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### Neurostimulation in the Treatment of Chronic Pain

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#### Abstract

Back surgery is performed more than 200,000/year in the United States, with 40% of the patients failing to have a long-term satisfactory outcome after primary procedures. Treatment options and further refined indications for procedures must be developed. Chronic pancreatitis is another chronic pain syndrome difficult to manage.

More than 20 years ago, spinal cord stimulation (SCS) was introduced. Application of neurostimulation in the treatment of both failed back surgery syndrome (FBSS) and chronic pancreatitis pain syndrome (CPPS) will be reviewed.

North (1) recently reported a five-year study on the treatment of 102 patients with FBSS who underwent SCS. The patients were evaluated by a third party two times postoperatively (0.4-4.2 yrs). Fifty (50) patients completed the follow-up. All patients were evaluated by myelography-CT. None had surgical indication. All patients had trials with temporary SCS leads followed by percutaneous implantation of receivers. The authors reverted recently to implantation of leads through a laminectomy due to their experience of lead migrations. Even with this approach, some patients will require revision of lead position. Repositioning of leads occurred in 64% for percutaneous placement and 36% for laminectomy placement.

Success was defined as at least 50% pain relief in two years, and patient was satisfied with it. Functional status was also evaluated. At the five-year follow-up, 47% reported success:

- 7% >50% pain relief but questionable satisfaction
- 54% SCS more effective than other procedures
- 28% Less effective than other procedures
- 48% Reported decreased pain
- 12% Reported increased pain

Trial SCS may not predict success 100% of the time (12/50 failed). Eighty three percent (83%) of the patients continue to use the SCS at the five-year follow up.

Complications included superficial infection, lead migration and fracture, and receiver failure. Forty eight percent (48%) of patients underwent secondary procedures. Lead revision rate dropped from 28% to 20% when the bipolar lead was changed to the quadruple lead.

Favorable prognostic factors include female gender and multi-contact lead. Poor predictors are multiple complaints in sensory, affective and evaluative adjectives.

Half of acute pancreatitis is related to diseases of the biliary tract, and half related to upper abdominal surgery and alcohol ingestion. However, chronic pancreatitis is mainly due to alcoholism. CPPS involves usually relatively young patients. Conventional treatment involves analgesics, including opioid, and surgery. These therapies are usually not satisfactory. I introduced the new technique of celiac plexus neurostimulation for cases with intractable pain(2). A SCS lead is inserted percutaneously around the celiac plexus under the guidance of CT. After a trial of several days to establish stimulation parameters consistency in analgesia and patient acceptance, a permanent generator or receiver is implanted. The methodology will be presented. Early results show that pain score, opioid dosage, hospitalization and functional level all improved significantly. It should be noted that placement of the lead should be performed when the CPPS is in acute exacerbation. Psychological evaluation not and follow up are essential for a successful outcome.

Complications include lead migration and lead fracture. Infection has not been experienced.

Conclusion: The SCS system with the electrodes implanted in epidural space and around celiac plexus are useful in pain control and functional recovery in selected patients with FBSS and CPPS, respectively. Careful psychological screening for risk factors are important to predict successful outcome.

"A little learning is a dangerous thing, Drink deep, or taste not the Pierian spring; There shallow droughts intoxicate the brain, And drinking largely sobers us again." -- Alexander Pope, An Essay on Criticism