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# National Practice Patterns of Infection Prophylaxis for Sacral Neuromodulation Device: A Survey of High Volume Providers

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**Abstract**

**Introduction:** Sacral neuromodulation using the InterStim® device is a safe, effective treatment for urgency, frequency, urgency incontinence, nonobstructive urinary retention and fecal incontinence. However, there is no standard recommendation regarding infection prophylaxis. Therefore, we surveyed the infection prophylaxis patterns of high volume device providers to describe current practice patterns of perioperative infection prophylaxis.

**Methods:** A web based survey was sent to 35 high volume providers, including urologists, gynecologists and colorectal surgeons.

**Results:** Our response rate was 89% (31 of 35 participants). Of the providers 51% were urologists, 39% were gynecologists and 10% were colorectal surgeons. Of the respondents 74% had performed more than 200 procedures and 22% had done more than 500. The testing period was generally 1 to 2 weeks. Only 13% of the surveyed providers routinely screened for methicillin resistant Staphylococcus aureus. All providers administered antibiotics preoperatively, most commonly cefazolin or vancomycin, and 81% administered antibiotics postoperatively, most commonly cephalexin and trimethoprim-sulfamethoxazole. Most providers prescribed 5 to 7 days of treatment but 6 (19%) prescribed no postoperative antibiotics. In addition, 71% of respondents used adjunctive measures, frequently intraoperative wound irrigation and/or a preoperative chlorhexidine shower. After stages 1 and 2, 19% of providers prohibited showering for more than 3 days postoperatively while 61% permitted showering after 1 or 2 days and 19% recommended no bathing restriction.

**Conclusions:** We present the infection prevention practices of high volume InterStim sacral neuromodulation device implanters in the United States. Further study is warranted to guide evidence-based practice in InterStim infection prophylaxis.

*Key Words:* urinary incontinence, fecal incontinence, implantable neurostimulator, prosthesis-related infections, antibiotic prophylaxis

**Abbreviations and Acronyms**

AUA = American Urological Association

IPG = implantable pulse generator

MRSA = methicillin resistant Staphylococcus aureus

SSI = surgical site infection

TMP-SMX = trimethoprim-sulfamethoxazole

Since 1997 the InterStim sacral neuromodulation device, an effective treatment for overactive bladder and other pelvic floor disorders, has been FDA (Food and Drug Administration) approved.[1,2] However, infection remains a concern for any surgical procedure involving an implantable device. Furthermore, the InterStim device is often implanted as a staged procedure with an externalized electrode lead between stages, which could potentially add to the infection risk. A recent systematic review showed an infection rate in the range of 5% to 11%.[3] This is consistent with the 4% to 5% rate of similarly staged implantable neurostimulators used in the brain and suprasacral spinal cord.[4,5]

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Infection can lead to explantation of an otherwise well functioning device, resulting in significant patient inconvenience and health care costs.[3] Antibiotic therapy is well established to be effective for preventing SSI.[6] Although the manufacturer recommends antibiotic prophylaxis before and after the procedure, to our knowledge there are no data in the literature to guide the choice of antibiotic or duration of therapy. A 2013 French guideline specifically for sacral neuromodulation recommended preoperative antibiotics but did not comment on a postoperative regimen.[7] Other measures may also have a role in infection prophylaxis, such as preoperative antiseptic skin preparations, intraoperative antibiotic irrigation and postoperative bathing restrictions.[8]

In the absence of quality data we performed a nationwide survey of high volume InterStim providers to present a descriptive summary of their infection prophylaxis practices. Our ultimate goal was to provide guidance to the clinician seeking to minimize infectious complications based on the collective experience of these experienced providers and ultimately spur further investigation of potential prophylactic measures.

## Methods

A web based self-administered survey was created and study data were collected and managed using REDCap™, a secure, web based application to build and manage online surveys and databases.[9] We queried the InterStim manufacturer, which provided a list of 35 faculty across the specialties of urology, gynecology and colorectal surgery in the United States who had performed at least 20 procedures in the last 12 months. The survey was composed of 19 items detailing provider practice patterns in regard to infection prophylaxis. It was sent via email to all 35 high volume providers.

## Results

Of the 35 high volume InterStim providers 31 completed the survey for an 89% response rate. Most respondents were urologists (16 or 51%) and the remaining respondents were gynecologists (12 or 39%) or colorectal surgeons (3 or 10%) (fig. 1, *A*). Of the providers 25 (81%) had at least 5 years of experience with implanting the device and 15 (48%) had more than 10 years of experience (fig. 1, *B*). More than 200 and more than 500 procedures had been performed by 23 (74%) and 7 respondents (22%), respectively (fig. 1, *C* ). In addition, 22 respondents (71%) performed staged procedures and office peripheral nerve evaluation (fig. 2, *A*). The testing period for staged procedures was generally 1 to 2 weeks (fig. 2, *A* and *B*). Only 4 of the 31 providers (13%) reported routinely screening for MRSA before device implantation (fig. 2, *C* ).

Figure 3 shows reoperative antibiotic use. Cefazolin alone was by far the most common choice (18 providers or 58%), followed by vancomycin (5 or 16%). Five providers (16%) also administered gentamicin combined with an anti-gram-positive agent. In patients with a penicillin allergy most providers

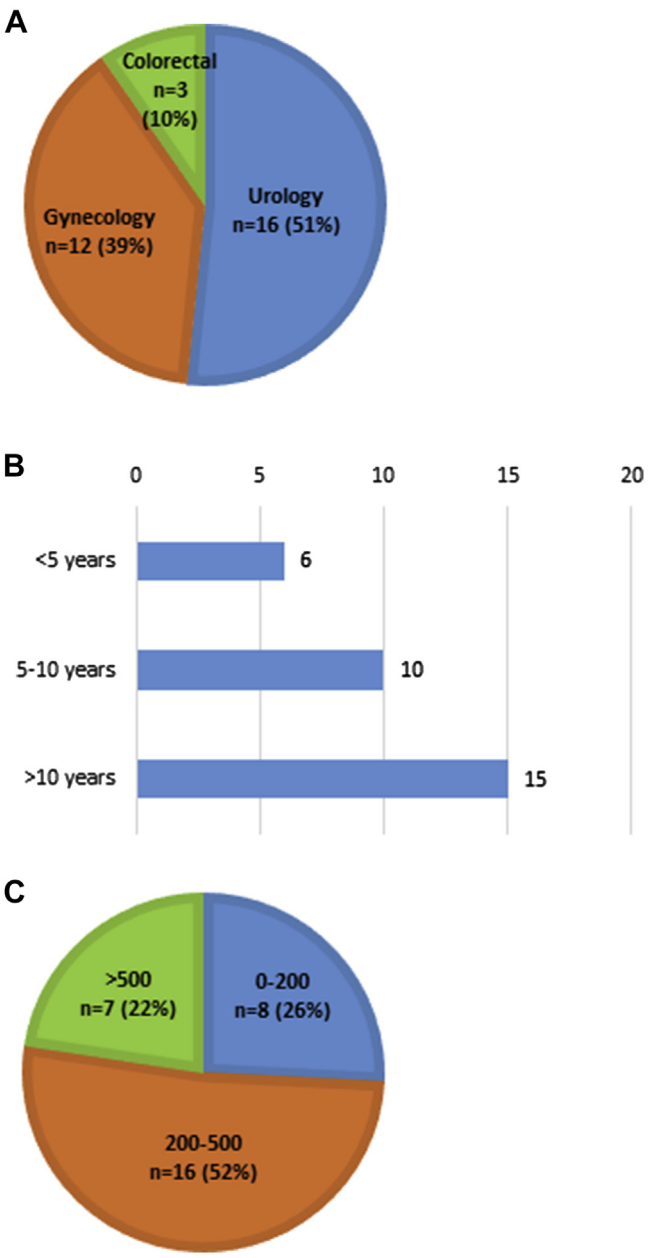


**Figure 1.** Results for 31 providers. *A*, training background. *B*, years of experience with device implantation. *C*, number of implantations performed.

administered clindamycin or vancomycin with or without gentamicin.

Figure 4 shows postoperative antibiotic prescribing patterns. Six providers did not routinely prescribe antibiotics postoperatively (fig 4, *A*). Of the 25 respondents who prescribed postoperative antibiotics 13 recommended a 5 to 7-day course. For staged procedures all providers repeated the same postoperative antibiotic regimen for each stage. The most common postoperative antibiotics prescribed were cephalexin, followed by TMP-SMX (fig. 4, *B*). In case of penicillin allergy TMP-SMX was most commonly used, followed by ciprofloxacin (fig. 4, *C* ).