



Marked Impact on Suicidal Ideation and Suicidology in a Military Populations Following a Cervical Sympathetic Blockade

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Disclosures

- I am NOT a psychiatrist
- I am board certified in Anesthesiology and Pain Medicine

Disclosures

Financial disclosure: Eugene Lipov MD, is the inventor on US Patent : 8,987,327 which is owned by the Eugene Lipov MD , covering the use of Long Acting Anesthetic and Clonidine injection in the cervical spine for Post Traumatic Stress Disorder .

- **Suicides in the military ,
Overview**

Dr. Kemp assessed suicide rates in United States veterans in the year 2010, by doing a retrospective review. Her findings were grim, approximately 22 veterans have taken their life in 2010, as per Dr. Kemp's Suicide Data Report, 2012, Department of Veterans Affairs Mental Health Services Suicide Prevention Program (Kemp 2013) .

Etiology of suicides in the US military

- Types of conflict
- Prolonged tours of duty
- Lack of sleep when deployed
- Lack of support for the veterans
- Specific symptoms of PTSD that are associated with suicide

- SLEEP DISORDERS and suicidal ideation
- “In support of a priori hypotheses, **self-reported insomnia symptoms were cross-sectionally associated with suicidal ideation**, even after accounting for symptoms of depression, hopelessness, PTSD diagnosis, anxiety symptoms and drug and alcohol abuse “(Ribeiro 2012) . “Although insomnia and nightmares were significantly associated with depressive and suicidal symptoms, after controlling for additional variables, such as depression and sex, **only nightmares remained associated with suicidality**”(Bernert 2005).

Bernert, Rebecca A., et al. "Suicidality and sleep disturbances." *SLEEP-NEW YORK THEN WESTCHESTER*- 28.9 (2005): 1135.

Ribeiro, Jessica D., et al. "Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military." *Journal of affective disorders* 136.3 (2012): 743-750.

Impulsivity and suicidal ideation

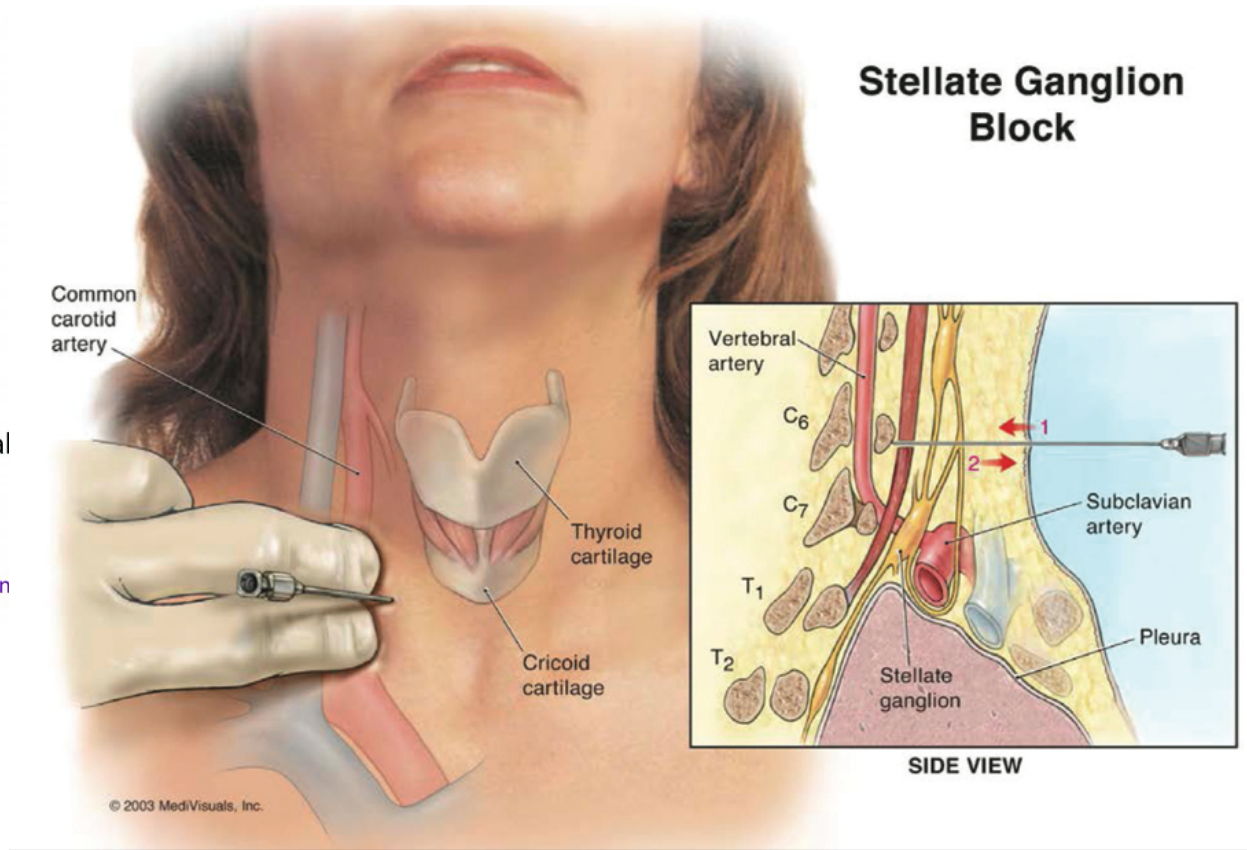
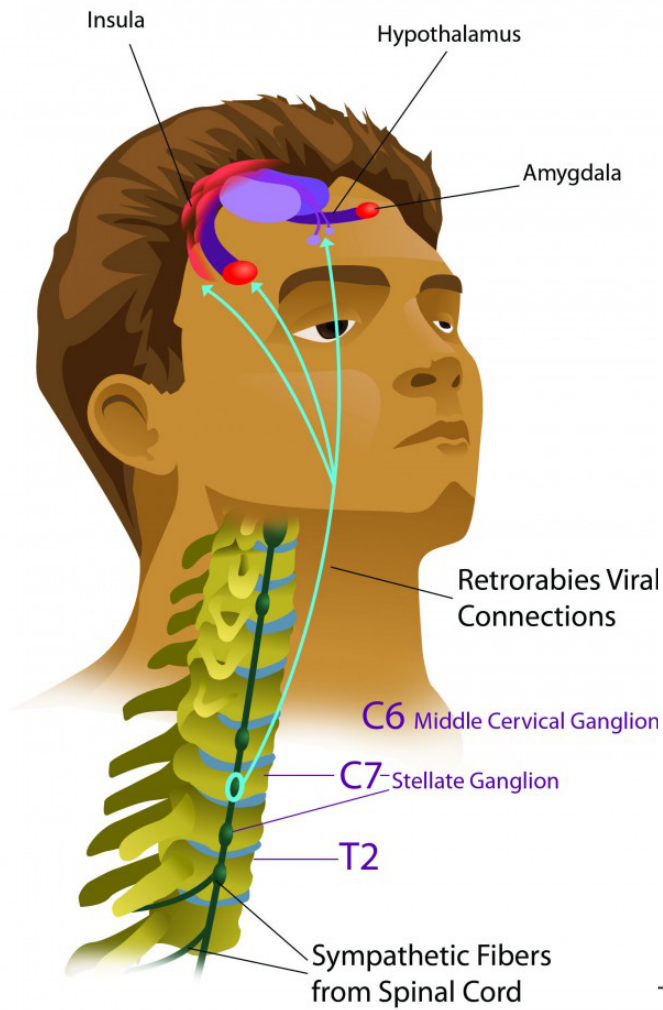
“Impulsive behavior with or without violence increases suicide risk” (Brent 1994, Conner 2001). “These findings suggest that persons with PTSD are at higher risk for suicide and that in assessing suicide risk among persons with PTSD, careful attention should be paid to levels of impulsivity, which may increase suicide risk, and to social support, which may reduce the risk”. (Kotler 2001)

Brent DA, Johnson BA, Perper J, Connolly J, Bridge J, Bartle S, Rather C: Personality disorder, personality traits, impulsive violence, and completed suicide in adolescents. *J Am Acad Child Adolesc Psychiatry* 1994; 33:1080–1086

Conner KR, Conwell Y, Duberstein PR: The validity of proxy-based data in suicide research: a study of patients 50 years of age and older who attempted suicide, II: life events, social support and suicidal behavior. *Acta Psychiatr Scand* 2001; 104:452–457

Kotler, Moshe, et al. "Anger, impulsivity, social support, and suicide risk in patients with posttraumatic stress disorder." *The Journal of nervous and mental disease* 189.3 (2001): 162-167.

Stellate Ganglion Block



- Case studies

Patient #1

Patient is a 67 year old male veteran of the Vietnam War. His military service began at 19 years old, where he served as a MedEvac for 19 months during the Vietnam War. The patient reported that , while not seeing combat, he witnessed many horrific incidents.

The patient complained of depression, insomnia, nightmares, flashbacks, alcoholism, and suicidal ideation for multiple years . He dealt with fatigue, frequent headaches, and problems with concentration, thinking, and memory. Additionally, he reported always being on edge and having a very short temper.

Patient #1 Continued

The patient lived with these symptoms for more than 40 years. During that time period he went through individual counseling(over 40 years), and was treated with many different medications including Trazadone. The veteran found himself very frustrated with the lack of relief these treatment modalities were providing .

The patient was noted to be severely anxious and agoraphobic at time of presentation , he denied being suicidal at the time of first evaluation. However , after being treated he reported “ if I could not have the injection done I would have killed my self that night”.

Patient #1 Continued

The patient received first SGB , that night was the first time he slept through without having nightmares.

Two weeks after SGB #2 patient reported sleep improvement and he had been able to decrease the dose of Trazadone he was taking daily by almost 50%, from 600mg down to 350mg. He was feeling fairly calm during the day and was finding himself better able to socialize. His flashbacks had decreased and he found himself much less tense. Two weeks after SGB #2 he was able to sleep through the night, was much more social then he had been able to be prior to the injections, and his tension was greatly reduced, he had fewer flashbacks and he no longer had thoughts of suicide.

Patient #1 Continued

SGB literally saved my life. I had nightmares which pretty much destroyed the house every night since 1968. I can honestly say that the night (after receiving SGB #1) was the first time I slept all the way through the night without a nightmare. I was at the end of my rope. I was ready to commit suicide. The procedure is so simple and the results are so great.” The patient still has memories of the war, but he states the memories no longer cause him anxiety. He no longer takes any medications for his PTSD, nor does he require any counseling. On a recent follow up , nearly 4 years following original SGB , patients PCL was 29 .

Patient #1 Continued

Days	PRE SGB		POST SGB
	SGB	PCL	
0	#1	71	
1			54
16		79	
16	#2		
30			27
57			21
1450			29

Patient #2

The patient was a 35 year old male with 8 years time in service (Army) as a truck driver. He had two deployments to Iraq 2004-2005 and 2007-2008. ... During this time the patient also reports psychological disturbance from seeing burning / dismembered bodies. .. He was admitted to the inpatient psychiatric ward 4 times between 22 MAR 2009 and 15 NOV 2010 for suicidality in the context of ETOH intoxication and PTSD symptoms. ... During the patient's final stay on the TAMC psychiatric inpatient ward, he screened 80 or 85 on his PCL-M. ... Two days post-procedure he was discharged from the ward, his PCL-M having dropped to 18, and his suicidal ideation having completely resolved. ..He was lost to follow up following the procedure (Alino 2013)

Alino J, Kosatka D, McLean B, et al: Efficacy of stellate ganglion block in the treatment of anxiety symptoms from combat-related post-traumatic stress disorder: a case series. Mil Med, 2013; 178: 473 -477

Patient #3

The focus of this report is a 41-year Caucasian male veteran. The patient served 3 years of duty in Iraq as a marine and experienced heavy battle. The patient was familiar with our clinic due to previous treatments provided for lower back pain for this veteran. At the time of the patient's second presentation, complaints were: anxiety, night sweats, depression, claustrophobia, fear of crowds, irritability and suicidal ideation, including having a specific suicide plan.

The patient was diagnosed with PTSD at the local Veterans Administration Hospital 1 year prior. He had undergone conventional Cognitive Behavior Therapy and was placed on Modafinil 200mg QD and Viibryd (Vilazodone), a SSRI with a dose of 40mg QD, which he had minimal response.

Patient #3 Continued

Following evaluation of the patient, a recommendation for an immediate psychiatric admission to Veterans Administration Hospital was made, which was forcefully refused. The patient stated, "If I go back there, I will die. All I want is the injection." At this point, another attempt was made to admit the patient to a civilian psychiatric hospital and again he adamantly refused. Being unable to admit the patient to the psychiatric hospital, an alternative plan was implemented, involving his wife who was present at the visit. The patient was asked to give up all his weapons and not drive alone until the SGB could be completed. The patient received a SGB within 2 days of the presentation with suicidal ideation.

Patient 3 Continued

SGB was performed with no impact noted within 45 minutes. At this point a decision was made to enhance the efficacy of the sympathetic blockade by performing a superior cervical sympathetic ganglion injection. In the recovery room, 10 minutes following the completion of "sequential" cervical sympathetic blockade, the patient noted symptom improvement, spontaneously reporting, "I feel good and I am not thinking of suicide anymore." In the following month, the patient was able to taper off his medication and noted feeling more alert and productive in his work, as an engineer.

The patient's symptoms remained in remission as measured by PCL scores and his subjective experience at 6 months follow up . Following this, the patient was lost to follow up.

Patient #3 Continued

	PCL-M	Days post SGB
Pre SGB	74	0
	55	6
	40	30
	25	83
	45	187

Patient #4

- Military patient with PTSD had long term symptoms including persistent suicidal ideation , in the 4 th decade of his life . Had SGB that removed his suicidal ideation in 2 days . This result lasted over 2 years , the patient returned following return of symptoms , at this time he received a sham injection following enrollment in a study that failed to produce the effect .

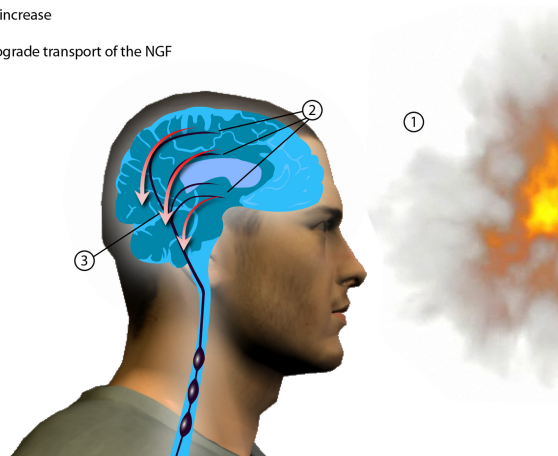
- Personal communication Dr McLay , Psychiatrist , Naval Hospital , San Diego

Neurobiology of PTSD

1: Precipitating event, nerve trauma, PTSD triggering event

2: NGF increase

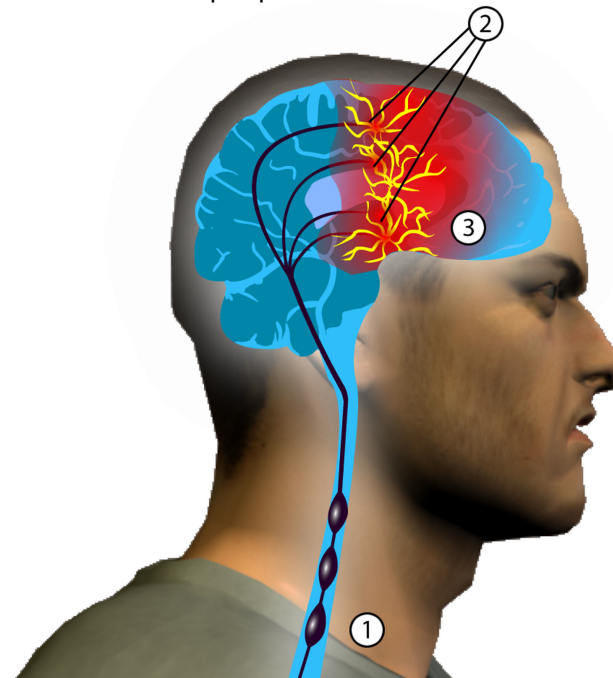
3: Retrograde transport of the NGF



1: NGF increase in the Stellate Ganglion

2: Sprouting of the sympathetic fibers distally

3: Increase in the brain norepinephrine



Lipov, Eugene G., Jaydeep R. Joshi, Sarah Sanders, and Konstantin V. Slavin. "A unifying theory linking the prolonged efficacy of the stellate ganglion block for the treatment of chronic regional pain syndrome (CRPS), hot flashes, and posttraumatic stress disorder (PTSD)." *Medical hypotheses* 72, no. 6 (2009): 657-661.

Evidence so for SGB use to treat PTSD

A recent review of literature by Dr Navaie her findings in summarizing available literature from 2008 to 2013

Cases were predominantly male (n=21, 88%) and active duty military (n=14, 58%) or veterans (n=8, 33%) with combat-related PTSD. The average age was 40.5 years (± 10.0 SD). All cases had received >1 year of psychotherapy and pharmacotherapy before SGB. Seventeen cases (71%) received one SGB, seven (29%) received multiple SGBs. Clinically meaningful improvements were observed in 75% (n=18) of cases after SGB, with significant differences in mean PTSD scores pre- (69.5 ± 26.6) and post-SGB (34.2 ± 32.5) across cases ($p < 0.001$) (Navaie, 2014)

Publications in 2014

Dr Mulvaney , where **166 service members** with symptoms of PTSD elected to receive a SGB . This report went on to describe his observations that a military population with multiple combat deployments, **over 70%** of the patients treated had a clinically significant improvement in their PCL score which persisted beyond 3 to 6 months postprocedure . (Mulvaney ,2014)

Dr Alkire who selected the most extreme PTSD cases in the veteran population , leading him to title his presentation as “Prolonged Relief of **Chronic Extreme PTSD** and Depression Symptoms in Veterans Following a Stellate Ganglion Block” He observed that the block was greatly effective in helping **75%** (9/12) of the subjects. (Alkire, 2014)

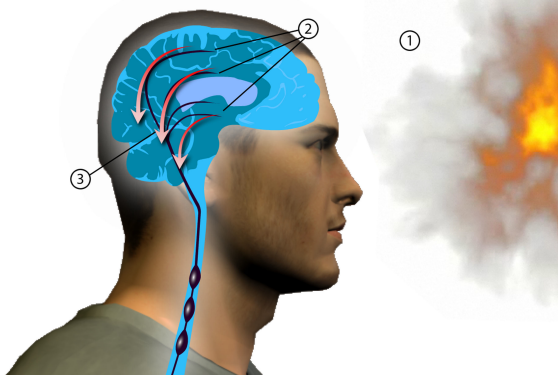
ALKIRE, M. T., HOLLIFIELD, M., KHOSH SAR, R., NGUYEN, L., ALLEY, S. R., COURTNEY, C. G., & REIST, C. PROLONGED RELIEF OF CHRONIC EXTREME PTSD AND DEPRESSION SYMPTOMS IN VETERANS FOLLOWING A STELLATE GANGLION BLOCK.

PRESENTED AT AMERICAN SOCIETY OF ANESTHESIOLOGY , OCTOBER 11, 2014

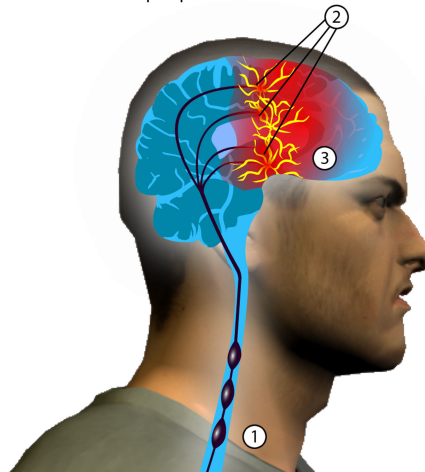
Mulvaney, S. W., Lynch, J. H., Hickey, M. J., Rahman-Rawlins, T., Schroeder, M., Kane, S., & Lipov, E. (2014). Stellate Ganglion Block Used to Treat Symptoms Associated With Combat-Related Post-Traumatic Stress Disorder: A Case Series of 166 Patients. *Military medicine*, 179(10), 1133-1140.

Neurobiology of SGB for PTSD

- 1: Precipitating event, nerve trauma, PTSD triggering event
- 2: NGF increase
- 3: Retrograde transport of the NGF

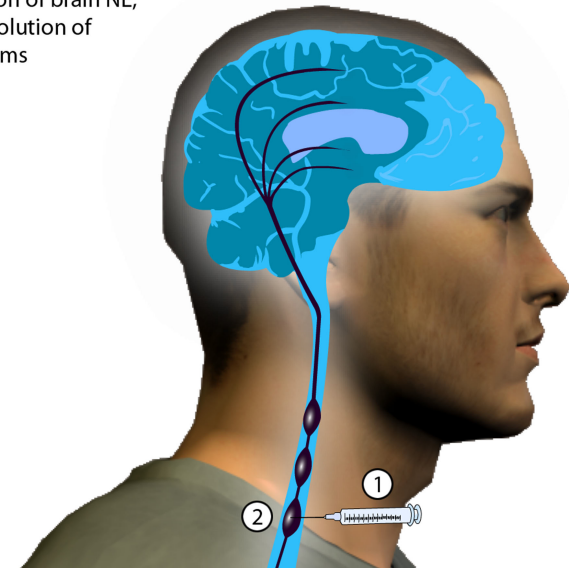


- 1: NGF increase in the Stellate Ganglion
- 2: Sprouting of the sympathetic fibers distally
- 3: Increase in the brain norepinephrine



- 1: SGB Stellate Ganglion Block

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



Lipov, Eugene G., Jaydeep R. Joshi, Sarah Sanders, and Konstantin V. Slavin. "A unifying theory linking the prolonged efficacy of the stellate ganglion block for the treatment of chronic regional pain syndrome (CRPS), hot flashes, and posttraumatic stress disorder (PTSD)." *Medical hypotheses* 72, no. 6 (2009): 657-661.

Role of norepinephrine in suicidal ideation and impulsivity

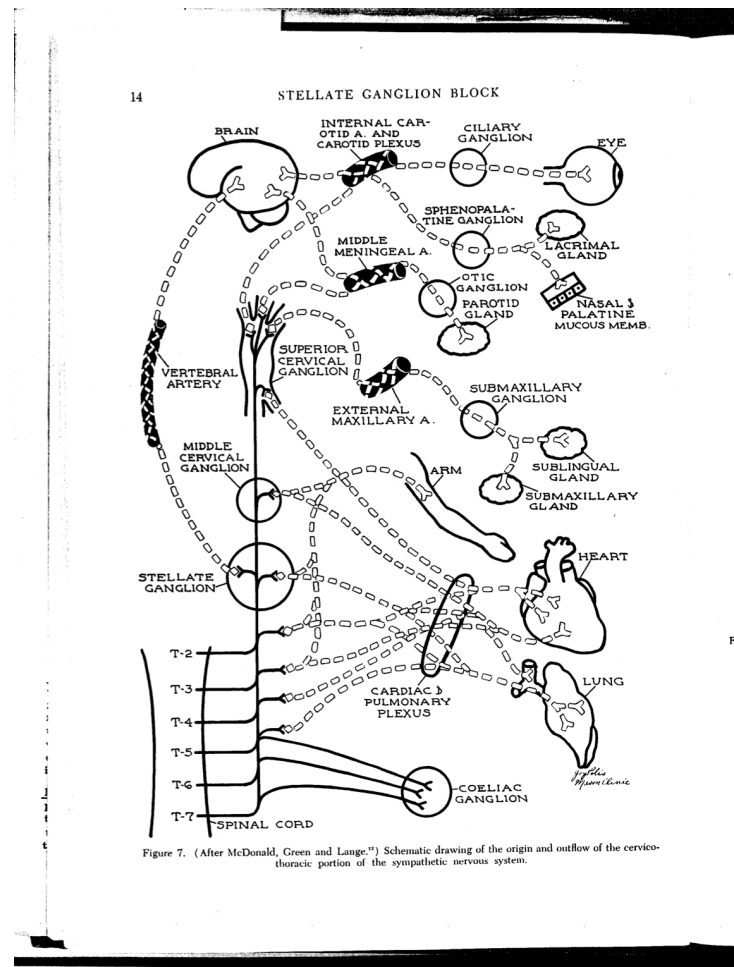
It has been suggested that alterations in NE, E, and 5-HT may have relevance for symptoms commonly seen in survivors with PTSD, including hypervigilance, exaggerated startle, irritability, **impulsivity**, aggression, intrusive memories, depressed mood, and suicidality(Southwick,1999)

Why does SGB fail?

What can be done
about that

A complete
sympathetic system
“reboot”

Sequential Cervical Sympathetic block



Local anesthetic with an
adjuvant

- Toward an ideal choice of injectate for cervical nerve blockade .Clonidine as an adjuvant.

Clonidine reduced the onset time of sensory block by extending the field of adequate anesthesia, which produced dose-dependent prolongation of analgesia, reaching a mean 770 min (range, 190-1440 min) (Duma ,2005).

Clonidine decreased forearm blood flow from 3.5 ± 0.52 to 1.8 ± 0.32 in the first six subjects and from 4.2 ± 0.84 to 2.7 ± 0.61 ml/min/100 ml in the other subjects (Kiowski,1883).

Duma, A., B. Urbanek, C. Sitzwohl, A. Kreiger, M. Zimpfer, and S. Kapral. "Clonidine as an adjuvant to local anaesthetic axillary brachial plexus block: a randomized, controlled study." *British journal of anaesthesia* 94, no. 1 (2005): 112-116.

Kiowski, Wolfgang, Ulf Lennart Hulthén, Rudolf Ritz, and Fritz R. Bühler. " α_2 Adrenoceptor-mediated vasoconstriction of arteries." *Clinical Pharmacology & Therapeutics* 34, no. 5 (1983): 565-569.

Clonidine as an adjuvant

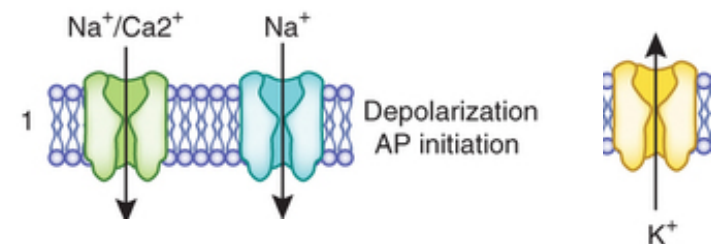
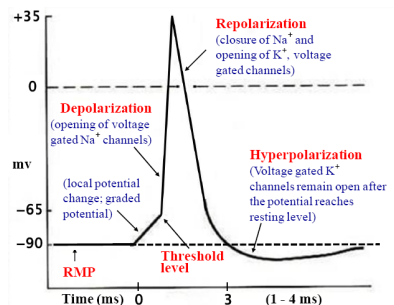
All previously published reports of SGB as a method to treat PTSD, have utilized Bupivacaine 0.5%, Ropivacaine 0.5% and Bupivacaine 0.25% / Lidocaine 2% mixture. None of the previous reports have used any local anesthetic with an adjuvant. Our clinic has been using bupivacaine 0.5% mixture with clonidine 2.5 micrograms / cc for the last 13 months.

Clonidine as an adjuvant mechanisms of action

- 1) clonidine direct blocking of Ca^{++} ion influx (vs Na^+ ion influx blocked by local anesthetic) producing a synergistic blockade of the neuronal action potential (Kroin,2004)
- 2) Clonidine producing peripheral vasoconstriction , presumably maintaining the mixture at the site of the injection . The results suggest that, apart from the classical α_1 adrenoceptor, there is a second type of adrenergic receptor on smooth muscle cells that can mediate vasoconstriction, resembling the α_2 -adrenoceptor pharmacologically.(Kiowski 1983)

Kiowski, Wolfgang, Ulf Lennart Hulthén, Rudolf Ritz, and Fritz R. Bühler. " α_2 Adrenoceptor-mediated vasoconstriction of arteries." *Clinical Pharmacology & Therapeutics* 34, no. 5 (1983): 565-569.

Kroin, Jeffrey S., Asokumar Buvanendran, Daniel R. Beck, Daniel E. Watts, and Kenneth J. Tuman. "Clonidine prolongation of lidocaine analgesia after sciatic nerve block in rats Is mediated via the hyperpolarization- activated cation current, not by alpha-adrenoreceptors." *Anesthesiology* 101, no. 2 (2004): 488-494.



Conclusion

DISCUSSION: It appears that SGB seems to significantly improve PTSD symptoms as well as significantly reduce or eliminate suicidal ideation in patients with severe PTSD . Further work is needed to identify optimal subjects for this treatment approach and to understand the mechanisms involved that can produce such a rapid, dramatic and long-term change in psychological health for PTSD patients with suicidal ideation .