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| Study Name/ Year  | Design  | Study Quality | Indication SNM\* | SNM\* Procedure | Follow-up duration  | Study interventions | Total N | N received intervention | Infection rate  |
| Washington 2007 | Retrospective chart review | C | Refractory UUI\*, urinary frequency, and NOUR\* | Stage II  | Mean 147.4 days(33-461 days)  | 1. Pre-and-post-op\* antibiotics
2. Skin prep
3. Irrigation

Pre-Op antibiotics: Either 1st or 2nd generation cephalosporinPost-op antibiotics: Either oral levofloxacin or ciprofloxacin for 7 days Betadine scrub Nonspecific antibacterial irrigation  | 37 | 37 | **13.5%** (5/37) |
| Guralnick 2007 | Case control  | B | 1. OAB\* Wet n=32 (42%)
2. OAB\* Dry n=20 (26%)
3. NOUR\* n=11 (15%)
4. Painful bladder n=13 (17%)
 | Stage I Stage II  | 3 years  | 1. Pre-op\* antibiotics
2. Skin prep
3. Technique

Pre-Op antibiotics: Single dose IV cephalexin or moxifloxacin if PCN\* allergic Skin prep: Pre-Op hibiclens showerPovidone-iodine prep or CHG\* if iodine allergic Technique: Ioban barrier sheath after prep | 76 | NR | **12.5%** (9/72)15.4% (4/26) unsuccessful Stage I10.0% (5/50) successful Stage I4 excluded from analysis (ultimately had infection of IPG) unclear if subclinical at stage I or occurred at stage II.  |
| Faucheron 2010 | Prospective cohort  | B | 1. Neurological FI\*n=104 (85%)
2. Idiopathic FI\*n=19 (15%)
 | Stage II  | Mean 48.5 months  | 1. Pre-op\* antibiotics

IV cefoxitin 1 hour before permanent IPG  | 87 | 87 | **4.6%** (4/87)  |
| Haraway 2013 | Retrospective cohort  | B | Refractory urinary urgency and frequency, UUI\*, or NOUR\* | Stage II Combined stage I/II  | 3 years | 1. Pre-and-Post op\* antibiotics
2. Skin prep

Pre-Op antibiotics: Cefazolin alone, vancomycin alone, or vancomycin + gentamicin Post-Op antibiotics: 5-7 days oral cephalexin or if allergy no antibiotics, ciprofloxacin, levofloxacin, TMP/SMX\*Skin prep: Preoperative shower with antibacterial soap Iodine-based scrub and paint +/- additional alcohol-based preparation  | 135 | Cefazolin n=35 Vancomycin alone n=49 Vancomycin + gentamicin n=51  | **5.9%** (8/135) 17.1% (6/35) cefazolin 2.0% (1/50) vancomycin alone 1.96% (1/51) vancomycin + gentamicin OR 7.34 (1.25-54.77), p=0.01 for infection with pre-op cefazolin  |
| Lai 2013 | Prospective cohort  | B | 1. NOUR\* n=11 (29%)
2. UUI\* n=10 (26%)
3. Urgency/Frequency\* n=4 (11%)
4. IC\* n=3 (8%)
 | Stage IStage II  | 6 months | 1. Pre- and post-op\* antibiotics
2. Skin prep
3. Irrigation

Pre-Op antibiotics: 1g Vancomycin Post-Op antibiotics: Stage I: 7 days oral cephalexin or ciprofloxacin if PCN\* allergic Stage II: additional 1g IV Vancomycin 12h postop, 7 days oral cephalexin or ciprofloxacin10-minute Betadine or CHG\* skin paint Irrigation: 500 ml normal saline + 50,000 U bacitracin after lead placement | 38 | 38 19- Chlora Prep 19- Betadine  | **10.5%** (4/38) 0 stage I4 stage II   |
| Gorissen 2015 | Prospective cohort study  | C | Refractory FI\* | Combined stage I/II  | Mean follow up 13 months (3-25 months)  | 1. Pre-op\* antibiotics
2. Skin prep
3. Irrigation

Pre-op antibiotics: 1.2 g IV amoxicillin/clavulanic acid Iodine skin prepIrrigation: 80 mg gentamicin irrigation of IPG pocket  | 61 | 61 | 0% (0/61)  |
| Brueseke 2015 | Retrospective cohort  | B | NR\* | Stage IStage II  |  | 1. Skin prep
2. Pre-and-post op\* antibiotics (not specified)

Skin prep: Home 4% CHG\* wash, shower night before and morning after surgery  | 699 | 346 procedures | **4.3%** 30/699 **1.7%**( 6/346) (after CHG\* protocol)**7.4%** (24/323) before CHG\* protocol Measured in proceduresTotal patients 290 with total procedures 699  |
| Zhang 2015 | Retrospective cohort  | C | Refractory lower urinary tract dysfunction  | Stage IStage II  | NR\* | 1. Pre-and-Post op\* antibiotics
2. Skin prep
3. Irrigation

Pre-Op antibiotics: Cefoxitin 2g IV (if negative skin test), levofloxacin 0.5 g IV if skin test positive Post-op antibiotics: Additional dose IV cefoxitin or levofloxacin 12 hours post-op. Oral cefdinir 100mg TID\* for 7 days or levofloxacin 500 mg daily 7 daysIodophor skin prep (3 times)Sterile water irrigation  | 23 | 19 cefoxitin/Cefdinir4 levofloxacin  | **(0%)** 0/23 |
| Koh 2015  | Cohort study  | C | Refractory FI\*  | Combined stage I/II  | Mean follow up 35 months (2-67 months)  | 1. Irrigation
2. Pre-op\* antibiotics (not specified)

IPG\* pre-soaked in gentamicin | 52 | NR\* | **13.5%** (7/52) |
| Kavvadias 2017 | Retrospective chart review  | C | 1. OAB\* n=41 (70%)
2. NOUR\* n=15 (25%)
3. Pelvic pain n=3 (5%)
 | Stage II  | Median 14 months  | 1. Pre-op\* antibiotics

Pre-Op Cefuroxime | 59 | 59 | **8.5%** (5/59)  |
| Myer 2018 | Case control  | B | Cases1. OAB\* n=29 (76%)
2. NOUR\* n=4 (11%)
3. FI\* n=5 (13%)

Controls1. OAB\* n=56 (78%)
2. NOUR\* n=8 (11%)
3. FI\* n=8 (11%)
 | PNE \*Stage I Stage II Combined stage I/II | At least 180 days after implant  | 1. Pre-op\* antibiotics
2. Post-op\* antibiotics (not specified)
3. Skin prep
4. Irrigation
5. Technique

PNE/Stage I Preop antibiotics: Cephalosporins Aminoglycosides PCN\*Glycopeptides Other/None Stage II/combined I/II Preop antibiotics: Cephalosporins AminoglycosidesPCN\*Vancomycin Other/none PNE/Stage I Skin prep: Home CHG\* wash before surgery CHG\*Betadine-iodineOtherAntibiotic irrigation solution used (5% gentamicin, bacitracin, and other) Number of days post- op antibiotic prophylaxis (<7 or ≥ 7 days)Technique: pocket depth | 1930   | NR | **1.97%** (38/1930) IPG: 38 cases 72 matched controlsNo difference between cases (infection) and control groups in intraoperative antibiotic class, post-procedure antibiotic use and duration of use, home chlorhexidine wash before surgery, skin prep solution type, or irrigation between case and control groups in testing or implant stage. Pocket depth ≥ 3cm was significantly associated with infection requiring explant (21% of cases, 0% of controls, P=0.031)Hematoma formation: n=5 (13%) cases, 0 controls.  |
| Manjunath 2019 | Retrospective cohort  | C | Not all reported, included Neurologic etiologies for voiding dysfunction 16/75 (21%)  | Stage I Stage II Standard and abdominal placement of IPG  | 35 months | 1. Pre-and-post op\* antibiotics

Pre-op antibiotics: Vancomycin and gentamicinPost-op antibiotics: Dicloxacillin or Bactrim (if PCN\* allergic) oral 7 days  | 75 | NR\* | **4.0%** (3/75) 1.7% (1/60) standard placement 13.3% (2/15) abdominal placement |
| Yiannakou 2019 | Randomized controlled trial  | A | Refractory idiopathic chronic constipation  | Stage I Stage II  | 6 weeks for stage I and 6 months after IPG\*  | 1. Pre-op\* antibiotics
2. Irrigation

Pre-op antibiotics: Originally 80 mg IV gentamycin. Changed to either flucloxacillin 1g and gentamycin 120 mg IV or teicoplanin 400 mg and gentamycin IV depending on MRSA\* status due to infection rate. Irrigation solution: all implantable materials soaked in gentamycin solution  | 45 | NR\* | **22.2%** (10/45) 6/45 (13%) stage I lead infection3/27 (11%) IPG\* infection |
| Agnello 2022  | Retrospective cohort | B | 1. NOUR\* n=107(46%)
2. Urinary incontinence due to DO n=65(28%)
3. Dysfunctional voiding n=29(13%)
4. Pelvic pain n=17 (7%)
5. FI\* n=14 (6%)
 | Stage I  | Minimum 8 weeks  | 1. Pre- and post-op\* antibiotics
2. Skin prep
3. Technique

Pre-op antibiotics: 2g IV cephazolin or 500 mg IV levofloxacin (if PCN allergic) Post-op antibiotics: IV cephazolin 1g per day 2 days and oral cefixime 400 mg daily 5 days OR IV levofloxacin 500 mg per day 2 days and oral levofloxacin 500 mg daily after discharge Skin prep: double surgical scrub with povidone-iodine (Iodoten 7.5%) or CHG\* if Iodine allergyTechnique: <4 cm skin incision gluteal pocket, exit wire “medicated” with sterile gauze before connecting temporary stimulator  | 232 | 232 | **2.6%** (6/232)1.3% (3/232) pre-op levofloxacin 500 mg IV, post-op levofloxacin 500 mg IV per day 2 days, 500 mg oral per day 5 days 1.3% (3/232) pre-op cefazolin 2g IV post-op cefazolin 1g IV per day 2 days, oral cefixime 400 mg oral per day 5 days  |
| Trump 2022 | Retrospective cohort  | B | 1. FI\* n=2 (1%)
2. NOUR\* n= 27 (16%)
3. Urgency/frequency\* n=141 (83%)
 | Combined Stage I/II  | Minimum 3 months from implantation | 1. Pre-op\* antibiotics
2. Antimicrobial Pouch
3. Skin prep
4. Irrigation
5. Technique

Pre-op antibiotics: 2g cefazolin (3g if >120kg), clindamycin if CI\* cefazolin Pouch: TYRX antibiotic pouch utilizing minocycline and rifampin Skin prep: CHG\*Normal saline irrigation IPG\* pocket prior to battery placement Technique: skin incised sharply, IPG\* pocket closed 2 layers, skin glue over sites, occlusive dressing 48 hours.  | 170 | 85 pouch 85 no pouch  | **2.9%** (5/170)**0%** antimicrobial pouch (0/85) **5.9%** no antimicrobial pouch (5/85)  |
| Goudelocke 2023 | Cohort study (retrospective and prospective)  | B | Pre-Protocol: 1. Urgency/frequency\* n=66 (76%)
2. NOUR\* n=21 (24%)

Protocol 1. Urgency/frequency\* n=322 (73%)
2. NOUR n=121 (27%)
3. FI\* n=1 (0.2%)
 | Stage II Combined Stage I/II Replacement/Revision  | Mean follow up 58.1 months (both groups)  | Pre-Protocol/Protocol: 1. Pre-op\* antibiotics
2. Skin prep

**Protocol:** Pre-op antibiotics: Bilateral nasal cultures, if positive MRSA or MSSA treated with 5 days intranasal mupirocin BID Pre-op vancomycin if MRSA\* positive Nare cultures MSSA\* positive or negative cultures treated with preop cefazolin (unless allergic) Skin prep: 2% CHG\* wipes night before/morning of surgery2-agent prep 4% CHG scrub followed by alcohol/iodine polyacrylex paint for pre-op scrub**Pre-Protocol:** Pre-op antibiotics: Cefazolin 2% CHG\* in 70% isopropyl skin prep  | 531 | 87 Pre-protocol444 Protocol  | **1.5%** (8/531)Pre-Protocol: **4.6%** (4/87)Protocol: **0.90%** (4/444) Risk ratio of infection 0.19 for pre/post protocol (p=0.01) Odds-ratio 5.1  |

\*SNM= Sacro neuromodulation, Op= operative, PCN= penicillin, IPG= implantable pulse generator, NOUR= non-obstructive urinary retention, FI= fecal incontinence, UUI= urge urinary incontinence, IC= interstitial cystitis, MRSA+ methicillin-resistant Staphylococcus aureus, MSSA= methicillin- sensitive Staphylococcus aureus, SNS= sacral nerve stimulation , urgency/frequency= refractory urinary urgency with frequency, OAB= overactive bladder including urinary urgency, frequency and urge incontinence, NR= not reported , PNE= percutaneous nerve evaluation, CHG= chlorhexadine gluconate, TMP/SMX= trimethoprim-sulfamethoxazole, TID= three times daily