Peripheral nerve stimulation

Peripheral nerve stimulation, frequently referred to as PNS, is a commonly used approach to treat chronic pain. It involves surgery that places a small electrical device (a wire-like electrode) next to one of the peripheral nerves.

Notably, achieving efficacious pain relief relies on correct patient selection and the optimal placement of the leads, ensuring, in particular, a lead depth of 10-12 mm from the surface to maximize the target sensation (mediated by fast-adapting A β fibers) of peripheral nerve field stimulation (PNFS), which is believed to be most effective for the pain relief ¹.

Although introduced half a century ago, it has enjoyed rapid growth in popularity and acceptance over the last decade or so.

Indications

The spectrum of clinical situations where peripheral nerve stimulation (PNS) has been successfully used includes chronic pain in extremities, neck, lower back, chest and abdominal wall, and head and face regions. Based on several multicenter studies, PNS has been recently approved for clinical use in Europe for treatment of chronic low back pain and intractable chronic migraines. Such administrative recognition of clinical value of PNS necessitates update on PNS status for interested readers. The goal of this article is to provide a comprehensive overview of the different types of peripheral neurostimulation that are used today and providing the most updated information on the current state of the modality. As clinical interest and experience with PNS continue to grow, we expected steady accrual of objective evidence in terms of safety, efficacy, best indications and optimal stimulation parameters, all of which will be necessary for worldwide regulatory approval of PNS and for the benefit of patients who are still suffering from chronic neuropathic pain ²⁾.

Future research and growing clinical experience will help in identifying the best candidates for PNS, choosing the best procedure and best hardware for each individual patient, and defining adequate expectations for patients and pain specialists ³⁾.

Mechanism

The electrode delivers rapid electrical pulses that are felt like mild tingles (so-called paresthesias). During the testing period (trial), the electrode is connected to an external device, and if the trial is successful, a small generator gets implanted into the patient's body. Similar to heart pacemakers, electricity is delivered from the generator to the nerve or nerves using one or several electrodes. The patient is able to control stimulation by turning the device on and off and adjusting stimulation parameters as needed.

A common misconception about PNS is that it is a relatively new method that was just recently introduced. In fact, PNS was invented in the mid-1960s, even before the commonly used spinal cord

stimulation (SCS). Since that time, PNS has become established for very specific clinical indications, including certain complex regional pain syndromes, pain due to peripheral nerve injuries, etc. Some of the common applications of PNS include treatment of back pain (recently approved in some parts of the world), occipital nerve stimulation for treatment of migraine headaches, and pudendal nerve stimulation that is being investigated for use in urinary bladder incontinence. Despite its long history, the large body of supporting literature, and its official approval in Europe and Australia, peripheral nerve stimulation for pain is still considered "off-label" in the United States.

Ilioinguinal neuralgia (IG) and genitofemoral neuralgia (GF) following inguinal hernia repair is a chronic and debilitating neuropathic condition. Peripheral nerve stimulation has become an effective and minimally invasive option for the treatment of refractory pain. Shaw et al we present a retrospective case series of six patients who underwent placement of peripheral nerve stimulation electrodes using various techniques for treatment of refractory post-intervention inguinal region pain.

Six patients with post-intervention inguinal, femoral or GF neuropathic pain were evaluated for surgery. Either octopolar percutaneous electrodes or combination of paddle and percutaneous electrodes were implanted in the area of their pain. Pain visual analog scores (VAS), surgical complication rate, preoperative symptom duration, degree of pain relief, preoperative and postoperative work status, postoperative changes in medication usage, and overall degree of satisfaction with this therapy was assessed.

All six patients had an average improvement of 62% in the immediate post-operative follow-up. Four patients underwent stimulation for IG, one for femoral neuralgia, and another for GF neuralgia. Peripheral nerve stimulation provided at least 50% pain relief in all the six patients with post-intervention inguinal region pain. 85% of patients indicated they were completely satisfied with the therapy overall. There was one treatment failure with an acceptable complication rate.

Peripheral nerve or field stimulation for post-intervention inguinal region pain is a safe and effective treatment for this refractory and complex problem for patients who have exhausted other management options $^{4)}$

1)

Verrills P, Russo M. Peripheral Nerve Stimulation for Back Pain. Prog Neurol Surg. 2015;29:127-38. doi: 10.1159/000434666. Epub 2015 Sep 4. PubMed PMID: 26393502.

Rasskazoff SY, Slavin KV. An update on peripheral nerve stimulation. J Neurosurg Sci. 2012 Dec;56(4):279-85. Review. PubMed PMID: 23111288.

Slavin KV. Peripheral nerve stimulation for neuropathic pain. Neurotherapeutics. 2008 Jan;5(1):100-6. doi: 10.1016/j.nurt.2007.11.005. Review. PubMed PMID: 18164488.

Shaw A, Sharma M, Zibly Z, Ikeda D, Deogaonkar M. Sandwich technique, peripheral nerve stimulation, peripheral field stimulation and hybrid stimulation for inguinal region and genital pain. Br J Neurosurg. 2016 Jun 27:1-6. [Epub ahead of print] PubMed PMID: 27347767.

From: https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki**

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=peripheral_nerve_stimula tion

3/3



Last update: 2024/06/07 02:49