Safe Surgery

September 14, 2015

รร.นารายณ์

กรุงเทพมหานคร

SSI: ป้องกันได้ ถ้าตั้งใจทำ

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Outcomes associated with SSI

- 2–11 times higher risk of death among patients with SSI
- 70% of deaths in patients with SSI are directly attributable to SSI>
- 60% of SSIs estimated preventable by evidence-based guidelines

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71

เสริมหน้าอก ทรงหยดน้ำ
แก้ไขหน้าอก หน้าอกหย่อนยาน

- เสริมหน้าอก ถุงนมมาตรฐานทั่วไป พัก 1 คืน = 60,000 บ.
- เสริมหน้าอก ถุงนมมาตรฐานพิเศษ พัก 1 คืน = 80,000 บ.

กรณีขนาดมากกว่า 400 CC (มีมาตรฐานเดียว)

400 - 525 CC พัก 1 คืน = 92,000 บ.

550 - 800 CC พัก 2 คืน = 120,000 บ.

1000 CC พัก 2 คืน = 200,000 บ.

กรณีถุงน้ำเกลือ พัก 1 คืน = 82,000 บ.

กรณีทรงหยดน้ำ 410 Style พัก 2 คืน = 125,000 บ.

ก่อนทำ

หลังทำ

คุณดาวิกา โหแน่ (คุณใหม่กว่า) อายุ 35 ปี เป็นเบาหวาน, HbA_1C 7.4 gm/L, ไม่สูบบุหรี่, น้ำหนักตัว 65 กก., BMI 31 kg/m^2, ได้รับการผ่าตัด mammoplasty, ก่อนผ่าตัดแพทย์สั่ง shave หน้าอกถึงรักแร้, skin paint ด้วย betadine และให้ cefazolin 1 gm IV dripในห้องผ่าตัด 5 นาทีก่อนลงมีด การผ่าตัดเสร็จสิ้นภายใน 20 นาที หลังผ่าตัดให้ cefezolin 1 gm q 8 h อีก 2 วัน เปลี่ยนเป็น dicloxacillin ยากินและให้กลับบ้านได้

คุณดาวิกา โหแน่ (คุณใหม่กว่า) อายุ 35 ปี เป็นเบาหวาน HbA1C 7.4 gm/L, ไม่สูบบุหรี่, น้ำหนักตัว 65 กก., BMI 31 kg/m^2, ได้รับการผ่าตัด mammoplasty กลับบ้านไป 14 วัน วันนี้มาพบแพทย์เนื่องจากแผลผ่าตัดบวมแดงมีหนอง เพาะเชื้อขึ้น Methicillin-sensitive *S. aureus*

ก. ปัจจัยเสี่ยงใดบ้างที่น่าจะเกี่ยวข้องกับการติดเชื้อข้างต้น

ข. Intervention ใดบ้างที่อาจลดความเสี่ยงการติดเชื้อข้างต้น

SSI Strategy Guidelines 2014

Sponsored by

- **The Society for Healthcare Epidemiology of America (SHEA)**
- **The Infectious Diseases Society of America (IDSA)**
- **The American Hospital Association (AHA)**
- **The Association for Professionals in Infection Control and Epidemiology (APIC)**
- **The Joint Commission**

SHEA/IDSA PRACTICE RECOMMENDATION

Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update

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PURPOSE

Previously published guidelines are available that provide comprehensive recommendations for detecting and preventing healthcare-associated infections (HAIs). The intent of this document is to highlight practical recommendations in a concise format designed to assist acute care hospitals in implementing and prioritizing their surgical site infection (SSI) prevention efforts. This document updates "Strategies to Prevent Surgical Site Infections in Acute Care Hospitals,"[1] published in 2008. This expert guidance document is sponsored by the Society for Healthcare Epidemiology of America (SHEA) and is the product of a collaborative effort led by SHEA, the Infectious Diseases Society of America (IDSA), the American Hospital Association (AHA), the Association for Professionals in Infection Control and Epidemiology (APIC), and The Joint Commission, with major contributions from representatives of a number of organizations and societies with content expertise. The list of endorsing and supporting organizations is presented in the introduction to the 2014 updates.[2]

SECTION 1: RATIONALE AND STATEMENTS OF CONCERN

I. SSIs are common complications in acute care facilities
   A. SSIs occur in 2%–5% of patients undergoing inpatient surgery.[3,4]
   B. Approximately 160,000–300,000 SSIs occur each year in the United States.[5,6]
   C. SSI is now the most common and most costly HAI.[7-9]

II. Outcomes associated with SSI
   A. Up to 60% of SSIs have been estimated to be preventable by using evidence-based guidelines.[10,11]
   B. SSIs account for 20% of all HAIs in hospitalized patients.[12]
   C. Each SSI is associated with approximately 7–11 additional postoperative hospital-days.[3,9,13,14]
   D. Patients with an SSI have a 2–11-times higher risk of death compared with operative patients without an SSI.[15,16]
      1. Seventy-seven percent of deaths in patients with SSI are directly attributable to SSI.[17]
   E. Attributable costs of SSI vary depending on the type of operative procedure and the type of infecting pathogen.[14,16,18-25]
      1. SSIs are believed to account for $3.5 billion to $10 billion annually in healthcare expenditures using the CPI (consumer price index for inpatient hospital services with all cost estimates adjusted for 2007 dollars).[6]

SECTION 2: BACKGROUND—STRATEGIES TO DETECT SSI

I. Surveillance definitions
   A. The Centers for Disease Control and Prevention's (CDC's) National Healthcare Safety Network (NHSN) definitions for SSI are widely used for public reporting, interfacility comparison, and pay-for-performance comparisons.[26]
   B. SSIs are classified (Figure 1) as follows:
      1. Superficial incisional (involving only skin or subcutaneous tissue of the incision).

National Collaborating Centre for
Women's and Children's Health

Surgical site infection

prevention and treatment of surgical site infection

Clinical Guideline

October 2008

Funded to produce guidelines for the NHS by NICE

SUPPLEMENT ARTICLE: SHEA/IDSA PRACTICE RECOMMENDATION

Strategies to Prevent Surgical Site Infections in Acute Care Hospitals

Deverick J. Anderson, MD, MPH; Keith S. Kaye, MD; David Classen, MD, MS; Kathleen M. Arias, MS, CIC; Kelly Podgorny, RN, MS, CPHQ; Helen Burstin, MD; David P. Calfee, MD, MS; Susan E. Coffin, MD, MPH; Erik R. Dubberke, MD; Victoria Fraser, MD; Dale N. Gerding, MD; Frances A. Griffin, RRT, MPA; Peter Gross, MD; Michael Klompas, MD; Evelyn Lo, MD; Jonas Marschall, MD; Leonard A. Mermel, DO, ScM; Lindsay Nicolle, MD; David A. Pegues, MD; Trish M. Perl, MD; Sanjay Saint, MD; Cassandra D. Salgado, MD, MS; Robert A. Weinstein, MD; Robert Wise, MD; Deborah S. Yokoe, MD, MPH

PURPOSE

Previously published guidelines are available that provide comprehensive recommendations for detecting and preventing healthcare-associated infections. The intent of this document is to highlight practical recommendations in a concise format designed to assist acute care hospitals to implement and prioritize their surgical site infection (SSI) prevention efforts. Refer to the Society for Healthcare Epidemiology of America/Infectious Diseases Society of America "Compendium of Strategies to Prevent Healthcare-Associated Infections" Executive Summary and Introduction and accompanying editorial for additional discussion.

SECTION 1: RATIONALE AND STATEMENTS OF CONCERN

1. Burden of SSIs as complications in acute care facilities.
   a. SSIs occur in 2%-5% of patients undergoing inpatient surgery in the United States.[1]
   b. Approximately 500,000 SSIs occur each year.[1]

2. Outcomes associated with SSI
   a. Each SSI is associated with approximately 7-10 additional postoperative hospital days.[1,2]
   b. Patients with an SSI have a 2-11 times higher risk of death, compared with operative patients without an SSI.[3,4]
      i. Seventy-seven percent of deaths among patients with SSI are directly attributable to SSI.[5]
   c. Attributable costs of SSI vary, depending on the type of operative procedure and the type of infecting pathogen; published estimates range from $3,000 to $29,000.[4,6-12]
      i. SSIs are believed to account for up to $10 billion annually in healthcare expenditures.[3,4,13]

SECTION 2: STRATEGIES TO DETECT SSI

1. Definitions
   a. The Centers for Disease Control and Prevention National Nosocomial Infections Surveillance System[14] and the National Healthcare Safety Network definitions for SSI are widely used.[14,15]
   b. SSIs are classified as follows (Figure):
      i. Superficial incisional (involving only skin or subcutaneous tissue of the incision)
      ii. Deep incisional (involving fascia and/or muscular layers)
      iii. Organ/space

2. Methods for surveillance of SSI
   a. The direct method, with daily observation of the surgical site by the physician, physician extender, a trained nurse, or infection prevention and control professional

Guideline summary: Pre-op

Type	SHEA 2014	NICE 2008	SHEA 2008
Glucose control	I-II	NA	AII
Smoking	I	NA	AII
Obesity	I	NA	AII
Immunosuppressive	III	NA	CII
Periop infection Rx	II	Recommended	AII

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71
NICE clinical guideline 74 guidance.nice.org.uk/cg74
Anderson DJ, et al. Infect Control Hosp Epidemiol 2008;29(suppl 1):S51–61.

Guideline summary: Pre-op

Category	Recommendations
Glucose control	For DM , reduce hemoglobin A1c < 7% before surgery (I)
Smoking	Encourage smoking cessation within 30 days (I)
Obesity	Increase dosing of prophylactic antimicrobial agent for morbidly obese patients (I)
Pre-op ID outside surgical site	Identify and treat infections (eg, urinary tract infection) remote to the surgical site prior to elective surgery, do not routinely treat colonization or contamination (II)

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71
NICE clinical guideline 74 guidance.nice.org.uk/cg74
Anderson DJ, et al. Infect Control Hosp Epidemiol 2008;29(suppl 1):S51–61

Guideline summary: Peri-op

Category	SHEA 2014	NICE 2008	SHEA 2008
Clipping for hair removal	II	Recommended	AI
Skin preparation	I	Recommended	AII
Normothermia	I	Recommended	Unresolved
Supplemental oxygen	I	Recommended	Unresolved

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71
NICE clinical guideline 74 guidance.nice.org.uk/cg74
Anderson DJ, et al. Infect Control Hosp Epidemiol 2008;29(suppl 1):S51–61.

Guideline summary: Peri-op

Category	Recommendations
Hair removal	If necessary, remove hair outside OR using clippers or a depilatory agent (II)
Skin prep	Use alcohol-containing skin paint if not contraindicated. Unclear which combo with alcohol: alcohol + CHG > betadine, alcohol + iodine > betadine, (I)
Normothermia	Maintain normothermia (temp > 35.5°C) (I)
Oxygen supplement	Optimize tissue oxygenation with supplemental oxygen & adequate fluid during and immediately following surgery esp patient on ventilator (I)

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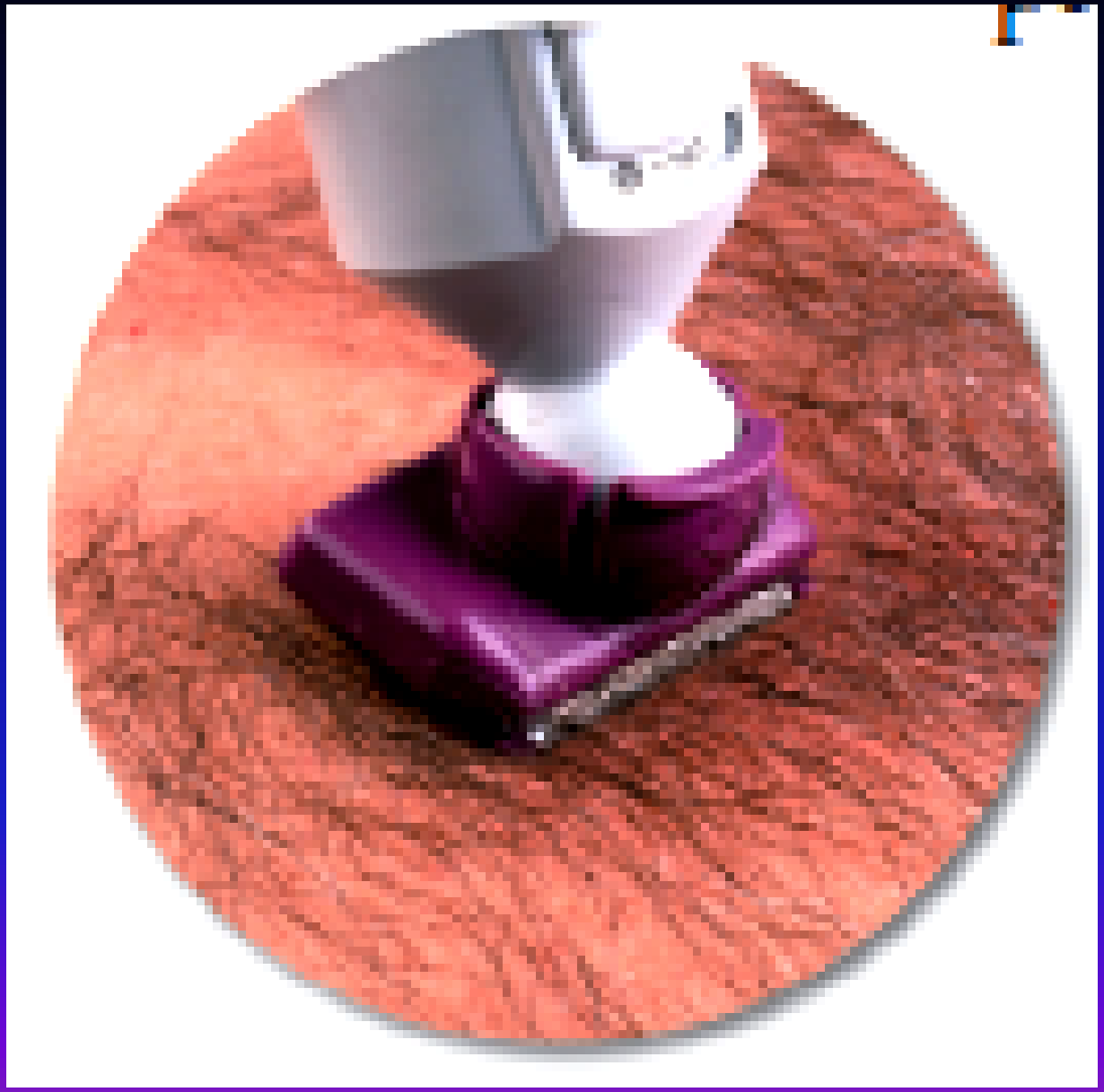
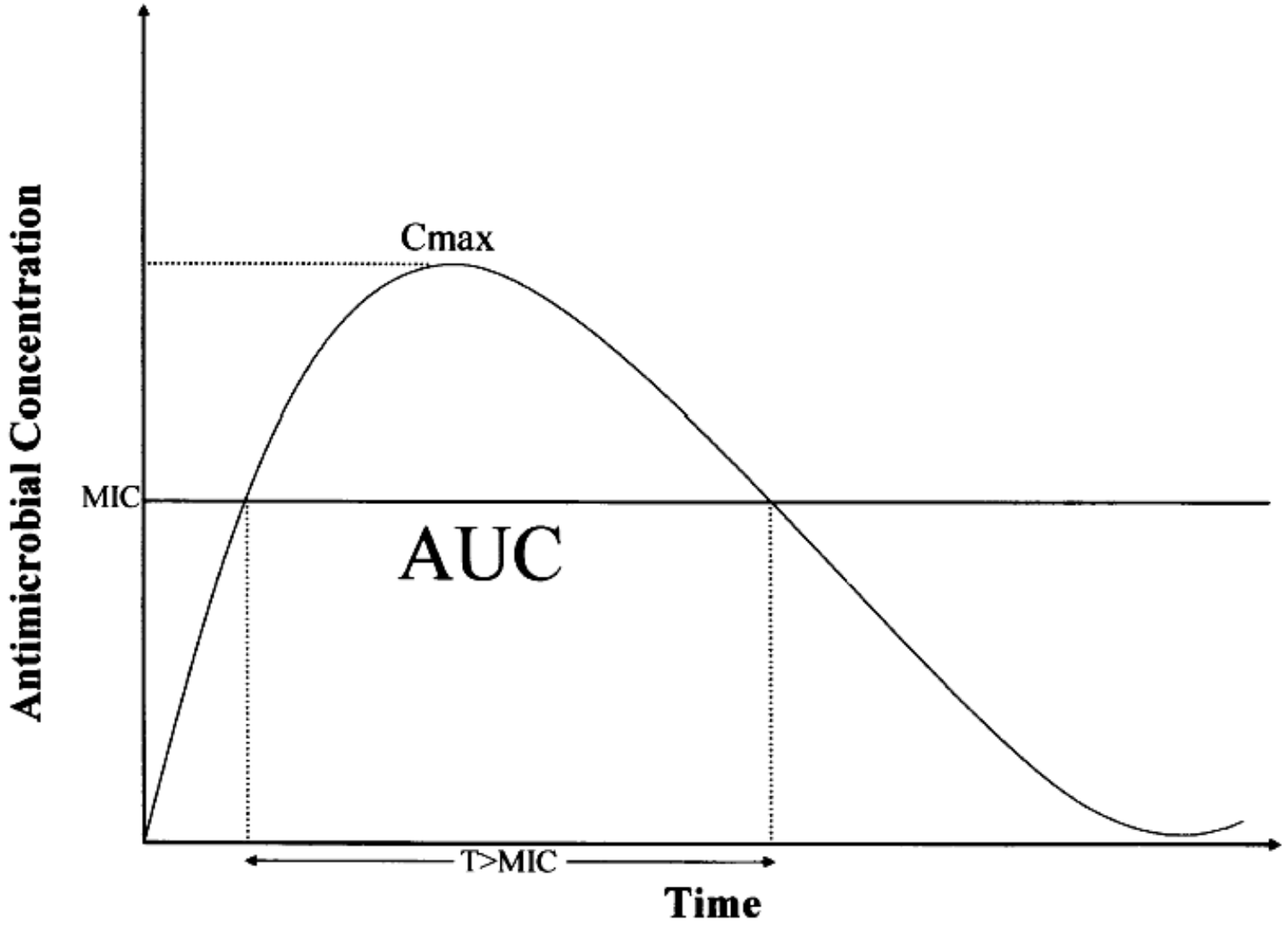
Anderson DJ, et al. Infect Control Hosp Epidemiol 2008;29(suppl 1):S51–61.



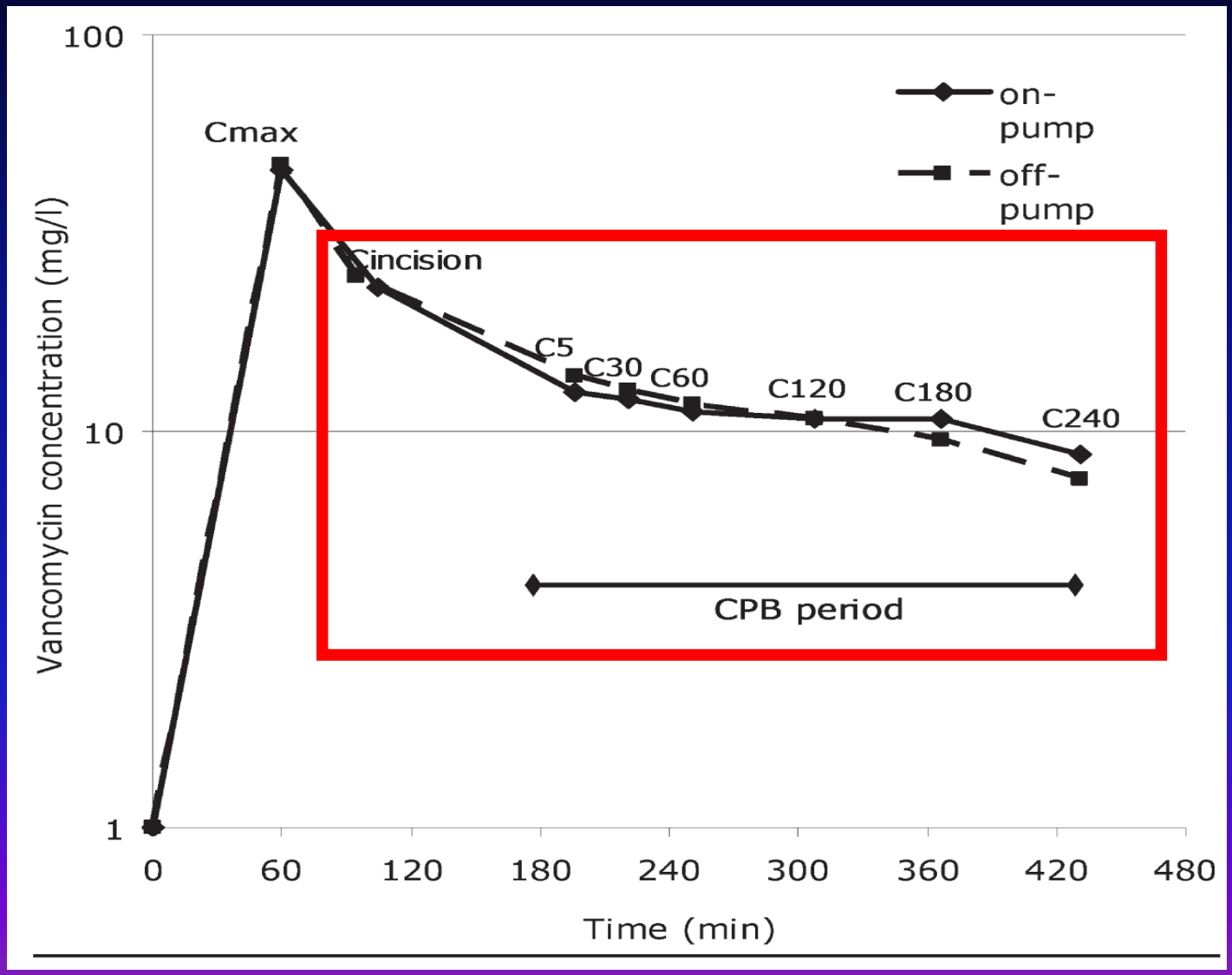
Principles of surgical prophylaxis

- Aimed to reduce burden of specific organism at risk of inoculating surgical site
- Reduced effectiveness associated with emerging antimicrobial resistance
- Surgical prophylaxis needs to be “adequate” as well as antimicrobial therapy

Considerations in Antibiotic Dosing PK/PD Markers



Vancomycin Pharmacokinetics in Cardiac Surgery With or Without Cardiopulmonary Bypass



Vancomycin concentration/ time curves, Values expressed as median, Cotogni P. Ann Pharmacother 2013;47:455-63

Guideline summary: Surgical prophylaxis

Type	SHEA 2014	NICE 2008	SHEA 2008
Timing ≤ 30-60 min	II	Recommended	AI
Antimicrobial of choices	II	Recommended	AI
Duration of prophylaxis	I	NA	AI

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NICE clinical guideline 74 guidance.nice.org.uk/cg74
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Surgical prophylaxis: Timing

Category	Recommendations
Timing	Administration within 1 hour before incision. < 1 hour is effective, some studies show superior efficacy for between 0 and 30 min prior to incision compared with between 30 and 60 min
	Two hours for the vancomycin and fluoroquinolones
	Antimicrobials infused prior to inflation of tourniquets in procedures using “bloodless” techniques: data insufficient

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71

Surgical prophylaxis: choice & duration

Category	Recommendations
Choice & duration of prophylaxis	Select appropriate agents on the basis of the surgical procedure, the most common pathogens causing SSIs for a specific procedure, and published recommendations
	Discontinue agent within 24 hours after surgery No evidence of efficacy after closure, but increased resistance & *Clostridium difficile*

Marshall J, et al. Infect Control Hosp Epid 2014:35;753-71

ASHP REPORT

Clinical practice guidelines for antimicrobial prophylaxis in surgery

Dale W. Bratzler, E. Patchen Dellinger, Keith M. Olsen, Trish M. Perl, Paul G. Auwaerter, Maureen K. Bolon, Douglas N. Fish, Lena M. Napolitano, Robert G. Sawyer, Douglas Slain, James P. Steinberg, and Robert A. Weinstein

Am J Health-Syst Pharm. 2013; 70:195-283

Guidelines developed jointly by the American Society of Health-System Pharmacists (ASHP), the Infectious Diseases Society of America (IDSA), the Surgical Infection Society (SIS), and the Society for Healthcare Epidemiology of America (SHEA)

Table 1.
Recommended Doses and Redosing Intervals for Commonly Used Antimicrobia

Antimicrobial	Recommended Dose		Recommended Redosing Interval (From Initiation of Preoperative Dose), hr[c]
	Adults[a]	Pediatrics[b]	
Ampicillin–sulbactam	3 g (ampicillin 2 g/sulbactam 1 g)	50 mg/kg of the ampicillin component	2
Ampicillin	2 g	50 mg/kg	2
Aztreonam	2 g	30 mg/kg	4
Cefazolin	2 g, 3 g for pts weighing ≥120 kg	30 mg/kg	4
Cefuroxime	1.5 g	50 mg/kg	4
Cefotaxime	1 g[d]	50 mg/kg	3
Cefoxitin	2 g	40 mg/kg	2
Cefotetan	2 g	40 mg/kg	6
Ceftriaxone	2 g[e]	50–75 mg/kg	NA
Ciprofloxacin[f]	400 mg	10 mg/kg	NA
Clindamycin	900 mg	10 mg/kg	6
Ertapenem	1 g	15 mg/kg	NA
Fluconazole	400 mg	6 mg/kg	NA
Gentamicin[g]	5 mg/kg based on dosing weight (single dose)	2.5 mg/kg based on dosing weight	NA
Levofloxacin[f]	500 mg	10 mg/kg	NA
Metronidazole	500 mg	15 mg/kg Neonates weighing <1200 g should receive a single 7.5-mg/kg dose	NA

Preventing SSI : Antimicrobial & dosing

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Type of Procedure	Recommended Agents[a,b]	Alternative Agents In Pts With β-Lactam Allergy	Strength of Evidence[c]
Cardiac			
Coronary artery bypass	Cefazolin, cefuroxime	Clindamycin,[d] vancomycin[d]	A
Cardiac device insertion procedures (e.g., pacemaker implantation)	Cefazolin, cefuroxime	Clindamycin, vancomycin	A
Ventricular assist devices	Cefazolin, cefuroxime	Clindamycin, vancomycin	C
Thoracic			
Noncardiac procedures, including lobectomy, pneumonectomy, lung resection, and thoracotomy	Cefazolin, ampicillin–sulbactam	Clindamycin,[d] vancomycin[d]	A
Video-assisted thoracoscopic surgery	Cefazolin, ampicillin–sulbactam	Clindamycin,[d] vancomycin[d]	C
Gastroduodenal[e]			
Procedures involving entry into lumen of gastrointestinal tract (bariatric, pancreaticoduodenectomy[f])	Cefazolin	Clindamycin or vancomycin + aminoglycoside[g] or aztreonam or fluoroquinolone[h-j]	A
Procedures without entry into gastrointestinal tract (antireflux, highly selective vagotomy) for high-risk patients	Cefazolin	Clindamycin or vancomycin + aminoglycoside[g] or aztreonam or fluoroquinolone[h-j]	A

Preventing SSI : Antimicrobial choice & procedure

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Type of Procedure	Recommended Agents[a,b]	Alternative Agents In Pts With β-Lactam Allergy
Plastic surgery		
Clean with risk factors or clean-contaminated	Cefazolin, ampicillin–sulbactam	Clindamycin,[d] vancomycin[d]
Head and neck		
Clean	None	None
Clean with placement of prosthesis (excludes tympanostomy tubes)	Cefazolin, cefuroxime	Clindamycin[d]
Clean-contaminated cancer surgery	Cefazolin + metronidazole, cefuroxime + metronidazole, ampicillin–sulbactam	Clindamycin[d]
Other clean-contaminated procedures with the exception of tonsillectomy and functional endoscopic sinus procedures	Cefazolin + metronidazole, cefuroxime + metronidazole, ampicillin–sulbactam	Clindamycin[d]

Preventing SSI : Antimicrobial choice & procedure

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Biliary tract	
Open procedure	Cefazolin, cefoxitin, cefotetan, ceftriaxone,[k] ampicillin–sulbactam[h]
Laparoscopic procedure	
Elective, low-risk[l]	None
Elective, high-risk[l]	Cefazolin, cefoxitin, cefotetan, ceftriaxone,[k] ampicillin–sulbactam[h]
Appendectomy for uncomplicated appendicitis	Cefoxitin, cefotetan, cefazolin + metronidazole
Small intestine	
Nonobstructed	Cefazolin
Obstructed	Cefazolin + metronidazole, cefoxitin, cefotetan
Hernia repair (hernioplasty and herniorrhaphy)	Cefazolin
Colorectal[m]	Cefazolin + metronidazole, cefoxitin, cefotetan, ampicillin–sulbactam,[h] ceftriaxone + metronidazole,[n] ertapenem

Preventing SSI : Antimicrobial choice & procedure

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Neurosurgery	
Elective craniotomy and cerebrospinal fluid-shunting procedures	Cefazolin
Implantation of intrathecal pumps	Cefazolin
Cesarean delivery	Cefazolin
Hysterectomy (vaginal or abdominal)	Cefazolin, cefotetan, cefoxitin, ampicillin–sulbactam[h]
Orthopedic	
Clean operations involving hand, knee, or foot and not involving implantation of foreign materials	None
Spinal procedures with and without instrumentation	Cefazolin
Hip fracture repair	Cefazolin
Implantation of internal fixation devices (e.g., nails, screws, plates, wires)	Cefazolin
Total joint replacement	Cefazolin

Preventing SSI : Antimicrobial choice & procedure

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Urologic	
Lower tract instrumentation with risk factors for infection (includes transrectal prostate biopsy)	Fluoroquinolone,[hij] trimethoprim–sulfamethoxazole, cefazolin
Clean without entry into urinary tract	Cefazolin (the addition of a single dose of an aminoglycoside may be recommended for placement of prosthetic material [e.g., penile prosthesis])
Involving implanted prosthesis	Cefazolin ± aminoglycoside, cefazolin ± aztreonam, ampicillin–sulbactam
Clean with entry into urinary tract	Cefazolin (the addition of a single dose of an aminoglycoside may be recommended for placement of prosthetic material [e.g., penile prosthesis])
Clean-contaminated	Cefazolin + metronidazole, cefoxitin

Preventing SSI : Antimicrobial choice & procedure

Bratzler D, et al. Am J Health-Syst Pharm. 2013; 70:195-283

Guideline summary: Post-op

Category	Recommendations
Glucose control	For DM , The recommendation of maintaining postoperative blood glucose less than 200 mg/dL at 6 am on postoperative days 1 and 2 is being replaced
	Blood glucose during post-op for cardiac surgery (I) and noncardiac surgery (II) (180 mg/dL or lower) in the time frame of 18–24 hours after anesthesia end time

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Guideline summary: OR characters

Type	SHEA 2014	NICE 2008	SHEA 2008
Ventilation	III	NA	CI
Traffic	III	NA	BII
Environment cleaning	III	NA	BIII
Sterilization of devices	II	NA	BI

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NICE clinical guideline 74 guidance.nice.org.uk/cg74
Anderson DJ, et al. Infect Control Hosp Epidemiol 2008;29(suppl 1):S51–61.

Preoperative SSI intervention

- คุมน้ำตาล
- หยุดบุหรี่
- หนักไม่มา

Perioperative SSI intervention

- ยาพอดี
- มีน้ำยา
- มาพร้อมคลิบ (เปอร์)