

Case Report

Permanent Implantation of Peripheral Nerve Stimulator for Combat Injury-related Ilioinguinal Neuralgia

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A peripheral nerve stimulator (PNS) can be an alternative for long-term pain relief refractory to conventional therapeutic modalities. We present a case of chronic incapacitating ilioinguinal neuralgia, which was successfully managed with permanent implantation of a peripheral nerve stimulator. A 26-year-old active duty African American man was referred to the University Pain Clinic with left ilioinguinal neuralgia due to shrapnel injury during his military service 6 years prior to his visit. Most of the shrapnel were surgically removed, but the patient subsequently developed left lower abdominal pain. Multiple surgeries, including inguinal herniorrhaphy, varicocelectomy, and orchiectomy, failed to provide satisfactory relief of his neuralgia. Other therapies tried resulting in limited outcomes were multiple ilioinguinal nerve blocks and cryoanalgesia. A trial of PNS was successful and the implantation of permanent leads was carried out. At his 3-month visit, the patient reported to have minimal pain, was tapered off oral analgesics, was able to return to work, and had resumed his normal daily activities. Recent technological advances in programming software and surgical techniques have led to renewed interest in PNS for the treatment of chronic refractory peripheral nerve injury. Despite our limited understanding of its exact mechanism of action, it can be considered as a therapeutic potential for a few carefully selected, intractable cases. Its minimally invasive and reversible features make PNS a favorable option for these patients. The stringent and rigorous screening procedures for suitable candidacy, documentation of previously failed treatments, psychiatric evaluation, and 3–5 days of preplacement trial, improve the success rate.

Key words: Neuralgia, ilioinguinal, trauma, peripherel nerve stimulator

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Ilioinguinal neuralgia causes an intense, debilitating pain to some patients who suffer from a mechanical injury to the lower abdominal region or inguinal area. Conventional therapies are antineuropathic pain medications, regional nerve block with local anesthetics and steroids, cryoanalgesia, and surgical management. Alternatively, a peripheral nerve stimulator (PNS) can offer good long-term relief from pain refractory to other therapeutic modalities. We present a case of chronic incapacitating ilioinguinal neuralgia

secondary to shrapnel injury during combat which was successfully managed with permanent implantation of a peripheral nerve stimulator.

CASE REPORT

A 26-year-old African American man, on active military duty, presented to the Texas Tech Pain Management with complaints of intractable left lower abdominal pain. The pain was described as sharp, throbbing, stabbing, and aching in nature (8/10 on the

visual analog scale, VAS). Six years prior, he sustained a combat injury due to an improvised explosive device explosion during which, shrapnel, became embedded in his left lower abdomen and groin.

The shrapnel was surgically removed, but the patient subsequently developed left lower abdominal pain and an inguinal hernia. Despite multiple surgeries, including inguinal herniorrhaphy, varicocelectomy, and orchiectomy at a military hospital, his neuralgic pain persisted.

Prior to our clinic visit, he underwent multiple ilioinguinal nerve blocks and cryoanalgesia, only resulting in temporary pain relief. A PNS trial was successful. The patient was referred to Texas Tech Pain Management for permanent implantation. His analgesic medications included oral opioid and a nonsteroidal anti-inflammatory drug. His past medical history was remarkable for brain aneurysm, traumatic brain injury, and posttraumatic stress disorder.

Surgical lead placement was successful. Two electrical leads (Octrode™, St. Jude Medical, Plano, Texas) were positioned and anchored over the transverse abdominis fascia in parallel, one inch superior and inferior to the left ilioinguinal nerve. An implantable pulse generator was located at the left buttock (Figs. 1,2).

Upon follow-up, the patient reported a significant reduction of pain. By the third day, his pain had decreased to 2/10 VAS. At his 3-month visit, he continued to have minimal pain, had tapered off oral analgesics, was able to return to work, and had resumed his normal daily activities.

DISCUSSION

Ilioinguinal neuralgia usually is the result of irritation, injury, or entrapment of the nerve itself during its course of traveling between the internal oblique and transverse abdominis. Surgical staples, sutures, direct penetrating or blunt trauma, or even pregnancy, presumably from traction on the nerve, can contribute to this nerve injury. Commonly associated surgical procedures are inguinal hernia repair, appendectomy, and hysterectomy. The overall incidence of neuralgia is reported between 12% and 62% (1).

The mechanical injury to the nerve can result in a sharp, throbbing, stabbing, aching pain without overt myelopathy or neurological deficit. The pain usually originates from the anterior superior iliac spine, radiating to the groin, but does not pass below the knee. Pain is exacerbated by extension of the lumbar spine, which in turn stretches the sur-



Fig. 1. Permanent implantation of left ilioinguinal nerve stimulator. The leads were anchored to the fascia between the internal oblique and transverse abdominis.



Fig. 2. Scars due to shrapnel injury and previous herniorrhaphy at left lower abdomen and groin area. Surgical scars of peripheral nerve stimulator placement are shown at the right corner.

rounding muscles and ilioinguinal nerve. Accordingly, patients tend to assume a bent-forward novice skier's position. Sometimes, the pain becomes so intense and unbearable that the debilitated patients cannot resume normal daily activities, resulting in emotional and physical mishaps. Furthermore, untreated, poorly controlled pain can result in motor deficit and muscle spasm, leading to bulging of the anterior abdominal wall muscles, which is frequently mistaken for an inguinal hernia. Thus, prompt and accurate diagnosis as well as an appropriate pain management plan is crucial.

The therapeutic approach consists of a wide range of pharmacotherapy, regional nerve blocks, surgical decompression, or neurectomy. Opioid as well as adjuvant analgesics such as antidepressants and anticonvulsants are commonly prescribed, but their efficacy and long-term outcomes are inadequate, especially if delayed. Surgical treatment offers a success rate from 70% to 100%, however, patients who are refractory are more prone to persistent paresthesia and pain (2). For those dissatisfied, a series of local anesthetic nerve blocks followed by cryotherapy may provide some degree of pain relief.

CONCLUSION

Recent technological advances in hardware and surgical techniques have led to a renewed interest in PNS for treating chronic, refractory peripheral nerve injury. Despite limited understanding of its exact mechanism of action (3), it can be considered as a potential alternative for a few carefully selected, intractable cases (4). The selection process for an appropriate candidate should be stringent and rigorous, and include documentation of previously failed treatments, a psychiatric evaluation, and a successful 3-5 day trial period (5,6). Contraindications are coagulopathies, infections, psychiatric problems, and a failed trial. PNS is a minimally invasive, target-focused, and reversible procedure without any significant systemic adverse effect (7). Although the exact incidence of complication is unknown, most are not life threatening, and are related to lead migration, wound infections, muscle spasm, rapid battery depletion, and unsatisfied analgesic expectation (8). These features make PNS a favorable alternative for a number of selected patients. Success of PNS in this case reassures the benefit of this treatment and gives hope for continued advancement in this field.

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