Commentary

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Pain at Implantable Pulse Generator Site: Prevention, Treatment and Future Directions

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Abstract

Implantable Pulse Generator (IPG) site pain is a well-recognized complication following IPG implantation for invasive neuromodulation. IPG site pain can lead to decreased quality of life, revision surgery, and even explant. Recent literature has highlighted the incidence, severity, and factors associated with IPG site pain. This article focuses on treatment, prevention, and possible future directions to minimize IPG site pain

Keywords: Implantable pulse generator; Implantable pulse generator site pain; Deep brain stimulation; Sacral nerve stimulation; Spinal cord stimulation

Description

Recent literature has highlighted the incidence, severity, and factors associated with IPG site pain [1]. The indications for neuromodulation have increased leading to increasing variety in patient population. As the use of implantable pulse generator increases, it is essential to improve outcomes and minimize complications. IPG site pain is a known complication of neuromodulation with previously reported incidence of 0.4%-35% and surgical revision in 10%-20% of cases [2-8]. Recent publication with large survey of patients with IPG for Deep Brain Stimulation (DBS), Spinal Cord Stimulation (SCS), and Sacral Nerve Stimulation (SNS) analyses possible factors associated with IPG site pain [1]. The study surveyed 844 patients with response rate of 60.5% and analysed 424 completed surveys [1]. Overall incidence of any pain at the IPG site was 31.1% with most reporting mild (68.2%) or moderate (24.2%) pain in severity. However, 7.6% of respondents reported severe pain and 1.2% of patients required revision surgeries due to pain [1].

Prevention of IPG Site Pain

As with other surgical procedures, careful patient selection is key to successful outcomes and minimize complications. Uncontrolled diabetics, severely immunocompromised patients, and those requiring anticoagulation must be carefully assessed to optimize their condition prior to proceeding to implantation as they may be at higher risk for hematoma or infection [9]. Other factors that may worsen IPG site pain include pre-existing pain conditions especially with chronic pain medication use, smoking status, and extremes of body mass index [10].

It is unknown whether improvement in perioperative pain management with systemic medications or regional anesthetic techniques can improve IPG site pain outcomes. Given that poorly controlled acute pain can have chronic pain in other disease states, it is possible that improving perioperative pain control for IPG implantation can decrease IPG site pain [11].

Importance of detailed psychological evaluation prior the procedure cannot be over emphasized. Active psychiatric disease including untreated drug addiction or abuse can negatively impact the outcome [9]. Patient education and counselling are also critical to mitigating IPG site pain. Given that the SCS patients more commonly experienced IPG site pain, more extensive education and counselling is needed in this patient population to manage the post-operative expectations [1].

Proper surgical technique with careful attention to anchoring, strain relief, hemostasis, sterility is another key factor in preventing chronic IPG site pain [10]. However, the actual location of IPG site does not seem to affect the incidence of IPG pain [1,10]. It is unknown whether the depth of implant would affect the IPG site pain.

Treatment of IPG Site Pain

The optimal treatment of IPG site pain has not been well studied previously. With initial complaint of IPG site, patient should be evaluated to rule out infection or hematoma. With ongoing pain, patient may require medication or surgical treatment. Most frequently used IPG site pain treatment was lidocaine ointment and diclofenac gel [1]. Severe continued pain may require revision or explant surgery. The rate of revision surgery due to pain was 1.2% [1].

Discussion and Conclusion

Factors that were not analysed in the Choi et al. [1] study include IPG hardware factors. IPG shape and size including thickness, as well as rechargeability might also affect IPG site pain. With advances in technology, the need for IPG might

decrease as well. Remote pulse generator external to the patient that eliminates the need for IPG could shorten operation time, decrease risk of infection and hematoma, improve cosmetic outcomes and patient satisfaction.

With increasing use of IPG, IPG site pain remains an important source of morbidity. With careful patient selection, meticulous surgical technique, we may be able to reduce IPG site pain. Future directions include possible technological advancement that may one day eliminate the need for an IPG.

Authorship Statement

Heejung Choi, MD participated in conception, interpretation, article drafting, critical revision and final approval of the article.

References

1. Choi H, Gaiha R, Moeschler SM, Bendel MA, McCormick ZL, et al. (2020) Factors associated with implantable pulse generator site pain: A Multicenter Cross-Sectional Study. Neuromodulation.
2. Cameron T. Safety and efficacy of spinal cord stimulation for the treatment of chronic pain: A 20-year literature review. J Neurosurgery 100: 254-267.
3. Turner JA, Loeser JD, Deyo RA, Sanders SB (2004) Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: A systematic review of effectiveness and complications. Pain 108: 137-147.
4. Hong J, Ridgway EB (2015) Submammary placement with mastopexy for implantable pulse generator site pain in thin women. Neuromodulation 18: 754-756.
5. Turner JA, Loeser JD, Deyo RA, Sanders SB (2004) Spinal cord stimulation for patients with failed back surgery syndrome or complex regional pain syndrome: A Systemic Review of Effectiveness and complications. Pain 108: 137-147.
6. Alo KM, Redko V, Charnov J (2002) Four year follow-up of dual electrode spinal cord stimulation for chronic pain. Neuromodulation 5: 79-88.
7. Mekhail NA, Mathews M, Nageeb F, Guirguis M, Mekhail NM et al. (2011) Retrospective review of 707 cases of spinal cord stimulation: Indications and complications. Pain Pract 11: 148-153.
8. Cameron T (2004) Safety and efficacy of spinal cord stimulation for the treatment of chronic pain: A 20-year literature review. J Neurosurg 100: 254-267.
9. Deer T, Masone R (2008) Selection of spinal cord stimulation candidates for the treatment of chronic pain. Pain Medicine 9: S82-S92.
10. Mehta SH, Hoelscher CM, Sharan AD, Thalheimer S, Wu C (2019) Implantable pulse generator site may be associated with spinal cord stimulation revision surgeries. Neuromodulation.
11. Richebe P, Capdevila X, Rivat C (2018) Persistent postsurgical pain: Pathophysiology and preventative pharmacologic considerations. Anesthesiology 129: 590-607.