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Timing of Preoperative Surgical Antibiotic Prophylaxis Prior to One-to-Three Level Elective Lumbar Fusion

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Timing of Preoperative Surgical Antibiotics Prior to One-to-Three Level Lumbar Fusions

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 - Dept. of Orthopedic Surgery at Rothman Orthopedic Institute

Introduction & Objectives

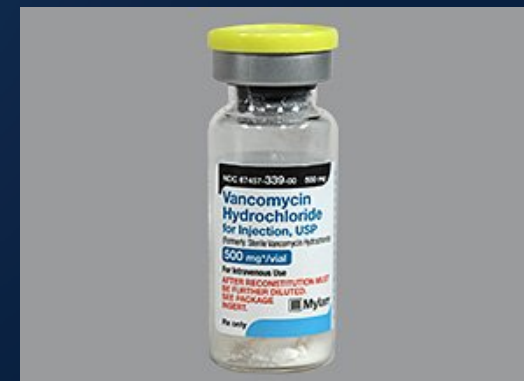
- Reducing Surgical Site Infections (SSIs) in Lumbar Fusion patients
- Preoperative
 - Medical clearances for significant comorbidities¹
 - Cardiac stress, HbA1c, albumin
 - Nasal swabs for MRSA
 - Stopping anticoagulation
- Intraoperative
 - Thoroughly supervising the OR
- Antibiotic Prophylaxis before lumbar fusions
 - Cefazolin² – Pre vs. Post Op
 - Vancomycin/Gentamycin³ for MRSA
 - Greater than 120 min before incision and after incision → higher SSIs⁴
- Cefuroxime given 59-30 mins before → lower SSIs⁵

Objectives & Hypothesis

- Research Question
 - What is the optimal timing of antibiotic prophylaxis in One-to-Three Level Lumbar Fusion Patients?
- Hypothesis
 - SSIs are greater in patients who receive antibiotic prophylaxis greater than 60 minutes prior to surgical incision compared with patients who receive antibiotic prophylaxis within 60 minutes.



- Retrospective Cohort
- Patients status post elective, 1-to-3 level lumbar fusion at Rothman Orthopedics between January 2013- December 2018
- Primary analysis: Timing of antibiotic before incision
 - Group A: 0-15 min Group C: 31-45 min Group E: 61+
 - Group B: 16-30 min Group D: 46-60 min
- Secondary analysis: Type of antibiotic
 - Cefazolin
 - Vancomycin
- Primary Outcome: SSI
- Secondary Outcomes
 - 90 day readmissions
 - Revision surgeries



- 27 SSI out of 1,131 patients (2.4%)
- Group E compared to Group A
 - 11x more likely to get SSI
 - ($p < 0.001$)
 - 7.2x more likely to get readmitted within 90 days
- Groups B-D: no significantly higher odds of SSI vs. Group A

Group Letter	Timing of Antibiotic Admin.	SSIs (Rates)
Group A N=571	0-15 min	11 (1.9%)
Group B N=294	16-30 min	5 (1.7%)
Group C N=124	31-45 min	2 (1.6%)
Group D N=69	46-60 min	1 (1.4%)
Group E N=73	61+ min	8 (11.0%)

- By antibiotic type
 - Group E still highest rates of SSI ($p < 0.001$)

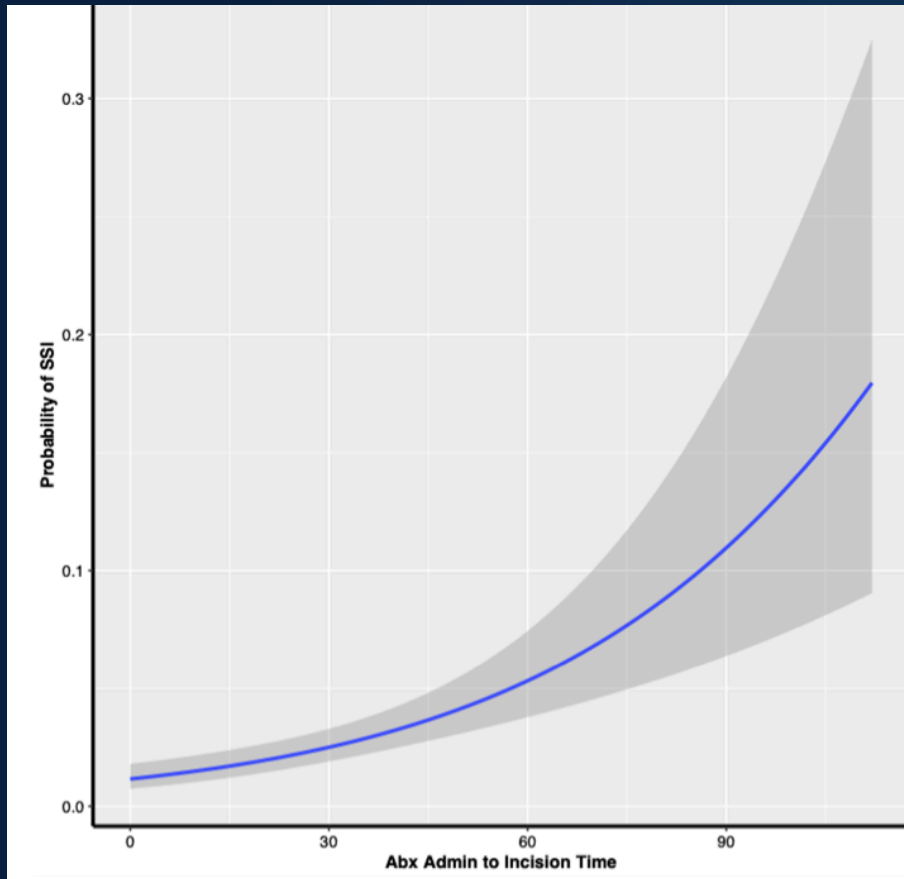
Vancomycin

Group Letter	Timing of Antibiotic	SSIs (Rates)
Group A N=23	0-15 min	0 (0%)
Group B N=17	16-30 min	0 (0%)
Group C N=30	31-45 min	1 (3.3%)
Group D N=58	46-60 min	0 (0%)
Group E N=71	61+ min	6 (8.5%)

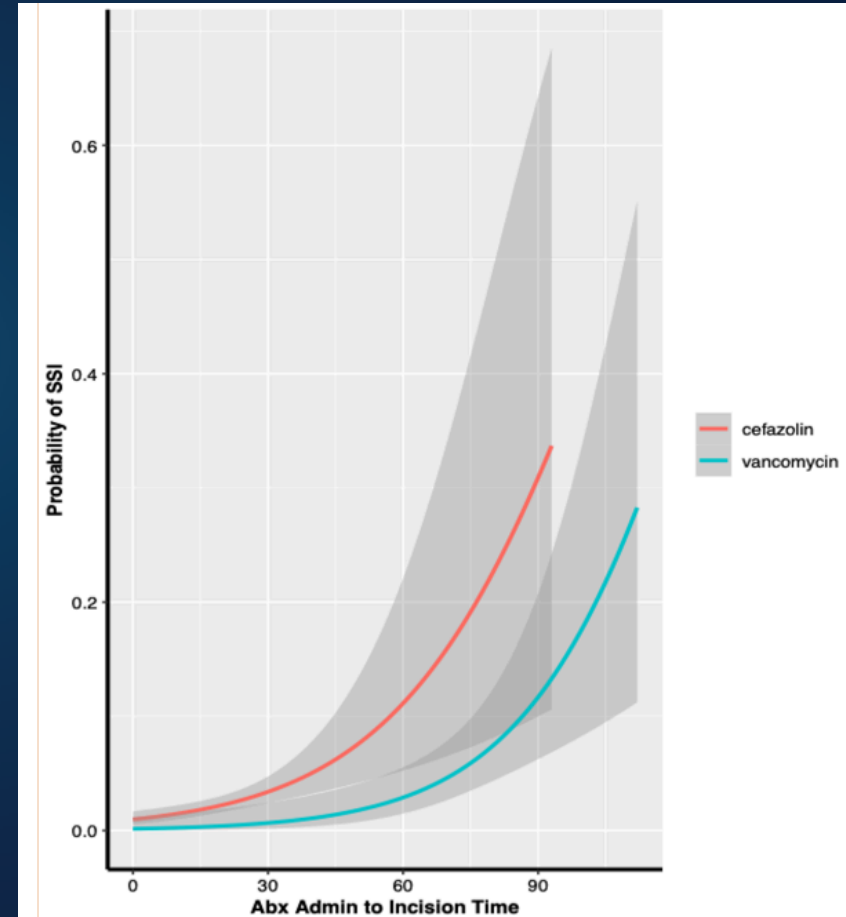
Cefazolin

Group Letter	Timing of Antibiotic	SSIs (Rates)
Group A N=548	0-15 min	11 (2.0%)
Group B N=277	16-30 min	5 (1.8%)
Group C N=94	31-45 min	1 (1.1%)
Group D N=11	46-60 min	1 (9.0%)
Group E N=2	61+ min	2 (100%)

Probability of SSI by Timing



Stratified by Antibiotic



Conclusions

- Preoperative antibiotic administration beyond an hour → 11x increased likelihood of SSI
 - One-to-Three Level Lumbar Fusion patients
- Other surgeries:
 - Cervical & Lumbar⁶: 3x increased likelihood if given >1 hour
 - Hip & Knee, Colorectal, Vascular, Gyn⁷: Higher rates of SSI if given > 1 hour
 - Cefuroxime use⁸: 30-59 mins has lower SSI than 0-30 mins
- Further research needed to better identify optimal timing between 0-60 minutes before incision



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