Dorsal root ganglion stimulation

Stimulation of the dorsal root ganglion (DRG) in the treatment of chronic, intractable pain has shown excellent clinical results in multiple published studies, including a large prospective, randomized, controlled trial. Both safety and efficacy have been demonstrated utilizing this therapeutic approach for many chronic complaints. Continued assessment of neuromodulation therapies, such as DRG stimulation, are not only an important aspect of vigilant care, but are also necessary for the evaluation for safety. Such technologies should be subject to rigorous evaluation as their mechanisms of action and long-term outcomes remain hitherto undefined.

Safety and complaint records for DRG and spinal cord stimulation (SCS) stimulation were obtained from the manufacturer, analyzed and compiled to further assess ongoing device safety. Complaint event data were stratified according to complain type as well as overall rates. Data from similar time periods were compared between epidural neurostimulation devices by the same manufacturer as well as rates reported in the literature.

Overall, DRG stimulation device event rates were lower or comparable to similar epidurally placed neurostimulation devices. Rates of events varied from 0 to 1.0% for DRG stimulation (n >500+ implants) which was similar to the event rate for SCS by the same manufacturer (n >2000+ implants). In comparison, complaints and adverse events ranged from 0 to 14% for SCS in the literature.

The current results from a large consecutive cohort obtained from manufacturer records indicates that DRG stimulation demonstrates an excellent safety profile. Reported event rates are similar to previously reported adverse event and complaint rates in the literature for this therapy. Similarly, safety events rates were lower or similar to previously reported rates for SCS, further demonstrating the comparative safety of this neuromodulation technique for chronic pain treatment.

**Indications**

see [Dorsal root ganglion stimulation for chronic neuropathic pain](https://operativeneurosurgery.com/).

**Case series**

Piedade et al., from University Hospital of Düsseldorf, reported a consecutive series of 20 patients treated with DRG stimulation in the upper thoracic and cervical region. All patients suffered from chronic neuropathic pain unresponsive to best medical treatment. Main pain etiologies were trauma, spine surgery, postherpetic neuralgia, and peripheral nerve surgery. All patients were trialed with externalized electrodes prior to permanent pulse generator implantation. Routine clinical follow-up
was performed during reprogramming sessions.

Out of all 20 patients trialed, 18 were successfully trialed and implanted with a permanent stimulation system. The average pain relief after three months compared to the baseline was of 60.9% (mean \textit{VAS} 8.5 to VAS 3.2). 77.8% of the patients reported a pain relief of at least 50% after three months. One patient developed a transient paresis of the arm caused by the procedure. She completely recovered within three months.

Cervical and upper thoracic DRG stimulation resulted in good overall response rates to trialing and similar pain relief when compared to DRG stimulation for groin and lower limb pain. A modified surgical approach has to be used when compared with lumbar DRG electrode placement. Surgery itself in this region is more complication prone and challenging \cite{4}.

Morgalla et al., prospectively enrolled 12 adult patients with unilateral localized neuropathic pain in the lower limbs or inguinal region and followed them up for six months Laser evoked potentials (LEP) were assessed at baseline, after one month of DRGS, and after six months of DRGS. Clinical assessment included the Numerical Rating Scale (NRS), Brief Pain Inventory (BPI), SF-36, and Beck Depression Inventory (BDI). For each patient, LEP amplitudes and latencies of the N2 and P2 components on the deafferented side were measured and compared to those of the healthy side and correlated with pain intensity, as measured with the NRS.

At the one- and six-month follow-ups, N2-P2 amplitudes were significantly greater and NRS scores were significantly lower compared with baseline (all p's < 0.01). There was a negative correlation between LEP amplitudes and NRS scores (rs = -0.31, p < 0.10).

DRGS is able to restore LEPs to normal values in patients with localized neuropathic pain, and LEP alterations are correlated with clinical response in terms of pain intensity \cite{5}.

Case reports

van Velsen et al. used a single-incision approach to tunnel and implant the leads and pulse generator for DRG stimulation treatment in a patient suffering from intractable foot pain. At long-term follow-up, the patient experienced a decrease in pain intensity and improvement in function, without any complications. A single-incision implantation technique for DRG stimulator implantation may simplify implantation and decrease the risk of complications \cite{6}.

References

\begin{enumerate}


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