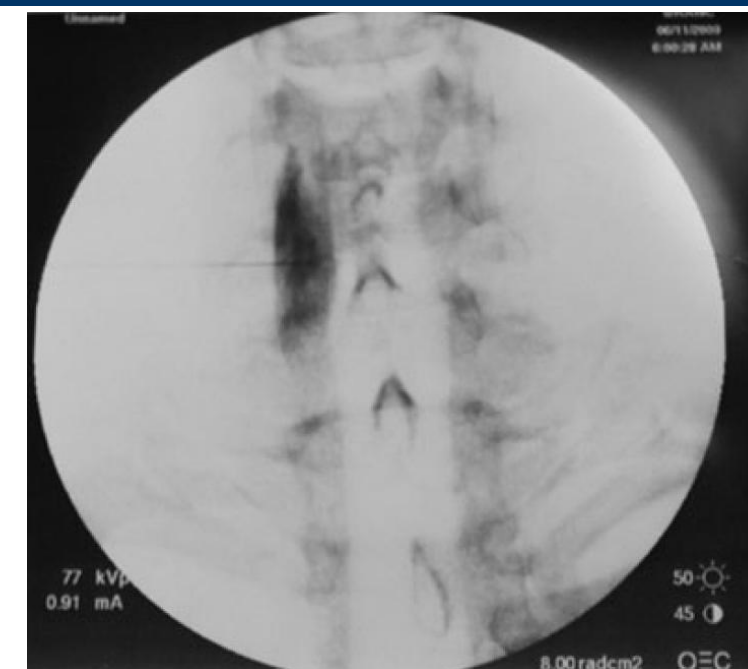
**Improved** <50%  
**Remission** <30%

## Patient Selection

The Post-traumatic Stress Disorder Checklist (PCL) is a 17-item psychometric test commonly used to screen, diagnose, and monitor symptom changes in individuals suspected/diagnosed with PTSD. A total symptom severity score (range = 17-85) can be obtained by summing the scores from each of the 17 items. One study of active duty members returning from combat recommended that a score of 28 was sensitive for the diagnosis of PTSD.<sup>18</sup> Other studies have recommended a score of 50 to optimize both sensitivity and specificity.<sup>19</sup> All patients included in this study had pre-procedure scores >50 and were already diagnosed with PTSD and had severe symptoms and had failed more conventional treatments.

No.	Response:	Not at all (1)	A little bit (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
1.	Repeated, disturbing memories, thoughts, or images of a stressful military experience?					
2.	Repeated, disturbing dreams of a stressful military experience?					
3.	Suddenly acting or feeling as if a stressful military experience were happening again (as if you were reliving it)?					
4.	Feeling very upset when something reminded you of a stressful military experience?					
5.	Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful military experience?					
6.	Avoid thinking about or talking about a stressful military experience or avoid having feelings related to it?					
7.	Avoid activities or situations because they remind you of a stressful military experience?					
8.	Trouble remembering important parts of a stressful military experience?					
9.	Loss of interest in things that you used to enjoy?					
10.	Feeling distant or cut off from other people?					
11.	Feeling emotionally numb or being unable to have loving feelings for those close to you?					
12.	Feeling as if your future will somehow be cut short?					
13.	Trouble falling or staying asleep?					
14.	Feeling irritable or having angry outbursts?					
15.	Having difficulty concentrating?					
16.	Being "super alert" or watchful on guard?					
17.	Feeling jumpy or easily startled?					

## The Procedure

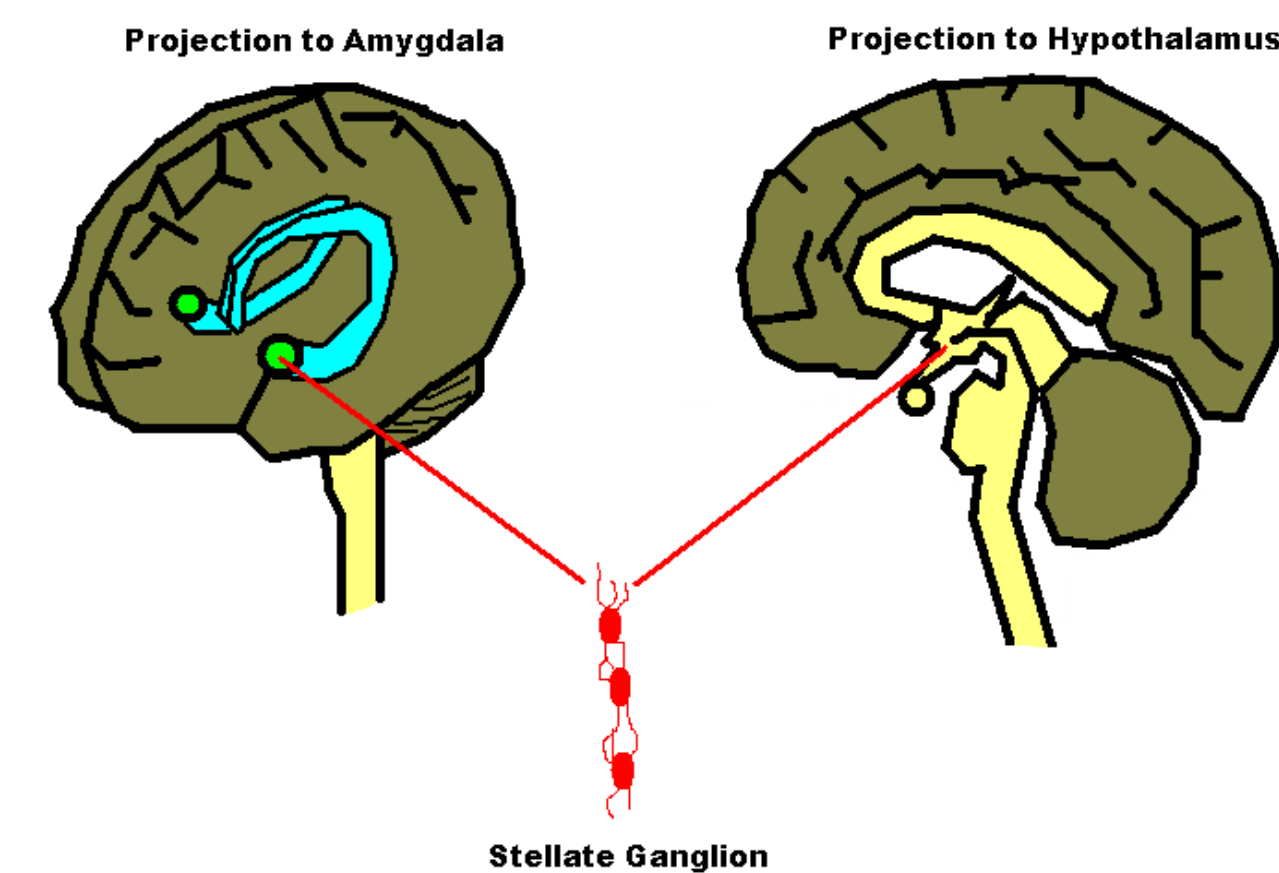


After radiographic confirmation of C6 transverse process the skin is anesthetized with 1 cc of 2% lidocaine. Using an oblique approach, a 25-gauge Quincke needle is passed under fluoroscopic guidance until it contacts right C6 vertebral body and is pulled back 1 mm..

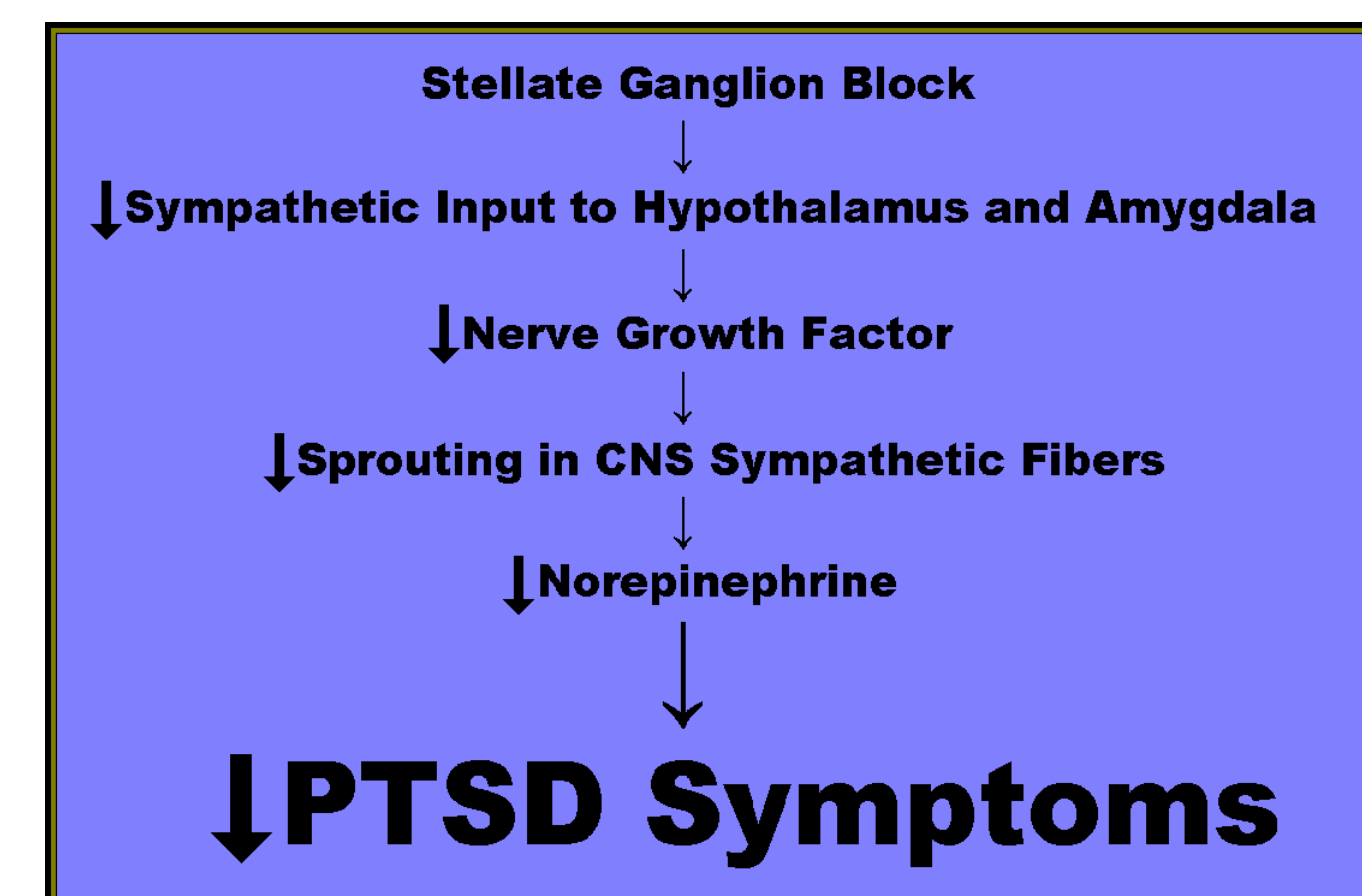
2 cc of iohexal radio-opaque dye is injected and spread is monitored to ensure correct placement.

After negative aspiration, 5 cc of 0.5% ropivacaine is slowly injected producing the sympathetic block. Pt is monitored for 30 minutes. Evidence of successful block includes elevation of right hand temperature by 1.5° Celsius and a right sided Horner's Syndrome (facial enophthalmos, anhidrosis, ptosis, swelling of lower eyelid, miosis and heterochromia), and reduction in symptoms.

## Theoretical Basis for use in PTSD



Neural pathway elicited by pseudorabies injection studies show synapses with the hypothalamus and central nucleus of the amygdala.



PTSD can be thought of as a self sustaining over sensitization brought on by external trauma. Increased sympathetic input leads to increased nerve growth factor (NGF) leading to sustained sprouting in and maintenance of CNS sympathetic neurons. Horner's symptoms from the procedure last approximately 12 hours. Current theory holds that the temporarily decreased sympathetic input leads to decreased NGF resulting in long term down regulation in CNS sympathetic neurons, a decrease in norepinephrine and a resolution of PTSD.

## Discussion of Theory

Elaboration of neural pathway as evidence for the theory is flawed as rabies travels in a retrograde axonal fashion. This indicates connections from the hypothalamus and amygdala to the stellate ganglion. While this does not invalidate the theory, it does mean the theory is less supported than previously thought.

## Methods

All patients reported received a SGB on the right side at the level of C6 using an oblique approach guided by continuous fluoroscopy and 5ml of 0.5% Ropivacaine. The patient's PTSD symptoms were evaluated using the PCL. This checklist was administered one day prior to treatment and again the day following treatment. The patients were also given the PCL at subsequent follow-up visits to quantify sustained benefit. The SGBs were all administered by the same anesthesiologist and the psychometric testing was administered and calculated by mental health providers.

## Results

Each of the four patients had significant reduction in their PTSD and anxiety symptoms both subjectively and as measured by the PCL with sustained benefits at one month.

Patient	Pre-PCL	Post-PCL
1	64	22
2	85	18
3	69	34
4	76	24

## Discussion

The response of these four patient's represent evidence as to the potential benefit of stellate ganglion block for treatment refractory PTSD. At this time, the documented data supporting its usefulness is sparse but growing. It is the experience of the authors that there needs to be further study as this appears to be a very effective adjunctive treat for a highly prevalent and problematic disorder in the general and military populations. Prospective and randomized trials are being conducted.

## References

1. Eugene G. Lipov, Jaydeep R. Joshi, Sarah Sanders, Konstantin V. Slavin: A unifying theory linking the prolonged efficacy of the stellate ganglion block for the treatment of chronic regional pain syndrome (CPRS), hot flashes, and posttraumatic stress disorder (PTSD). Medical Hypotheses 72 (2009) 657-661
2. Sean W. Mulvaney, MD; Brian McLean, MD; Jason de Leeuw, PsyD, ABPP: The Use of Stellate Ganglion Block in the Treatment of Panic/Anxiety Symptoms with Combat-Related Post-Traumatic Stress Disorder; Preliminary Results of a Long-Term Follow-Up: A Case Series. Pain Practice, Volume 10, Issue 4, 2010 359-365
3. Judith Cukor, Megan Olden, Francis Lee and JoAnn Defede; Evidence-based treatments for PTSD, new directions, and special challenges. Annals of the New York Academy of Sciences 1208 (2010) 82-89.
4. <http://www.ptsd.va.gov/public/pages/how-common-is-ptsd.asp>
5. <http://www.nimh.nih.gov/health/publications/the-numbers-count-mental-disorders-in-america/index.shtml#PTSD>

## Disclosure

The views expressed on this poster are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the US Government.