An Interventional Injection for the Treatment of Post-Traumatic Stress Disorder (PTSD)

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Spinal Diagnostics
Tualatin, Oregon
October 28, 2014
Patient #1

- “Will you do a stellate ganglion block for my PTSD?”
Objectives

» Define PTSD
» Discuss the Epidemiology of PTSD
» Briefly discuss current accepted treatments for PTSD
» Stellate Ganglion Block and why it may help
» Discuss current literature results
» Discuss results in my practice
PTSD

• Is a debilitating psychological condition triggered by experiencing or perceiving a traumatic event

• In WWII, was called "shell shock"
PTSD diagnosis (DSM-V)
Age greater than 6 years old

– History of exposure to a traumatic event that meets specific stipulations and symptoms from each of four symptom clusters
– Symptom duration greater than 1 month
– Impaired Functioning (e.g. - vocational, social)
– Symptoms not attributable to another condition

http://www.ptsd.va.gov/professional/PTSD-overview/dsm5_criteria_ptsd.asp
Summary of PTSD Symptoms

• Flashbacks/Blackouts
• Traumatic Nightmares/Trouble Sleeping
• Avoidance of situations that recall the trauma
• Irritability and Anger
• Impending Sense of Doom or Guilt
• Inability to enjoy life (Numb)
• Detached from others
• Hypervigilence
PTSD

• Almost 1 in 5 (18.3%) women have been sexually attacked
  – In these women, greater than 50% lifetime prevalence.

PTSD

- Prevalence in Military
  - 14%-35% of approximately 23 million US veterans of combat duty
  - Only 6.8% of non-combat duty veterans

PTSD

• In military between 2005 and 2008
  – PTSD incidence
    • increased from 7% to 11%
  – Attempted suicide rate
    • increased from 1% to 2%

Veterans with PTSD

- 40% to 84% have concurrent alcohol or substance use disorder
  - mortality is twice as high as those with only PTSD

Veterans with PTSD

Alcohol + PTSD

– 80% have disturbance in memory function and concentration

Consequences of PTSD

» The Patient
» Relationships/Marriages
» Children
» Grandchildren
Traditional Treatment

• Medications
  – SSRIs
  – SNRIs
  – Prazosin
    • Nightmares - Decreased
  – Risperidone
    • No better than placebo

• Counseling
• Cognitive Behavioral Therapy
• Eye Movement Desensitization & Reprocessing
• Stress Management
  – Meditation
  – Yoga
Traditional Treatment: The Problem
In military veterans and active duty with combat exposure
30% success rate of all treatments

The Stellate Ganglion

- Stellate Ganglion
  - present in 70-80% of individuals
  - fusion of the inferior cervical ganglion and the first thoracic ganglion
  - provides sympathetic innervation to the head, neck and upper limb

Stellate Ganglion Mapping

- Westerhaus and Loewy in 2001 used pseudorabies virus injections to identify connections of the stellate ganglion

Stellate Ganglion Block Procedure

Fluoroscopic guided and US guided are most common today

Involves local anesthetic injection of bupivacaine or ropivacaine at the level of C6/C7 vertebra

Right-sided SGB is necessary to affect right hemisphere structures responsible for autonomic responses to emotional stimuli and links to unconscious emotional memories

Content Source: Dr. Lipov
Horner's Syndrome

- Ptosis (droopy eyelid)
- Miosis (small pupil)
- Anhydrosis (no sweating on ipsilateral face)
- Enophthalmos

- Also expect 1.5 degree temp increase on ipsilateral side

Potential Complications of SGB

- pneumothorax
- bleeding
- infection
- allergic reaction
- intravascular injection and its consequences
- phrenic nerve or recurrent laryngeal nerve palsy
- hypotension
- injury to adjacent vascular structures (particularly the vertebral artery)
- bradycardia
Current Indications for SGB

- CRPS I & II
- Migraines/Headaches
- Hyperhydrosis in face and neck
- Peripheral neuropathy
- Vascular ischemic pain
- Raynaud's
- Herpes Zoster of the upper limb
1: SGB Stellate Ganglion Block

2: Reduction of NGF, decrease in sprouting, reduction of brain NE, and resolution of symptoms

PTSD and Cortisol

- Urine cortisol levels lower in individuals that go on to develop PTSD
- NGF after trauma is decreased if given cortisol
- 25 patients
  - 1/2 saline
  - 1/2 hydrocortisone
  - 60% reduction in developing PTSD in hydrocortisone group

SGB for PTSD

2008
- SGB for PTSD: Case Report in a Civilian
  - Lipov et al. *Annals of Clinical Psychiatry*
- SGB for combat-related PTSD: U.S. Army
  - Mulvaney et al. *Pain Practice*

2010
- SGB for PTSD: Case Report in a Civilian
  - Lipov et al. *Pain Research and Treatment*
- SGB for PTSD in Veterans and Civilians
  - Lipov et al. *Military Medicine*

2012
- SGB for PTSD: U.S. Navy
  - Hickey et al. *American Journal of Psychiatry*

2013
- SGB for PTSD and Memory Dysfunction: Case Report in a Veteran and Literature Review
  - Lipov et al. *Military Medicine*
- SGB for PTSD: Systematic Review
  - Hickey et al. *Psychiatric Annals*
- SGB for Combat-Related PTSD: U.S. Army
  - Alino et al. *Military Medicine*

Slide courtesy of Dr. Eugene Lipov
PTSD Checklist (PCL)

- 3 versions - military (PCL-M), civilian (PCL-C), and stressor (PCL-S)
- DSM-IV version:
  - 17 questions
  - Self reported score of 1 to 5 (17 to 85 points)
  - Quick Assessment
  - A change of 5 to 10 points is reliable (better than chance)
  - A change greater than 10 points is threshold for clinically meaningful change

- DSM-V version (PCL-5):
  - 20 questions
  - Self reported score of 1 to 4 (20 to 80 points)

Stellate Ganglion Block for PTSD at Tripler Army Medical Center (2013)

- **Sample & Methods**
  - 4 cases
  - Right C6 cervical sympathetic blockade using 7mL of 0.5% ropivacaine with Fluoro guidance
  - PCL-M used to measure pre- and post-treatment symptom severity

- **Results**
  - Case 1
    - PCL score 64 to 22 after first SGB
    - PCL score 35 to 29 after second SGB 1 month later
  - Case 2
    - PCL score from 80/85 to 18
  - Case 3
    - PCL score from 69 to 34
  - Case 4
    - PCL score from 76 to 24

- **Conclusion:**
  Stellate Ganglion Block
  Appears to be safe and efficacious treatment for PTSD
  May be beneficial for nonresponders of other treatments for PTSD


Special Thanks to Dr. Lipov
SGB for PTSD in 166 Service Members with Combat Exposure (2014)

• Sample & Methods
  – 166 service members with multiple combat deployments
    • 89% had direct close combat action of which 81% had been in at least 5 deployments
    • Only 5 had been on medication
  – Right C6 cervical sympathetic chain ganglion with 6 mL of 0.5% ropivacaine with US guidance
  – PCL-M used to measure pre- and post-scores with a minimum 3 months follow-up in 75 patients
  – over 75% of these patients continued to deploy to combat zones and were exposed to combat after treatment
  – Considered a "responder" if PCL score dropped by at least 10 points

SGB for PTSD in 166 Service Members with Combat Exposure (2014)

SGB for PTSD in 166 Service Members

**Results**
- At 1 week: 78.6%
- At 1-2 months: 81.8%
- At 3-6 months: 73.5%

**Conclusion**
- Selective blockade of the right cervical sympathetic chain at the C6 level is a safe and minimally invasive procedure that may provide at least 3 months of relief from symptoms associated with combat-related PTSD.

• Results
  Responders (ave. 22 point drop in PCL)
  – At 1 week, 78.6%
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• Conclusion
  – Selective blockade of the right cervical sympathetic chain at the C6 level is a safe and minimally invasive procedure that may provide at least 3 months of relief from symptoms associated with combat-related PTSD.

My personal experience

» 5 patients
  » 3 males - veterans of combat experience now retired
    » 1 special forces
    » 2 air force pilots
  » 2 females
    » 1 with history of close friend being murdered
    » 1 with history of childhood sexual abuse
My personal experience

• Required:
  • Active treatment with a mental health professional
  • A PCL-C at every visit
  • A diagnosis of PTSD
  • A 1 to 2 week follow-up after the procedure
  • A 6 week follow-up

• Technique:
  • Stellate Ganglion Block utilizing 7.0 mL of 0.5% ropivacaine performed on the right side at the C6 level using fluoroscopy
My experience with PTSD/SGB

- Results:
  - Case 1
    - PCL score 57 to 37 (1 week) to 25 (5 weeks)
  - Case 2
    - PCL score 61 to 31 (1 week) to 42 (8 weeks)
  - Case 3
    - PCL score 76 to 58 (2 weeks) to 60 (8 weeks)
  - Case 4
    - PCL score 70 to 60 (2 weeks)
  - Case 5
    - PCL score 57 to 22 (2 weeks)

“I can sleep for the first time in years. I don’t have nightmares any more.”
“My migraine headaches are gone.”
“I feel like I want to dance.”
“When I smile I mean it.”
“Things that triggered me before don’t trigger me anymore.”
“I don’t go from trigger to rage anymore.”
“My spouse has noticed I am calmer.”
“I can watch all the way through Lone Survivor without [flying off the handle].”
“I don’t have blackouts any more.”
“I don’t have road rage when driving any more.”
Conclusions
Stellate Ganglion Block for PTSD

- Stellate Ganglion Block works within 30 minutes
- 100% Compliance
- 2-3 Blocks needed for full recovery (?)
- Over 70% efficacy compared to current standard of care
- Studies suggest (but further studies needed)
  - May improve memory function in those with PTSD/alcohol use
  - May eliminate alcohol dependency
  - May help eliminate suicidal ideation in PTSD patients
  - May help for other psychologic conditions
- Question still to be answered
  - Is is durable and repeatable over time?
Special Thanks

• Patient #1
• The PTSD patients discussed
• Dr. Eugene Lipov
• Dr. Sean Mulvaney
References


References (continued)

Questions?

- dr.jasonanderson@gmail.com

- Recommend watch “Stellate Ganglion Block for PTSD: Patient Success Stories” - a YouTube video by Dr. Sean Mulvaney
Criterion A: Stressor (DSM-V)

- The person was exposed to: death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence, as follows: (one required)
  - Direct exposure.
  - Witnessing, in person.
  - Indirectly, by learning that a close relative or close friend was exposed to trauma.
  - Repeated or extreme indirect exposure to aversive details of the event(s), usually in the course of professional duties. Does not include being exposed to media of an event.
Criterion B: Intrusion symptoms

• The traumatic event is persistently re-experienced in the following way(s): (one required)
  – Recurrent, involuntary, and intrusive memories.
  – Traumatic nightmares.
  – Dissociative reactions (e.g., flashbacks) which may occur on a continuum from brief episodes to complete loss of consciousness.
  – Intense or prolonged distress after exposure to traumatic reminders.
  – Marked physiologic reactivity after exposure to trauma-related stimuli.
Criterion C: Avoidance

• Persistent effortful avoidance of distressing trauma-related stimuli after the event: (one required)
  – Trauma-related thoughts or feelings.
  – Trauma-related external reminders (e.g., people, places, conversations, activities, objects, or situations).
Criterion D: Negative Alterations in Cognition & Mood

• Negative alterations in cognitions and mood that began or worsened after the traumatic event: (two required)
  – Inability to recall key features of the traumatic event (usually dissociative amnesia; not due to head injury, alcohol, or drugs).
  – Persistent (and often distorted) negative beliefs and expectations about oneself or the world (e.g., "I am bad," "The world is completely dangerous").
  – Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences.
  – Persistent negative trauma-related emotions (e.g., fear, horror, anger, guilt, or shame).
  – Markedly diminished interest in (pre-traumatic) significant activities.
  – Feeling alienated from others (e.g., detachment or estrangement).
  – Constricted affect: persistent inability to experience positive emotions.
Criterion E: Alterations in Arousal and Reactivity

• Trauma-related alterations in arousal and reactivity that began or worsened after the traumatic event: (two required)
  – Irritable or aggressive behavior
  – Self-destructive or reckless behavior
  – Hypervigilance
  – Exaggerated startle response
  – Problems in concentration
  – Sleep disturbance
Criterion F, G, and H

• Criterion F: Duration of Symptoms
  – Persistence of symptoms (in Criteria B, C, D, and E) for more than one month.

• Criterion G: Functional Significance
  – Significant symptom-related distress or functional impairment (e.g., social, occupational).

• Criterion H: Exclusion
  – Disturbance is not due to medication, substance use, or other illness.
PTSD Theory on Memory Dysfunction

SGB Effect on PTSD

Use of SGB to treat PTSD

1. PTSD related NGF
   SGB is done

2. NGF
   NGF decreases following SGB

3. Sprouting

4. NE

5. Resolution of PTSD