

ICEOS 2017

Building the Case for Optimal Prophylaxis for Growth-Friendly Surgery for Non-idiopathic Scoliosis: Use of Vancomycin and Aminoglycosides

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Disclosures

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BPG for Optimal Prophylaxis of SSI in “High Risk” Patients

- JPO 2013
- Consensus re need for gram negative prophylaxis
- Did not specifically focus on EOS

1. Patients should have a chlorhexidine skin wash at home the night before surgery.*
2. Patients should have preoperative urine cultures obtained and treated if positive.*
3. Patients should receive a preoperative Patient Education Sheet.*
4. Patients should have a preoperative nutritional assessment.*
5. If removing hair, clipping is preferred to shaving.†
6. Patients should receive perioperative intravenous cefazolin.*
7. Patients should receive perioperative intravenous prophylaxis for gram-negative bacilli.*
8. Adherence to perioperative antimicrobial regimens should be monitored (ie, agent, timing, dosing, redosing, cessation).*
9. Operating room access should be limited during scoliosis surgery whenever practical.*
10. Ultraviolet lights need not be used in the operating room.*
11. Patients should have intraoperative wound irrigation.*
12. Vancomycin powder should be used in the bone graft and/or the surgical site.†
13. Impervious dressings are preferred postoperatively.†
14. Postoperative dressing changes should be minimized before discharge to the extent possible.†

Consensus for SSI prevention guidelines in EOS patients

- Glotzbecker et al. (SRS, 2015) developed guidelines with the EOS population.
- Use of Vanc Powder but no consensus on GNR prophylaxis

1. All patients should receive perioperative intravenous cefazolin prior to an insertion or lengthening procedure.
2. Vancomycin powder should be used in the bone graft/and or surgical site for insertion procedures.
3. Patients should receive a preoperative Patient Education Sheet.
4. Patient should have a pulmonary workup evaluation if there is a history of respiratory problems.
5. Prep should be wide enough to place a chest tube within the surgical field
6. Adherence to perioperative antimicrobial regimens should be monitored
7. Soft tissue handling and incision planning is important in preventing postoperative infections for insertion and lengthening procedures
8. Patients should have intraoperative wound irrigation
9. If removing hair prior to an insertion procedure, clipping is preferred to shaving
10. When compared to other skin preparations, chlorhexidine is preferred
11. Operating room access should be limited during scoliosis surgery when practical
11. All previous scars/incisions should be prepped in the surgical field

Gram Negative Rod (GNR) are common cause of SSI in EOS

- Garg et al found in all patients undergoing Vertical Expandable Prosthetic Titanium Rib (VEPTR) surgery from 2007 – 2013, **GNR comprised 20% of all deep SSI.**
- Sponseller et al. found **52% of deep SSI in neuromuscular patients** undergoing surgery from 1986 – 1996 were **Gram Negative Rods (GNR)**

Moving Target?

- Changes in multiple strategies simultaneously (CHG, in wound vancomycin, betadine etc)
- Shift from multiple procedures to MAGEC
- **Has microbiology changed and what should be the ideal prophylaxis in 2017?**

Study Rationale and Purpose

Utilize CSSG to:

Identify microbiology and susceptibilities of SSIs following growth-friendly surgery

Explore prophylaxis regimens used throughout CSSG and examine changes over time

Methods

Design and Setting

- Retrospective cohort study
- Multi Center National Registry – 11 participating sites
 - Children’s Spine Study Group Registry (CSSG)
 - Growth friendly instrumentation (excludes magnetically controlled growing rods, MAGEC) performed between 09/2001 – 01/2016

Methods

Inclusion Criteria

1. Non-Idiopathic Scoliosis
2. <18 years of age
3. Growth friendly instrumentation

Endpoints

1. Pathogens from SSI cultures (CDC: SSI occurring \leq 90 days)
2. Susceptibility profiles of pathogens
3. Perioperative prophylaxis regimen

593 EOS patients; 75 SSI

- 75 (12.6%) patients had 99 total SSIs reported

Patient Characteristics	N = 593
Mean age at implant (years)	5.9 (0.5 – 17.9)
<u>Gender</u>	
Male	273 (46%)
Female	320 (54%)
<u>EOS Etiology</u>	
Congenital	267 (45%)
Neuromuscular	231 (39%)
Syndromic	95 (16%)

Gram-positive Cocci cultured in 90.1% of SSI cultures

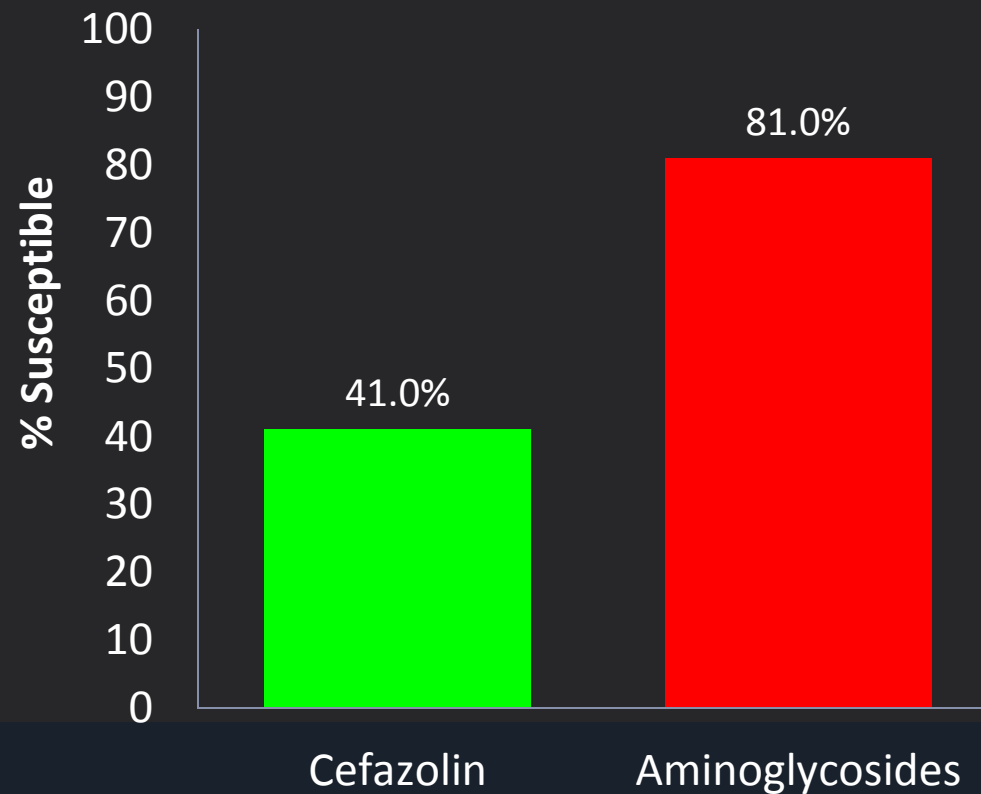
Relatively high rate of MRSA

Type of Pathogen	Number of cultures (%)
Gram-positive Cocci	82/91 (90.1%)
Methicillin-susceptible Staphylococcus aureus	44/91 (48.3%)
Methicillin-resistant Staphylococcus aureus	21/91 (23.1%)
Coagulase negative staphylococci*	5/91 (5.5%)
Unspecified S. aureus	6/91 (6.6%)
Group A streptococcus*	4/91 (4.4%)
Enterococcus faecalis	2/91 (2.2%)

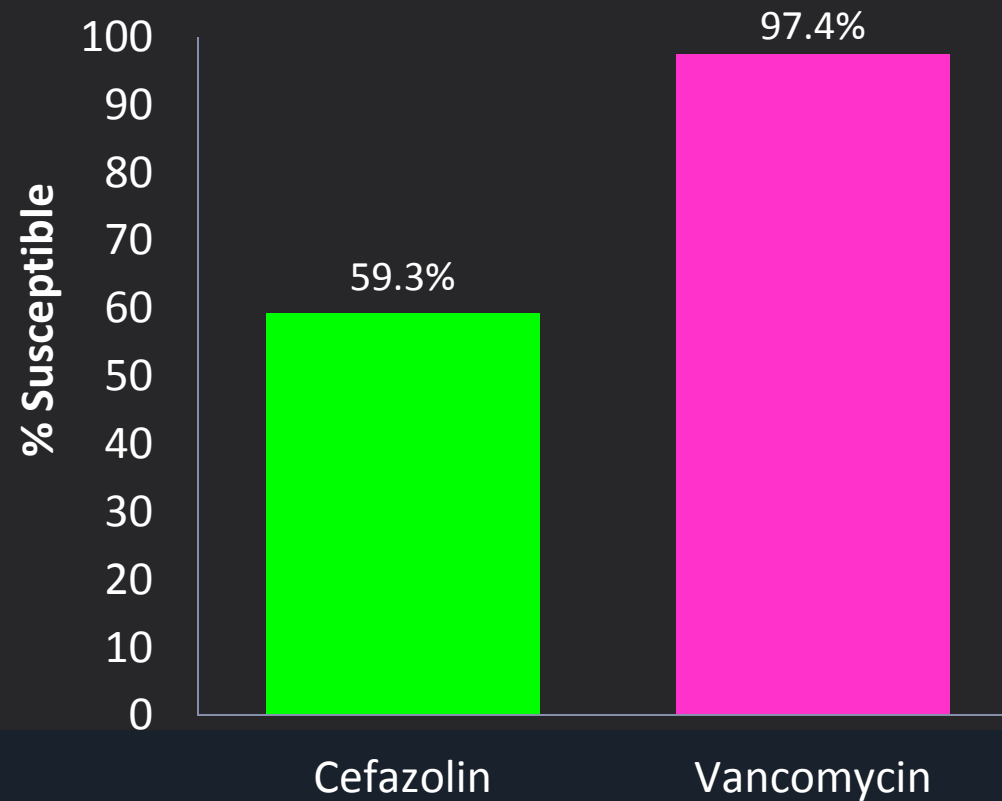
Gram negative rods comprise 16.5% of all SSI cultures

Type of Pathogen	Number of cultures(%)
Gram-negative Rods	15/91 (16.5%)
Escherichia coli	5/91 (5.5%)
Enterobacter cloacae	4/91 (4.4%)
Pseudomonas aeruginosa*	3/91 (3.3%)
Klebsiella pneumonia or K. oxytoca*	2/91 (2.2%)
Acinetobacter baumannii	1/91 (1.1%)

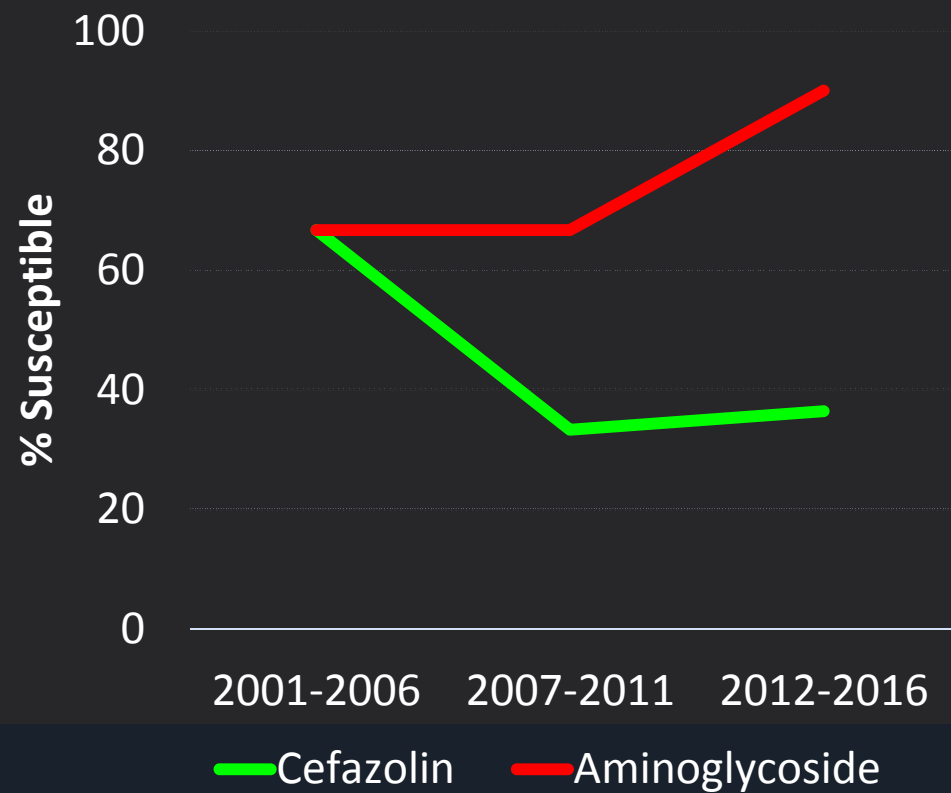
GNR have good but not universal susceptibility to aminoglycosides



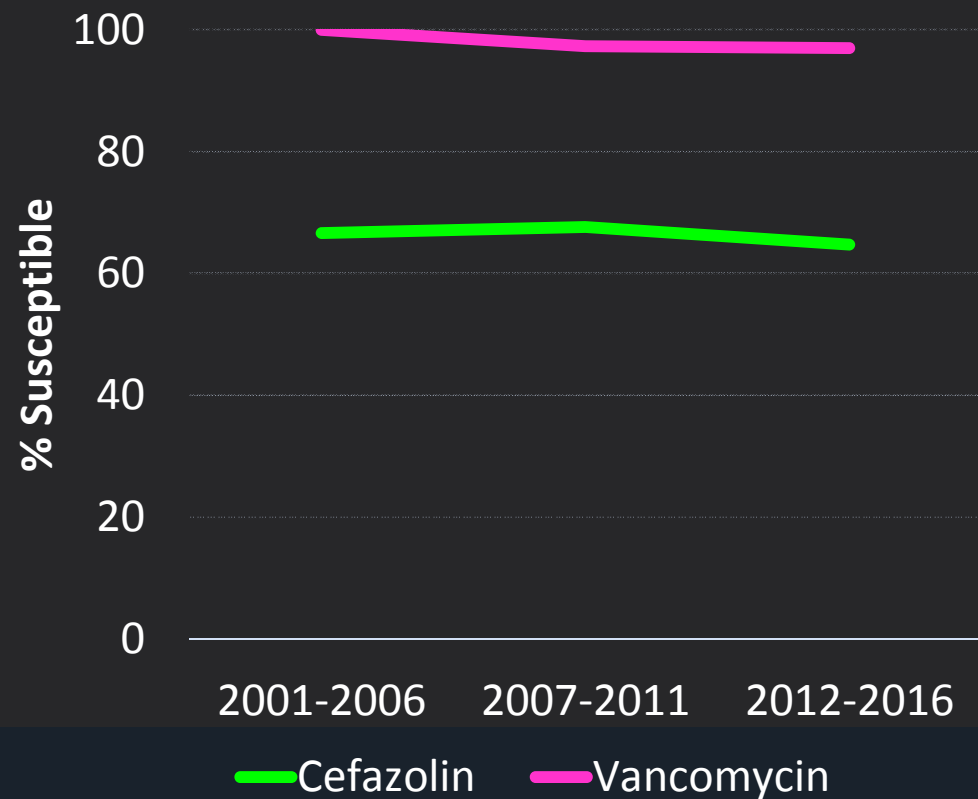
GPC have limited susceptibility to Cefazolin but highly susceptible to Vancomycin



GNR susceptibility to aminoglycosides increased over time- **no evidence of resistance !**



No change in GPC susceptibility to cefazolin and vancomycin over time



Current Prophylaxis Practice and Guidelines

- 100% of 11 institutions used cefazolin and *intravenous or topical vancomycin*
- 78% used aminoglycosides for Gram negative coverage

Conclusion

- 16.5% GNR in deep SSI cultures lower than 52% (Sponseller et al.) and 20% (Garg et al.)
- Aminoglycosides prophylaxis should be considered for GNR
- Vancomycin prophylaxis (IV or local) should continue to be used for GPC

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