Spinal cord stimulation surgical technique

Preoperative Planning

Patient Selection:

Suitable candidates are identified based on their medical history, the nature of their chronic pain, and their response to previous treatments. Psychological evaluation to ensure the patient can cope with an implanted device.

Trial Stimulation:

A temporary SCS system is often implanted to evaluate the potential effectiveness before committing to a permanent implant. The trial period usually lasts from a few days to a week.

Surgical Technique

Anesthesia:

The procedure can be performed under local anesthesia with sedation or general anesthesia, depending on the patient's condition and preference.

Patient Positioning:

The patient is positioned prone (lying face down) on the operating table to provide access to the posterior elements of the spine.

Preparation and Sterilization:

The surgical area is cleaned and sterilized to prevent infection. A sterile drape is placed over the surgical field.

Incision and Lead Placement:

A small incision (approximately 2-4 cm) is made over the selected vertebral level. Using fluoroscopic guidance (real-time X-ray), a needle is inserted into the epidural space. An epidural lead (a flexible electrode) is then introduced through the needle and positioned over the dorsal columns of the spinal cord.

Lead Testing and Tuning:

Initial electrical impulses are delivered to the lead to verify proper placement and to adjust the settings for optimal pain relief. The patient provides feedback on the coverage of the stimulation during this process.

Permanent Lead Fixation:

Once the optimal position is confirmed, the lead is secured in place using sutures or anchors to prevent migration. The incision is closed with sutures or staples.

Implantation of the Pulse Generator:

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A subcutaneous pocket is created, usually in the abdomen or gluteal region, to house the pulse generator (the device that delivers electrical impulses). The lead is tunneled under the skin from the spine to the pulse generator pocket. The lead is connected to the pulse generator, and the device is tested again to ensure proper functioning.

Closure:

The pocket incision is closed with sutures or staples. A sterile dressing is applied to the incision sites.

Postoperative Care

Recovery:

The patient is monitored in the recovery room until they are stable. Pain management, wound care, and infection prevention protocols are followed.

Device Programming:

The pulse generator is programmed with the optimal settings for pain relief. The patient is trained on how to use the handheld controller to adjust the stimulation settings.

Follow-up:

Regular follow-up appointments are scheduled to monitor the patient's progress, adjust the device settings, and address any complications. Potential Complications

Infection:

Preventative antibiotics and sterile techniques are used to minimize this risk.

Lead Migration:

Secure fixation techniques help prevent movement of the lead.

Hardware Malfunction:

Regular device checks and patient education on device use help manage this issue.

Pain at the Implant Site:

This is usually temporary and managed with pain relief measures.

Conclusion The SCS surgical technique is a well-established procedure for managing chronic pain, with careful attention to preoperative planning, precise surgical technique, and thorough postoperative care being essential for optimal outcomes. Advances in technology and techniques continue to improve the safety and efficacy of this therapy.

see also Wireless spinal cord stimulation.

In order for SCS to be effective, it is necessary for the patient to feel the stimulation in the areas of pain.

Two techniques are used to place electrodes in the epidural space:

1. plate-like electrodes placed via hemilaminectomy

2. wire-like electrodes placed percutaneously with a Tuohy needle.

Following electrode placement, a trial with an external generator over several days determines if SCS is effective. The electrodes are removed unless clear improvement occurs, in which case an implantable pulse generator is placed subcutaneously.

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