Troubleshooting for Spinal Cord Stimulation Therapy

By Michael Yang, MD
Founding Partner
Summit Pain Alliance
Santa Rosa, CA

Introduction

Spinal cord stimulation (SCS) therapy is an effective and proven therapy to treat neuropathic pain. Since its inception, a trial of the stimulation implant was promoted to increase success rate of the permanent implantation. Despite this, there are still complications that may arise after the implantation that hamper the effectiveness of the therapy. In one retrospective study of 234 patients, complications occurred in approximately a third of implanted patients. Hardware complications (74.1%) occurred more frequently than biologic complications.[1] This is a brief overview and troubleshooting guide to help manage a few of the most common issues during the post-implantation period.

Post-Implantation Troubleshooting

1. Loss of stimulation in the affected region of pain
   a. Lead migration is the most common complication of SCS implantation.[2]
      i. Obtain X-ray of the leads to visualize the positioning.
      ii. It may be necessary to revise the lead positioning.
      iii. Decrease incidence of lead migration by using tapered, silicone anchors with the tip buried deep past the fascia.[3]
   b. Lead fracture
      i. Obtain X-ray to visualize possible fracture site.
      ii. Will need to replace the fractured lead
   c. Loose connection with IPG
      i. Obtain X-ray to visualize the connection points on IPG.
      ii. Open IPG site, and reconnect the leads.
2. Exhibits symptoms at surgical site (e.g., fever, tenderness, edema, induration, erythema)
   a. Seroma
      i. Consider abdominal binder.
      ii. Do NOT aspirate with needle.
   b. Infection
      i. Superficial
         1. Debridement and washout
         2. Course of antibiotics after consultation with infectious disease specialist
         3. Close monitoring
      ii. Deep
         1. Debridement and washout
         2. Explant the entire device
         3. Course of antibiotics after culture and consultation with infectious disease specialist
         4. Close monitoring
         5. Possible future reimplantation once infection has cleared

3. Sensory and/or motor deficits (i.e., paresthesias, weakness, numbness)
   a. Epidural hematoma
      i. Radiographic spine imaging to rule out an epidural hematoma
         1. If positive, then emergent neurosurgical evacuation
   b. Epidural abscess
      i. Radiographic imaging to rule out an epidural abscess
         1. If positive, then emergent neurosurgical washout
         2. Explant the device
   c. Lead causing mechanical irritation of nerve root(s)
      i. Obtain X-ray to visualize the path of the leads
      ii. May require revision of leads

References
