

## With War-Related Post Traumatic Stress Disorder Being Resistant to Pharmaceuticals is it Time to Give Stellate Ganglion Block (SGB) a Shot?

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### Abstract

A large number of war veterans have PTSD in US military punctuated by a very high suicide rate of 22 per veterans per day. Current VA gold standard" treatments protocols will effectively reach no more than 20% of all veterans needing PTSD treatment. A recent study reported results multi- center study on off-label use of second-generation (atypical) antipsychotics has gained wide popularity Risperidone and demonstrated no benefit over placebo for military-related PTSD. This leaves practitioners with few weapons in their pharmacotherapeutic arsenal. The risks of SGA's are significant, such as sudden heart failure and increase the risk of suicidal attempts, pharmaceutical approach may be moving away from this conventional path. New techniques include modulation of the sympathetic nervous system (SNS) which is a part of the autonomic nervous system. It turns out that a possible treatment of physiologic hyper arousal is available by utilizing minimally invasive modulation of sympathetic nervous system. It seems possible to have similar results by using a common anesthetic procedure called Stellate ganglion Block ( SGB) which is much less invasive. Early results of this new approach are very promising, with a success rate of 70 to 75% a very high compliance, acceptance and minimal risk. Considering severity of PTSD and the lack of effective therapeutic interventions available it is time to dispense with established scientific /medical opinions look at the available data and apply SGB to the population most at risk of PTSD related complications.

### Rapid Report

Multiple deployments as well as large scale military operating in the last 15 years has caused a substantial mental health burden for war veterans and their families, particularly post- traumatic stress disorder (PTSD). (The term veterans in this article include personnel still remaining in service.) In a 2014 national survey of Iraq and Afghanistan war veterans, more than 60 percent of members of the Army, Marines, Air Force, and Navy said they have been diagnosed with PTSD or traumatic brain injuries. More than 30 percent of respondents also said that they have thought about taking their own life since joining the military [1]. In 2013 a grim statistic of suicide rate of 22 per veterans per day was reported [2]. In response to the immensity of the problem, US Departments of Defense and Veterans Affairs (VA) have implemented numerous programs in the areas of population screening, education (e.g. stigma reduction and other), and clinical care. The VA has mandated in 2008 that all veterans treated for PTSD have access to either prolonged exposure therapy or cognitive processing therapy (CPT) [3], irrespective of those policies, the suicide rate continuous to be unacceptably high, with extreme cost to the veterans and the society. VA recommends validated," gold standard" treatments protocols that usually include psychotherapy and pharmaceuticals. However, among veterans who begin PTSD treatment with those treatments, a high percentage drop out has been reported, commonly 20% to 40% in randomized clinical trials (RCTs) [4,5] but considerably higher in routine practice [6]. Part of the reason for the lack of treatment seeking is that veterans are demoralized due to the lack of efficacy. Examples of such perceptions include lack of trust in mental health professionals, thinking less of others who seek care, or considering treatment ineffective, unhealthy, or a "last resort" [7]. With only 50% of veterans seeking care and a 40% recovery rate, current strategies will effectively reach no more than 20% of all veterans needing PTSD treatment [7]. Psychotherapeutics and pharmaceuticals seems to have similar efficacy. RCTs that led to licensure of SSRIs showed within-group reductions in PTSD scores virtually identical to those seen in psychotherapy trials, and psychotherapy trials that included nonspecific supportive control conditions showed effect sizes comparable to those in medication trials

[8]. Above is a very brief overview, rest of this publication will focus on the current state of pharmaceutical therapy and an alternative approach ( Stellate Ganglion Block ) to successfully treat PTSD.

### Pharmaceuticals

Among a wide range of medications used in veterans with PTSD, only selective serotonin reuptake inhibitors (SSRIs) and serotonin-nor- epinephrine reuptake inhibitors (SNRIs) have A-level evidence (2 SSRIs are approved for this indication) [8]. However multiple reports have brought SSRI efficacy into question. SSRIs seem to be marginally effective for PTSD symptoms among civilian populations [9], combat PTSD has been relatively impervious to pharmacological treatment [10]. Other medications have been used for PTSD in a frequently cited CPT trial of veterans, 80% of participants were taking a psychotropic agent, including 40% taking 3 or more medications and 40% taking a benzodiazepine or barbiturate [1]. Any short- term alleviation of anxiety symptoms (which reinforces the perception of benefit) is offset by evidence that they can interfere with extinction of fear conditioning and worsen recovery [8]. Benzodiazepines are associated with tolerance and dependence and can become almost impossible to discontinue in combat veterans due to rebound exacerbation of symptoms (particularly sleep disturbance and anger) [8].

Considering lack of efficacy reported above, the off-label use of second- generation (atypical) antipsychotics has gained wide popularity, particularly quetiapine (Seroquel) and risperidone [7]. As of 2010 report by Department of Veterans Affairs 2010, no clinically

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meaningful benefits were found in the risperidone group compared with the placebo group, and risperidone-treated patients more often reported weight gain, somnolence, fatigue, and hypersalivation. There are numerous concerns with long-term adverse health effects (e.g. weight gain, glucose dysregulation, cardiac effects, or extrapyramidal effects). The results seriously call into question the use of atypical antipsychotics in PTSD treatment [8]. Even though quetiapine use for PTSD continues to be off label (quetiapine is FDA approval only for schizophrenia) and the lack of clinical results, it has not prevented quetiapine from being the second most used drug in VA second only to blood-thinner Plavix in 2010 [2]. A recent study by Dr John Krystal, a professor and chair of the Department of Psychiatry at Yale School of Medicine, at the Department of Veterans Affairs National Center for PTSD. The second-generation antipsychotic (SGA) risperidone, widely used to treat patients, Risperidone Shows No Benefit Over Placebo for PTSD in military-related posttraumatic stress disorder (PTSD) that is resistant to SSRI antidepressants. He made the determination after conducting a randomized, double-blind, placebo-controlled, multicenter study from February 2007 to February 2010 at 23 Veterans Administration (VA) outpatient medical centers. The researchers believe this study is the first large trial of a pharmacotherapy aimed at SSRI-resistant PTSD symptoms. "Overall, the data do not provide strong support for the current widespread prescription of risperidone to patients with chronic SSRI-resistant military-related PTSD symptoms," they said in the August 3 Journal of the American Medical Association. That revelation may leave practitioners with few weapons in their pharmacotherapeutic arsenal. And SGAs, namely risperidone, were thought to be the next logical step in treatment. So what's next in light of these results? "Our findings will very likely influence the risk-benefit decisions that doctors make, increasing their caution in prescribing risperidone as an adjunctive medication for PTSD or in continuing risperidone prescriptions for patients who show little evidence of benefit" [3].

The risks of SGAs are significant, such as Researchers at Vanderbilt University published a study in the New England Journal of Medicine suggesting a new risk: sudden heart failure. The investigators found three cardiac deaths per year for every 1,000 patients taking SGA [4]. Similar risks were reported by Dr. Kuehn who observed that, "taking atypical antipsychotics doubles the risk of sudden cardiac death [5]. Furthermore, clinical consideration for the use of atypical antipsychotics to treat patients with PTSD may be problematic since this class of medications can increase the risk of suicidal attempts, as demonstrated by Dr. Hering. His findings suggest that a non-compliant patient using atypical antipsychotics has a 3.6 times increased risk of suicide attempts as compared to compliant patient using atypical antipsychotic [6]. Thankfully, the pharmaceutical approach may be moving away from this conventional path. New techniques include modulation of the sympathetic nervous system (SNS) which is a part of the autonomic nervous system [7].

One example of this is the use of prazosin, an alpha1 adrenergic receptor antagonist through reduction of physiological reactivity associated with nightmares [18]. The role of the SNS is to mobilize the body's resources under stress, to induce the fight-or-flight response. It is also constantly active at a basal level in order to maintain homeostasis. In PTSD, the SNS is known to be chronically activated over the normal baseline levels [8]. PTSD is associated with dysregulation of the autonomic nervous system and hypothalamic-pituitary-adrenal axis, compounded in the combat environment by prolonged extreme stress and chronic sleep restriction [7]. The expectation that this level of dysregulation will reset easily upon return home is unrealistic [7].

The treatment of PTSD in veterans, therefore, must involve coordinated postdeployment care that addresses physiological hyper arousal [7]. It turns out that a possible treatment of physiologic hyper arousal is available by utilizing minimally invasive modulation of sympathetic nervous system. First report of this approach was Endoscopic sympathetic block (ESB) at the second thoracic vertebra (T2) by the use of clipping the sympathetic ganglia via an endoscopic sympathetic block (ESB) this was first reported in 1998 [9]. In a follow up publication, Dr. Telaranta noted the similarity in features between social phobias and PTSD - especially those caused by an overactive SNS, such as heart racing, hyper vigilance, and avoidance of painful psychic situations [10]. ESB requires an invasive surgical technique, however it seems possible to have similar results by using a common anesthetic procedure called Stellate ganglion Block (SGB) which is much less invasive. Early results of this new approach are very promising, with a success rate of 70 to 75% a very high compliance and acceptance. The first time SGB was performed for PTSD and published was 2008 [11]. SGB involves injecting a local anesthetic to the anterior lateral aspect of the cervical spine on the right side at a C6 level with the intent to anesthetize the cervical sympathetic ganglions. The results can be immediate and it addresses precisely the physiological hyper arousal addressed by Dr Hoge. To date over 2000 SGB's have been performed for PTSD with no long term complications reported for any of the procedures. The published success rate of using SGB in treating PTSD is 75%, as reported in the literature has been n=12, 75% [21], n= 24, 75% [22], n= 166 success rate of over 70% [23]. The clinical changes are often marked reduction of hyper vigilance, improved sleep and reduced reactivity to stimuli. The remission of symptoms has been described to last over years with 2 to 3 SGB's. Further, the sympathetic deactivation by using SGB has been reported to reduce or eliminate the need for psychotropic pharmaceuticals [24]. Stellate ganglion blockades carry risks that are considered very small. Although rare, severe complications following SGB do include bleeding, seizures, pneumothorax and spinal cord trauma. A study of the incidence of severe complications was last undertaken in 1992 by German researchers Wulf and Maier, with a reported 1.7 complications per 1,000 blockades based on surveys completed by patients receiving a combined total of 45,000 blocks. Those complications were: Most of these were CNS complications (i.e., convulsions, 11). A high subarachnoid block was reported in 6 cases, high epidural blockade in 3, pneumothorax in 9, and allergic reactions in 2. No fatalities or persistent complications were reported [25]. This survey was conducted prior to the use of fluoroscopic guidance where the stellate ganglion blocks were performed at the C7 level rather than C6. The current improvements in guidance technology and changing the needle location to C6 are likely to reduce the chance of complications. If the risk of suicide is taken into account, 22 per day, as well as other multiple complications due to PTSD symptoms, benefits of SGB far out way the risks of using this modality for treatment. Early reports clearly demonstrate that benefits outweigh harm, the opposite of the SGA benefits/harm ratio. Still SGB is considered off label and not available for the patients who are looking to be treated, and the attempts to study this phenomenon is still underfunded. If the off label use of second-generation (atypical) antipsychotics complications is compared to SGB, the advantages of cervical sympathetic blockade are clear. Why then this disparity in off label use of PTSD treatments, a reader is left to draw their own conclusions. One interpretation is that the observations of SGB efficacy as a treatment of PTSD are in conflict with the established scientific and medical opinions. Interestingly, a research and clinical use of ineffective therapeutics such as second-generation (atypical) antipsychotics continues in spite of demonstrated lack of efficacy and the potential danger of their use. Considering severity of PTSD

epidemic and the lack of effective therapeutic interventions currently available, it is time to look at the available data and apply SGB to the population most affected by PTSD, the military men and women who served this country so valiantly.

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