

Anesthetic considerations for patients with differing brands of spinal cord stimulators (SCS)

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INTRODUCTION

- Spinal cord stimulators are increasingly being utilized for neuromodulation of chronic pain conditions, including failed back syndrome, peripheral neuropathy, complex regional pain syndrome, and refractory cardiovascular conditions. (Figure1)
- Technological evolution has led to multiple manufacturers, each with advances and nuances regarding perioperative recommendations.
- As anesthesiologists, it becomes imperative to have a working knowledge of how these devices interact with other medical technology and their potential risks.

SUMMARY OF FINDINGS

Preoperative phase:

- Multidisciplinary discussion between anesthesiologist, surgeon, and pain physician.
- Comorbid conditions like hypertension and diabetes were optimized.
- Spinal cord stimulator (SCS) settings were adjusted to minimize interference.
- SCS was typically turned off before surgery.

Intraoperative phase:

- Standard ASA monitoring (ECG, pulse oximetry, capnography) was used.
- Careful patient positioning to avoid pressure on the SCS site and leads.
- A balanced general anesthesia regimen was used, avoiding interference with the SCS.
- Neuromuscular blockers were avoided to simplify postoperative SCS assessment.
- Bipolar cautery was used to minimize electromagnetic interference (EMI).
- Continuous communication between the anesthesia and surgical teams to monitor patient status and SCS function.

Postoperative phase:

- Close monitoring in the PACU for SCS malfunction or complications.
- Postoperative analgesia adjusted for chronic pain and SCS reliance.
- Pain specialist coordinated the reactivation and verification of the SCS function.

Manufacturer and Brand Features

	MRI	X Ray	Metal Detector
Boston Scientific (e.g. Precision Montage)	Conditional, safe for full body MRI access under specific conditions	Compatible	Likely to trip metal detectors; inform security, carry documentation
Medtronic (e.g. RestoreSensor Surescan,)	Conditional, allows access to MRI anywhere in the body, under certain conditions.	Compatible	May trip metal detectors; inform security personnel, carry documentation
Abbott (e.g. Proclaim)	Conditional, Safe for any body part when the IPG is coupled with the MR Conditional leads, implanted in an approved location, and a supported RF coil is used.	Compatible	May trip metal detectors; inform security personnel, carry documentation



DISCUSSION

- "MRI compatible" refers to a device that can be safely scanned in an MRI environment without causing harm to the patient's tissues or device.
- "MRI Conditional" indicates that the device can undergo an MRI scan only under specific circumstances or with certain restrictions. These conditions might include limitations on the type of MRI machine (e.g., the strength of the magnetic field, maximum spatial gradient), total imaging time, specific body regions that can be scanned, or using particular imaging protocols.
- The patient must be able to provide real-time feedback during and after imaging. If available, the IPG should be turned off or placed in "MRI Mode" and on/off after imaging.
- Prevent device malfunction and minimize electromagnetic interference (EMI).
- Ensure effective pain management, taking into account the SCS.
- A collaborative effort involving anesthesiologists, surgeons, and pain physicians is critical for successful outcomes.
- Early involvement of a pain physician is essential to manage SCS settings and ensure functionality.
- Avoid sources of EMI and carefully position the patient to protect the SCS and leads.

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