Antibiotic Prophylaxis in Elective Foot and Ankle Surgery: Does time of Tourniquet Inflation in Relation to the Administration of Intravenous Antibiotics Matter?

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INTRODUCTION

- Surgical site infection (SSI) is one of the most common healthcare-associated infections in the acute care setting [1]. Incidence of SSI varies by patient related factors, such as co-morbidities and surgery-related factors including type and duration of surgery [1,2].
- Guidelines for preventing SSI were published by the World Health Organization (WHO) in 2016, by the Centers for Disease Control and Prevention (CDC) in 2017 [1,4] and by Joint Commission National Quality Core Measures in 2010. Although these guidelines recommend preoperative surgical microbial prophylaxis (SAP) within one hour of surgical incision, the optimal timing of SAP during this period (e.g., 0-30min vs 30-60 min before incision) remains unclear.
- Currently there is a lack of study to evaluate the relationship between prophylactic antibiotic timing in lower extremity elective surgery and subsequent SSI with tourniquet timing as a continuous variable.

RESEARCH AIMS

- Lower extremity surgery commonly utilizes ankle and thigh tourniquets [surgical start time/incision = tourniquet inflation]. To our knowledge, no other study has evaluated the incidence of post-operative lower extremity infection and the relationship of prophylactic IV antibiotic and lower extremity tourniquet inflation time. This study investigates this potential time sensitive relationship.

METHODS

- Retrospective cohort study of 401 healthy patients receiving prophylactic antibiotic during elective Foot and Ankle surgery from 2016 through 2019. Prophylactic IV Cefazolin (Ancef) administration timing with respect to tourniquet inflation, and patient and procedure risk variables were assessed.
- Multiple linear regression statistical analysis models were used to examine the association between tourniquet inflation and antibiotic administration and SSI within 30 days post-procedure.
- Collected data and patient demographic information from the electronic medical records.
- Data analyzed using descriptive statistical methods in STATA software.

Methods

Table 1. Criteria (n=401)

Exclusion criteria	Inclusion Criteria
Diabetes Renal disease	Elective surgery
Current infection	Age range 15 - 64
ASA > 2	Healthy Patients ASA 2 or less
BMI > 30	
RA	
Trauma / Open fracture	
Smoking	

Results

Table 2. Baseline demographics (n=401)

Antibiotic administration prior to tourniquet inflation / incision (Minutes)	Antibiotic (IV)	Incidnece of SSI (%)	N
< 15	Ancef	3.9	94
<25	Ancef	4.0	180
<35	Ancef	3.98	127

Total tourniquet time	N	Incidence of SSI (%)	P- Value
<0- 60 minutes	198	4.0	<0.001
60-120 minutes	203	8.0	<0.001

- Of the 401 patients that meet the inclusion criteria, operative prophylactic antibiotics were administered at a median of 24 minutes (range, 14-38 minutes) prior to surgical incision [tourniquet inflation], 16 cases (4.0%) developed an SSI (P<0.001). SSI diagnosed per IDSA guidelines with confirmatory culture.

RESULTS

- When adjusted for confounding factors, no significant association was found between SSI and the timing of prophylactic antibiotic administration prior to tourniquet inflation (P=0.8). However, higher SSI rates were observed for procedures with total tourniquet inflation time longer than 60 minutes (4.0% vs 7.9%; P<0.001).

CONCLUSIONS

- In theory, administration of IV antibiotics close to tourniquet inflation may prevent the IV antibiotics diffusion into the surgical site and increase SSI. This was not supported by our study.
- Previous study by Akinyoola et al [5] examined the effects of antibiotic administration before and after tourniquet inflation . Interestingly, their results found more post-operative infections in patients who had antibiotics administered prior to inflation. However, the methodology of this study was questioned and had an insufficient sample size.
- The SSI risk varies by patient, comorbidities, total tourniquet time but is not significantly associated with the timing of prophylactic antibiotic administration prior to tourniquet inflation. (e.g., no difference in SSI was noted when antibiotics was given 14 minutes prior to tourniquet inflation, 20 minutes, 30 minutes or 38 minutes.
- The only increase in SSI was attribute to total tourniquet inflation time of longer than 60 minutes which corroborate previous studies on SSI [6].
- Disclosure: None.

References

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