RESULTS

The patient did experience some localized mild pain at the sites of PSWS. After 15 minutes, the patient described the beginnings of a panic attack that never matured into a full attack. We placed the patient supine and monitored vital signs closely. He complained of sensory loss in both upper and lower extremities, but without motor or strength loss. He hyperventilated for approximately 10 minutes but then seemed to become very calm and euphoric for lack of any pain, "first time in 5 years that I am totally out of any pain" said the patient. We discharged the patient home fully ambulatory approximately 2 hours later. During a follow-up visit the next day, the patient described a period lasting approximately 1 hour beginning at 11pm the previous night of "massive euphoria" as he described it. There was an abrupt discontinuance of intrusive thoughts as well immediate cessation of nightmares. He still felt dramatic relief from his chronic pain, but was nervous about his continued sensory deficits and tingling particularly in his feet. We performed a complete neurologic examination on the patient and found only minor sensory loss in his third and fourth toes of the left foot and the medial aspect of the great toe of the right foot. Otherwise his motor, sensory, and vibratory functions were totally normal. He elicited no untoward neurologic findings secondary to the PSWS therapy. After 2 days, he returned for a second PSWS treatment and was followed up 2 weeks later. He indicated initially the PTSD seemed to worsen, with more hot flashes and nausea, but that now were totally gone. In addition, he no longer had any further panic attacks and even felt that the threshold for panic attacks as he described it had vanished completely. In fact, he felt so good, he was starting to put weight on from his lack of nausea. His marital problems were dramatically improved, he enjoyed being around people, he felt vastly more productive at work and spent much less time sleeping. His only complaint was that he felt so euphoric, it was difficult to sleep. He no longer suffered from nightmares of the experience and described the initial event as "reduced to a tiny icon on the desktop rather than a recurrent widescreen horror story." His involvement in sports and other athletic activities were reenergized with a zest for life that he had not felt in half a decade.

At the time of this publication, the patient has been given 5 additional PSWS treatments and approximately 10 months later still has no PTSD symptomatology. His PSWS induced neurologic symptomatology have also completely resolved.

DISCUSSION

PTSD can be a chronic, life-long, debilitating, cataclysmic illness. Typically, its onset can be traced to a traumatic event where the victim feels helpless, horror or fear (DSM-IV). Subsequently, after a period of time, classic signs and symptoms of PTSD appear, that can be life threatening. Many treatments have been reported, but as described by several authors, the illness frequently degenerates into an allostatic illness that affects many aspects of the patients bodily functions and may create a relentless downward spiral in the persons health. Many articles have been written regarding positive improvement from electrical therapy in patients suffering from chronic pain and depression. These authors note the beneficial effects of increased beta endorphin release secondary to the Electroconvulsive Therapy (ECT).

Unfortunately ECT has many known complications and side effects, and is therefore used less frequently for psychiatric therapies. In addition, ECT is expensive, requires general anesthesia, and must be done in hospital with emergency personnel standing by. PSWS on the other hand is extremely inexpensive and has very little morbidity. In addition, it is done easily on an outpatient basis. PSWS is performed using a peripheral nerve stimulator, a device commonly used by anesthesiologists to test the effectiveness of nerve blocks prior to operative surgical procedures. The MicroStim plus (NeuroTechnology, Houston, Texas) produces a short burst of square wave electrical discharge. When using the device on the "Twitch" mode, a pulse is discharged once every second. The button is held for 3 to 6 discharges at each level and on each side of the spinal column posteriorly. The level of intensity is titrated so that the patient does not feel any severe pain. All levels of the spine are stimulated, beginning at the foramen magnum downward through the cervical, thoracic and lumbar spine and into the sacrum. Frequent transitory side effects include mild numbness and tingling of the extremities, mild extensor weakness, and dizziness. Many patients develop feelings of euphoria subsequent to the stimulation. This treatment offers patients with PTSD as well as chronic pain an alternative to routine drug therapies which are often nonspecific for PTSD.

PSWS appears to stimulate the release of endorphins, a natural method of therapy for PTSD as well as pain treatment. In a previous paper, ECT was used successfully in a patient with PTSD that was becoming increasingly suicidal and also had little or no relief from pharmacotherapy. ECT allowed this patient to return to society with full functionality. Because of ECT’s known side effects and expense, PSWS allows a different method of electrically treating the patient with drastically lower expense and no known permanent side effects, such as memory loss and seizures associated with ECT. The minor paresthesias and numbness our patient experienced all disappeared within 2 weeks of treatment. More case studies of treatment of PTSD with PSWS are needed. PSWS is a viable alternative to unsuccessful pharmacologic treatment without the known complications and side effects of ECT.

Repeated intrusive thoughts and memories of the initial torture are the hallmark of PTSD (DSM-IV). This patient suffered from repeated intrusive thoughts and nightmares despite treatment with SSRT’s and psychotherapy. PSWS totally eliminated these symptoms in our patient, and to our knowledge, no other study has reported this dramatic improvement in any PTSD patient so far. In addition, 50% of patients with chronic pain never achieve satisfactory amelioration of their pain. In this
patient, after all forms of treatment known to the medical community, the only treatment that succeeded in eliminating his pain was PSWS. Similar to Cognitive-Behavioral Therapy, PSWS is nonpharmacologic and therefore an alternative in patients refusing drug therapy because of known side effects such as inorgasmia and narcolepsy with some of the SSRIs.

As can be seen from this chart, ECT uses almost 60,000 times more energy per treatment than PSWS with far more complications. ECT also requires much more experience, personnel, equipment, and general anesthesia. ECT has helped many patients, in fact, one article clearly shows the effectiveness of ECT in treating chronic pain and depression. Abrams cites the malpractice problems with ECT as well as the large expense in protecting the patient, such as integral EEG monitor, rolling stretchers, operating room type, defibrillator and cart, oxygen, intravenous assess, laryngoscope, mouthgahds, experienced anesthesia personnel etc.

From our experience, this treatment has helped patients with chronic pain of various etiologies including migraine, fibromyalgia, and reflex sympathetic dystrophy. We have an additional bed-ridden patient with retroperitoneal fibrosis and chronic pancreatitis, aged 45 suffering from suicidal lower thoracic spinal pain on massive doses of IV morphine. He is now fully ambulatory with no spinal pain after two treatments with PSWS. In addition, his morphine dosages have been reduced by two thirds and he is able to enjoy being with his family.

In PTSD, patients display a much greater range and deficiency of cortisol. The potential role of hypocortisolism in the pathophysiology of stress related bodily disorders is described by Heim et al., who notes a similarity in cortisol deficiency and reduced adrenal capacity in entities with chronic stress such as fibromyalgia, rheumatoid arthritis and chronic pain syndromes. The effectiveness of PSWS on these other illnesses may in part be related to the common neurologic/endocrinologic pathogenesis. Yehuda et al. note the low beta-endorphin levels in PTSD. ECT is well known to raise beta-endorphin levels. In his excellent paper, Rasmussen cites many case studies of patients suffering from chronic pain, reflex sympathetic dystrophy syndrome, and depression that resulted in dramatic improvement in their symptoms post ECT. Abrams describes a large number of neurotransmitters, neuromodulators, and neuropeptides that are affected by electroconvulsive therapy. Weizmann et al conclusively document the rise in beta-endorphins after six days of treatment with ECT. Alexopoulos et al note not only an increase in beta-endorphins post ECT, but also a concomitant rise in adrenocorticotropic hormone levels. Wong notes the comorbidity of various illnesses in association with PTSD such as inflammatory bowel disorders, rheumatoid arthritis, periodontal disease, and coronary artery disease.

Based on our patient’s response, we believe the beta-endorphins levels in this study were elevated post PSWS. We believe this explains in part the antinociceptive effect from PSWS. Depolarization of sensory neurons undoubtedly play a role since the electrical current is directly applied in this area.

Peripheral nerve stimulators are used by anesthesiologists to pinpoint the nerve desired for complete anesthetic block prior to surgery. In his book, Brown notes that the negative electrode elicits 4 times stronger nerve twitch than if the positive electrode is punctured directly into the nerve.

Many articles have focused on the hippocampus and other supratentorial structures as the “seat” of PTSD. We believe the spinal cord and peripheral nervous system are also integrated in PTSD. Our patient noted an abrupt cessation of nightmares, panic attacks and intrusive thoughts immediately following PSWS.

THE FUTURE

Ancient Egyptians used electric eels to shock patients with chronic intractable pain with some success. In this patient there was a dramatic positive response to PSWS to not only his pain, but also a sustained improvement in his PTSD symptomatology. Perhaps PSWS can be useful in treating other psychiatric illnesses such as depression, involutional melancholia, paraphrenias, and personality disorders. PSWS will undoubtedly be a controversial form of treatment if it is widely adopted, however, as the ancient Egyptians discovered with electric eels, unconventional forms of treatment have had their place in history. Electricity as a form of treatment may become an important modality for psychiatric illnesses, without the harmful effects of ECT. Perhaps PSWS administered along with counseling after a person is involved in a terrifying event may help avert PTSD. Yehuda notes the effectiveness of administering hydrocortisone in patients in septic shock successfully preventing PTSD. McEwen also notes the protection that glucocorticoids provide in the prevention of PTSD. Preemptive treatment with glucocorticoids may add to the combination of therapies in preventing PTSD.

Acknowledgment

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References


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SUCCESSFUL TREATMENT OF POST TRAUMATIC STRESS DISORDER AND CHRONIC PAIN WITH PARASPINAL SQUARE WAVE STIMULATION

Philip D. Gottlieb, MD

Philip D. Gottlieb, MD, is director of Women's Imaging and co-director of interventional radiology, Guthrie Clinic, Sayre, Pennsylvania.

Objective • To determine if Paraspinal Square Wave Stimulation (PSWS) is effective in treating Post Traumatic Stress Disorder (PTSD) and or Chronic Pain.

Method • PSWS is applied to the paraspinous area from the cranio-cervical junction to the lower sacrum.

Results • Patient achieved dramatic relief from PTSD, unequaled by any previous pharmacologic or psychotherapies. The chronic pain is almost completely disappeared, unlike any previous therapies.

Conclusion • PSWS is the treatment of choice for this patient with PTSD and Chronic Pain. This patient appears to have completely recovered from PTSD, unlike any other study reported so far.


Pain is real when you get other people to believe in it. If no one believes in it but you, your pain is madness or hysteria.

The patient is a 34-year-old male concert pianist who approximately 5 years earlier had been tormented. He suffered from recurrent bouts of pain and approximately 4 months later began having nightmares, hot flashes, nausea, abdominal pain, difficulty concentrating, insomnia, hypervigilance, intrusive thoughts regarding the initial torture, and hyperrritability. The patient had developed full-blown signs and symptoms of Post Traumatic Stress Disorder (PTSD) with recurrent thoughts of suicide and major depression. Approximately one year later, the patient began experiencing panic attacks. Various medications were utilized in controlling the PTSD, all with limited success. The patient repeatedly complained of narcolepsy from all the serotonin reuptake inhibitor (SSRI) medications and because of his employment, was unable to continue his occupation while on these medications. He was treated with minimal success with various SSRIs, however, the patient's symptomatology after 5 years became worse and he refused retreatment with SSRIs. He also underwent various pharmacologic and nonpharmacologic therapies for his chronic pain, including a transcutaneous electrical nerve stimulator (TENS) unit, acupuncture, and intramuscular injections, all with only little or no effectiveness. Most recently, his pain cycles became more frequent and more painful, requiring the introduction of mild opiates which the patient resisted. He was bewildered as to why, 5 years later, his symptomatology and PTSD were worsening.

His relationship with friends, family and employee were worsening and he was worried about becoming suicidal once again.

MATERIAL AND METHODS
Written informed consent was obtained after this new and experimental procedure was thoroughly explained to the patient.

The patient underwent Paraspinal Square Wave Stimulation (PSWS) with a hand held peripheral nerve stimulator commonly used by anesthesiologists for testing nerve blocks.

The hand-held MicroStim Plus Model 7100 peripheral nerve stimulator (Figure 1) was utilized for treatment using the Ball Probe Electrodes included with the instrument. This device produces a square wave monophasic electrical pulse varying from 0-70mA. The unit is powered by a standard 9 volt battery and is easily portable. Of the 4 settings, only the "Twitch" button is pushed during treatment which pulses once every second. Three to 6 pulses are applied in the paraspinous region, first on one side of the spinous process and then on the opposite side. The 2 adjacent spinous processes are palpated and the MicroStim is placed between them and approximately one and a half finger widths lateral to the midline. The process begins at the level of the foramen magnum and proceeds caudally through the thoracic and lumbar area and down into the sacrum. The control knob on the MicroStim is rotated in order to regulate the amplitude of the impulses and is titrated so as to not cause any pain in the patient during treatment. We believe PSWS elicits (evokes) a large output of endorphins post treatment, similar to ECT. The device outputs a square wave of 120 volts which lasts for 200 microseconds. All electrical measurements are obtained on an oscilloscope in our biomedical engineering laboratory using a standard resistance.

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