



Antibiotic Prophylaxis Compliance and Surgical Site Infections in Colorectal and Hysterectomy Procedures

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2019 SHC Guidelines



SHC Antimicrobial Prophylaxis in Surgery Recommendations

Table 1. Antibiotic Recommendations for Surgical Prophylaxis

Surgical Procedure Type	Preferred Antibiotic(s) ¹	Type 1 PCN Allergy ¹⁻²	Type 1 Cephalosporin Allergy ¹⁻²
Cardiac, vascular, thoracic	Cefazolin ³	Cefuroxime	Vancomycin
Cardiac, LVAD	Cefuroxime + Vancomycin	Cefuroxime + Vancomycin	Aztreonam + Vancomycin
GI, gastroduodenal, biliary tract, non-obstructed small bowel	Cefazolin (prophylaxis) or Ceftriaxone (acute infection ⁴ or gross contamination)	Ceftriaxone	Vancomycin + Gentamicin
GI, appendectomy, colorectal⁵, obstructed small bowel	Cefazolin + Metronidazole (prophylaxis) or Ceftriaxone + Metronidazole (acute infection ⁴ or gross contamination)	Ceftriaxone + Metronidazole	Levofloxacin + Metronidazole Clindamycin + Gentamicin ± Metronidazole ⁶ (OB/GYN patients)
Gynecologic, cesarean section, hysterectomy	Cefazolin	Clindamycin + Gentamicin	Clindamycin + Gentamicin
Gynecologic, cancer procedures	Cefazolin ± Metronidazole ⁴	Clindamycin + Gentamicin ± Metronidazole ⁶	Clindamycin + Gentamicin ± Metronidazole ⁶
Head & Neck			
<ul style="list-style-type: none"> • Non-mucosal (skin/ear/sinonasal) • Through mucous membranes 	<ul style="list-style-type: none"> • Cefazolin • Cefazolin + Metronidazole 	<ul style="list-style-type: none"> • Cefuroxime • Cefuroxime + Metronidazole 	<ul style="list-style-type: none"> • Clindamycin • Clindamycin
Neurosurgery	Cefazolin (add Vanco if MRSA +)	Vancomycin	Vancomycin
Orthopedic			
Spinal			
Urologic			
e.g. Pub			
Note: For			
biopsy, T			
recommended and prophylaxis is based on culture results	Add Gentamicin	Vancomycin + Gentamicin	Vancomycin + Gentamicin
Other General Surgery			
e.g. hernia repair, plastic surgery (e.g. breast procedures without reconstruction)	Cefazolin	Vancomycin	Vancomycin
<ul style="list-style-type: none"> • With reconstruction 	<ul style="list-style-type: none"> • <u>With reconstruction:</u> Add Gentamicin 	<ul style="list-style-type: none"> • <u>With reconstruction:</u> Add Gentamicin 	<ul style="list-style-type: none"> • <u>With reconstruction:</u> Add Gentamicin

Guidelines were developed for all surgery cases; including colorectal and hysterectomy cases

Objectives



- ❑ **Primary:** To determine the overall and hospital-specific compliance rates to the antibiotic prophylaxis guidelines for colorectal (COLO) and hysterectomy (HYST) procedures developed by Sharp Healthcare's (SHC) Antibiotic Stewardship Program (ASP).
- ❑ **Secondary:** Evaluate if there is a correlation between antibiotic prophylaxis compliance and surgical site infection (SSI) rates within COLO and HYST procedures.

Study Design & Hypothesis



- ❑ 12-month retrospective study of antibiotic choices and surgical site infections for COLO and HYST procedures from **May 2019 to April 2020**.
- ❑ **Hypothesis:** Choosing the **correct prophylactic antibiotic regimen and initial doses** per SHC ASP guidelines are associated with lower surgical site infection rates.

Methods



- ❑ Data on antibiotic regimens for each procedure type was pulled from Cerner. SSI data was pulled from the National Health Safety Network (NHSN).
- ❑ SHC ASP Antibiotic Prophylaxis guidelines regimens for COLO and HYST procedures (approved September 2019) were used to determine if a patient's antibiotic prophylaxis regimen was compliant.
- ❑ If the patient had a documented penicillin (PCN) or cephalosporin (CEPH) allergy, a PCN/CEPH allergy from the SHC ASP guideline was used to determine appropriateness.

Methods



- ❑ SSIs present at time of surgery were excluded from the SSI count.
- ❑ Pivot tables were created using Microsoft Excel to organize data and calculate compliance and infection rates.
- ❑ A two-proportion test was performed to determine if there was a correlation between antibiotic prophylaxis compliance and surgical site infection rate.

Colorectal Cases: Compliance Rates



Antibiotic Compliance (COLO)	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Total
Correct Abx selection & initial dose	50% (3/6)	69% (81/118)	47% (75/158)	87% (34/39)	79% (276/349)	70% (469/670)
Incorrect Abx selection and/or initial dose	50% (3/6)	31% (37/118)	53% (83/158)	13% (5/39)	21% (73/349)	30% (201/670)

Correct antibiotic regimens & initial doses:

- Ancef 2g (3g if >120kg) + Flagyl 500mg are preferred antibiotics.
- Rocephin 2g + Flagyl 500mg are preferred alternatives and recommended for Type 1 PCN allergy patients.
- Levaquin 500-750mg + Flagyl 500mg OR Clindamycin 900mg + Gentamicin 5mg/kg or 2mg/kg (for CrCL < 30) with or without Flagyl 500mg are recommended for Type 1 PCN/CEPH allergy patients.

Hysterectomies: Compliance Rates



Antibiotic Compliance	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Total
Correct Abx selection & initial dose	100% (1/1)	84% (141/167)	95% (73/77)	95% (562/589)	94% (60/64)	93% (837/898)
Incorrect Abx selection and/or initial dose	0% (0/1)	16% (26/167)	5.2% (4/77)	4.6% (27/589)	6.3% (4/64)	6.8% (61/898)

Correct abx & initial doses:

- Ancef 2g (3g if $\geq 120\text{kg}$ OR $\text{BMI} \geq 40$) with or without Flagyl 500mg is the preferred regimen.
- Clindamycin 900mg + Gentamicin 5mg/kg or 2mg/kg (for $\text{CrCL} < 30$) with or without Flagyl 500mg are recommended for Type 1 PCN/CEPH allergy patients.
- Vancomycin 15mg/kg may be added for patients with a history of MRSA.

Colorectal Cases: SSIs



# of SSIs / # Cases	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Total
Correct Abx selection & initial dose	33% (1/3)	0% (0/81)	2.7% (2/75)	15% (5/34)	5.8% (16/276)	5.1% (24/469)
Incorrect Abx selection and/or initial dose	0% (0/3)	5.4% (2/37)	3.6% (3/83)	0% (0/5)	14% (10/73)	7.5% (15/201)

2 proportion test (Total): $p < 0.0001$

Surgical Site Infection (SSI) definitions:

- SSI data from National Healthcare Safety Network (NHSN) database provided by Clinical Analytics department.
- Does NOT include patients with positive cultures present at time of surgery (PATOS).
- Hysterectomy cases escalated to Colorectal cases **ARE** included in this table.

Hysterectomies: SSIs



# of SSIs / # Cases	Hospital 1	Hospital 2	Hospital 3	Hospital 4	Hospital 5	Total
Correct Abx selection & initial dose	0% (0/1)	2.8% (4/141)	1.4% (1/73)	1.6% (9/562)	1.7% (1/60)	1.8% (15/837)
Incorrect Abx selection and/or initial dose	NA (0/0)	0% (0/26)	0% (0/4)	0% (0/27)	0% (0/4)	0% (0/61)

Surgical Site Infection (SSI) definitions:

- SSI data from National Healthcare Safety Network (NHSN) database provided by Clinical Analytics department.
- Does NOT include patients with positive cultures present at time of surgery (PATOS).
- Hysterectomy cases escalated to Colorectal cases are **NOT** included in this table.

Discussion Points



- ❑ Opportunity to standardize hospital practices.
 - 47-87% compliance for COLO.
 - 84-100% compliance for HYST.
- ❑ EHR order set analysis.
 - 3 colorectal order set versions and 2 hysterectomy versions.
 - Review and merge the multiple versions into a standard order set has been escalated to the appropriate SHC system quality and pharmacy committees for next steps.

Discussion Points

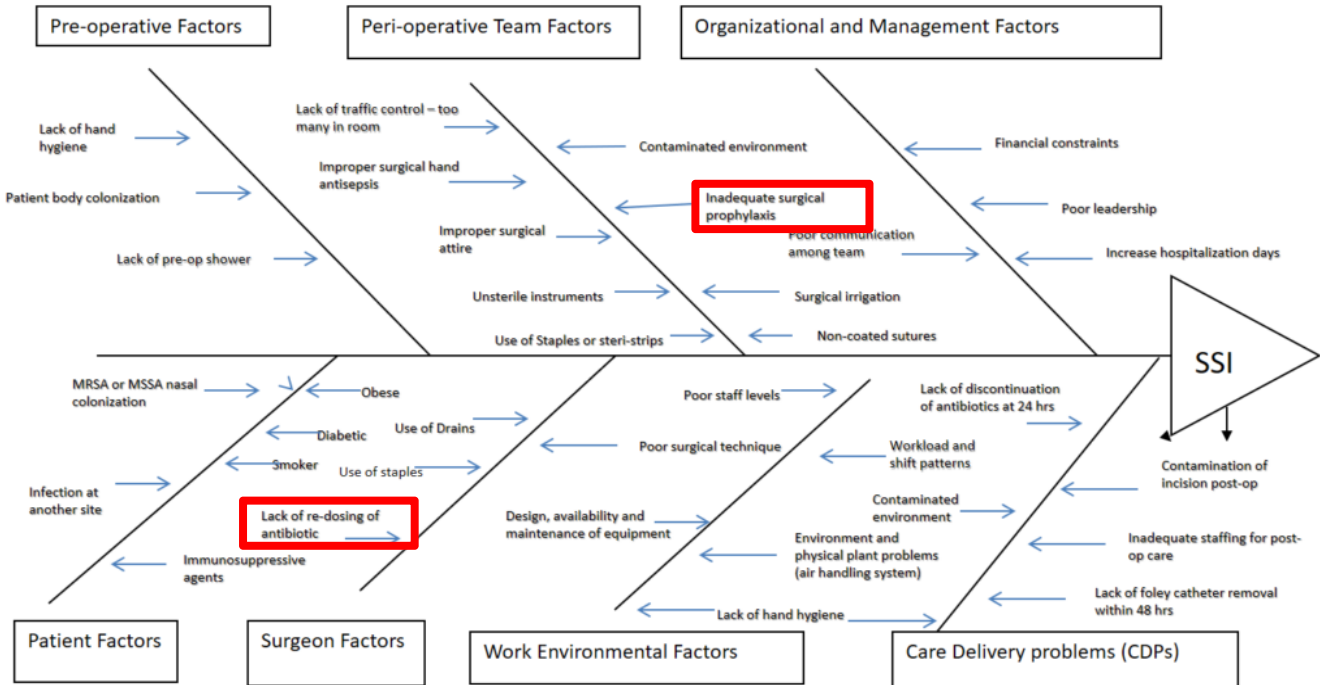


- ❑ More complex dual therapy (i.e. Ancef and Flagyl) for COLO procedures compared to the monotherapy (Ancef) recommended for HYST.
- ❑ Patient allergies may add further complications.
 - Documentation
 - Clinician's judgement

Discussion Points



Complexity of factors contributing to SSIs.



Conclusions



COLO data

- ❑ Antibiotic compliance is at 70% with opportunity for improvement.
- ❑ Statistically higher percentage of SSI/Cases.
 - 7.5% for incorrect antibiotic regimen/initial dosing versus 5.1%.

HYST data

- ❑ Antibiotic compliance is high at 93%.
- ❑ All 15 SSI cases observed in cases despite correct antibiotic selection and initial dose.

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