

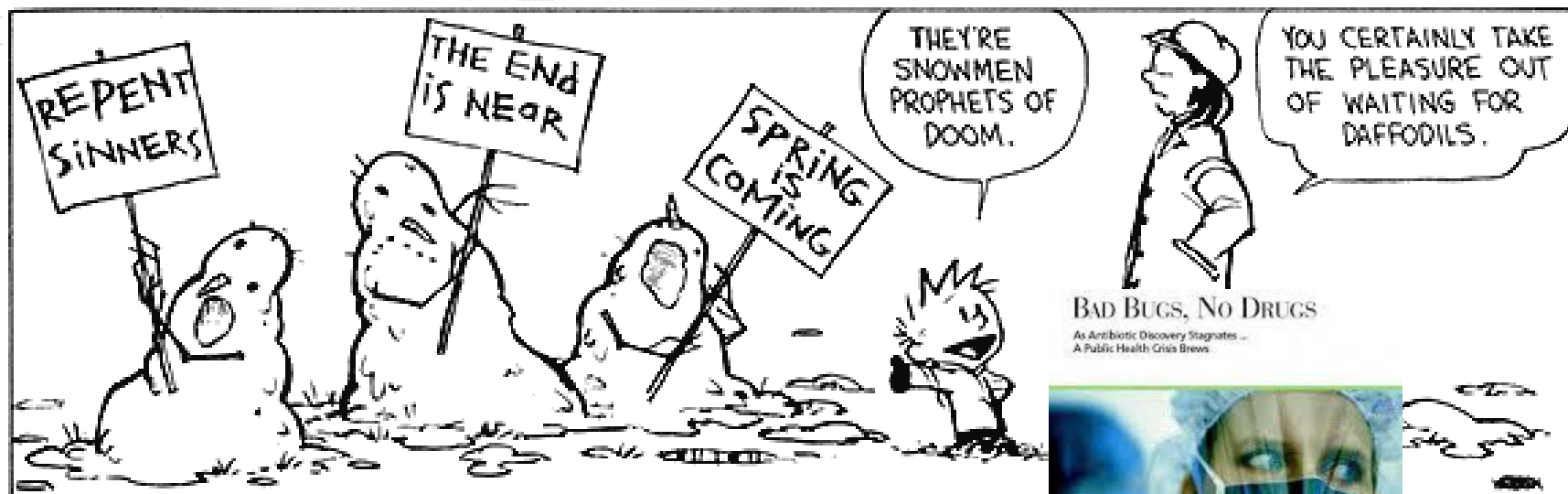
Surgical Site Infection



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 **Calvin and Hobbes** 
 by **WATSON**



IDS
 Infectious Diseases Society of America

July 2004

Potential Conflict of Interest

💧 Advisory Board

💧 Contract Research

💧 Training

💧 Lectures

- Sanofi Aventis
- Pfizer
- MSD
- Merck
- Aspen
- Sandoz
- Ranbaxy

Introduction

💧 Heath Care Associated Infection (HCAI)

- SSI 20% of HCAI
- Incidence of 2 – 5% of surgical inpatient population
 - *Increasing ASA score*
 - *Fast-track surgery and day cases*
- Morbidity
 - *Increase LOS*
 - *Financial burden on health care*
 - *Long term effects*
- Mortality of up to 3%

Introduction

cont...



💧 Guidelines

- IHI 5 million lives campaign 2006
- NICE guidelines 2008 (www.nice.org.uk)
- IDSA and CDC 2012 and 2013 updates
- Local
 - Best Care Always (www.bestcarealways.org.za)
 - Nesibopho (www.criticalcare.org.za)

Overview

QAGLAIGM

- 💧 **Definition**
- 💧 **Pathogenesis and Pathogens**
- 💧 **Risk Factors and Stratification**
- 💧 **Guidelines**
 - Pre-operative
 - Intra-operative
 - Post-operative
- 💧 **Management**

Definition

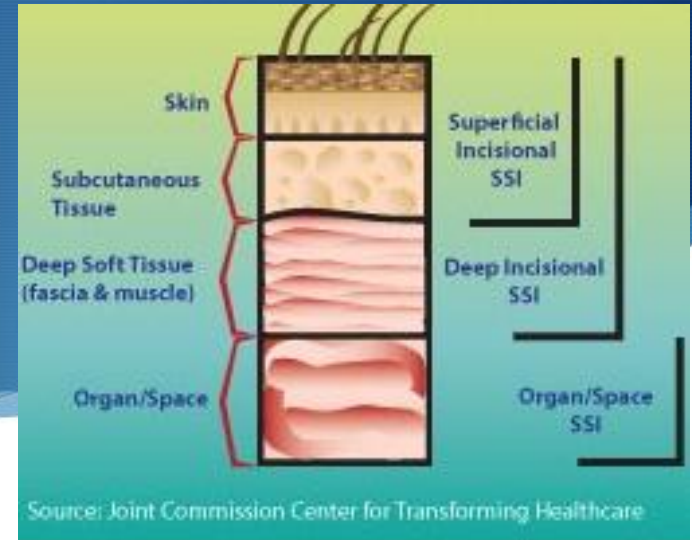
💧 Post surgical infection

- Affecting tissues involved in surgery
 - *Mostly superficial (skin and skin structure)*
 - *Usually confined to wound sepsis*
 - *Can affect deeper tissues/organs and implanted material*
 - *Potentially life threatening*
- Diagnosed on signs of infection
 - *Rather than microbiological specimen alone*
- Within 30 days of surgery
 - *Usually between 5 – 10 days post-operative*
 - *Exception where prosthetic material is used in deep infections*

Definition (cont...)

💧 CDC levels of SSI

- Superficial incisional
 - *Skin and subcutaneous tissue*
 - *Local signs of redness, pain heat, swelling or draining puss*
- Deep incisional
 - *Affecting fascial or muscle layer*
 - *Puss or abscess formation, fever and tenderness of wound*
 - *Separation of the edges of the wound*
- Organ or space infection
 - *Any part other than the incision*
 - *Often with systemic sequelae*



Pathogenesis



💧 Contamination

- During or at the end of the operation
- Usually by endogenous flora
 - *Skin*
 - *GIT if breached*
- More seldom
 - *Seeding from distant site*
 - *Exogenous form*
 - ◆ Surgical team
 - ◆ Break in aseptic technique
 - ◆ Ineffective hand hygiene
 - ◆ Physical environment

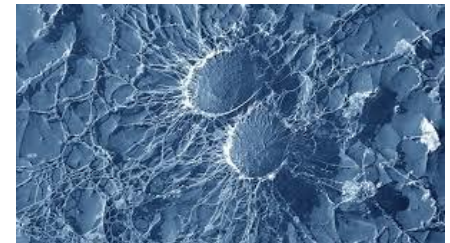
Pathogens

💧 Contamination derived

- From skin (*S aureus*)
- If GIT opened variety of organisms
 - *Enterobacteriaceae* and anaerobes act in synergism

💧 Progression to infection

- Inoculum size
- Virulence of organism
- Host defence and pre-morbid illness
- Blood supply to the tissue
- Presence of foreign material



Risk Stratification

💧 Age

- Above 40 *OR 1.24 95% CI 1.07 – 1.44*
- Linear increase in risk up to 65
 - *Possible inverse risk for those aged above 65*

💧 Co-Morbid disease

- Increasing ASA score (3 or more)
- Diabetes 2 – 3 fold increase
- Malnourishment *OR 1.13 95% CI 1.04 – 1.22*
- Steroid usage within 90 days *OR 1.37 95% CI 1.08 – 1.74*
- Peripheral vascular disease *OR 1.64 95% CI 1.66 -2.44*

Risk Stratification *(cont...)*

💧 Obesity

- Less vascular supply
- BMI > 35 2- 7 fold increase

💧 Smoking *OR 1.23 95% CI 1.04 – 1.44*

- Vaso-constriction, impaired wound healing and decreased DO₂

💧 Site and complexity of surgery

Risk Stratification

(cont...)

💧 Wound classification (NAS)

- Clean 2.1%
- Clean Contaminated 3.3%
- Contaminated 6.7%
- Dirty 7.1%

Guidelines

Pre-operative

💧 Patient information

- Risk stratification for SSI
- Intent to give antibiotics
- Wound care information for post-discharge
- Signs and Symptoms of SSI

💧 Pre-operative shower/bathing

- Day before or on day of surgery
- Ordinary soap
 - *No need for antiseptic lotion*
 - *OR 0.90 when compared to chlorhexidine*



Guidelines

Pre-operative (cont...)

💧 Hair removal on the day of surgery

- **No SHAVING (RR 1.54)**
- Electric clippers with single use head or depilatory cream

💧 Theatre wear

- Easy access to operative site
- Specific theatre wear non sterile for all staff

💧 Nasal decontamination

- Do NOT decontaminate routinely



Guidelines

Pre-operative (cont...)

💧 Operating team

- Remove hand jewellery
- Remove nail polish and artificial nails
- Sterile gowns during operating procedure

💧 Operating room

- Keep doors closed
- Minimize
 - *Staff in theatre*
 - *Movement of staff wearing non-sterile attire*

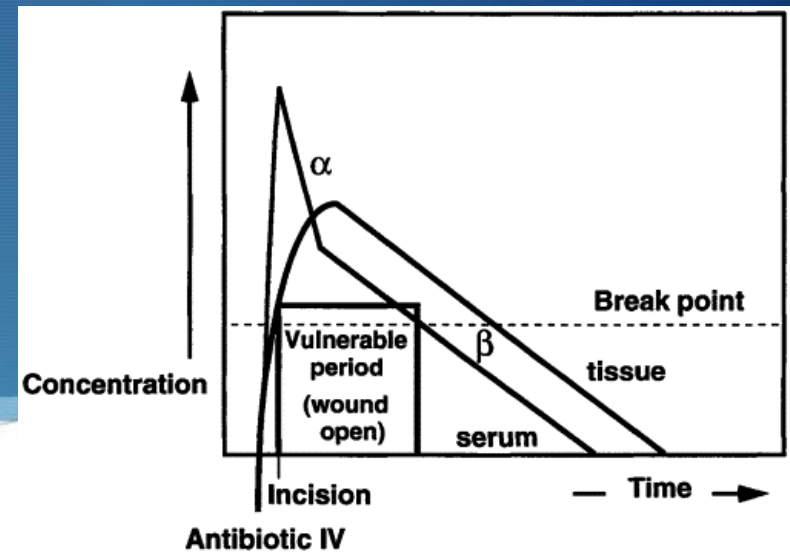


Guidelines

Intra-operative

💧 Antibiotic prophylaxis

- Indication
 - *Clean surgery only with placement of prosthesis/implant*
 - *Clean contaminated*
 - *Contaminated*
- Single dose on induction of anaesthetics
 - *Earlier if tourniquet used*
 - *Adjust for pharmaco-kinetics*
- Dose adjustment for BMI
- Repeat dose for blood loss and duration of surgery
- **Do NOT continue past 24 hours**



Guidelines

Intra-operative (cont...)

💧 Antibiotic treatment

- For dirty and infected wounds

💧 Inform patients that they have received antibiotics

💧 Hand decontamination

- 1st procedure of the day / after soiling
 - *Aqueous antiseptical surgical solution*
 - *Single use nail brush / nail pick*
- Subsequent operations
 - *Alcoholic hand rub OR antiseptical surgical solution*

Guidelines

Intra-operative

(cont...)

💧 Skin preparation and drapes

- Skin at surgical site
 - *Aqueous or alcohol based*
 - *Povidone-iodine or chlorhexidine*
 - *Prevent pooling*
 - *Drying by evaporation*
 - *Caution if diathermy is used with alcohol based solutions*
- *Iodophor impregnated incise drape if used*

💧 **Do NOT use diathermy for skin incision**

Guidelines

Intra-operative

(cont...)

💧 Patient homeostasis

- Prevent inadvertent hypothermia
- Optimal oxygenation ($\text{SpO}_2 > 95\%$)

💧 Irrigation

- Not recommended intracavity nor wound routinely

💧 Wound dressing

- Appropriate interactive dressing

Guidelines

Post-operative

💧 Wound care

- If possible leave closed for 24 – 48 hours
- Aseptic technique for dressing removal / changes
- Cleaning
 - *Sterile Saline up to 48 hours*
 - *Tap water after 48 hours*
 - *Patients may shower within 48 hours*
- Do NOT use topical antimicrobials
 - *For wounds healing with primary intent*
- Wounds healing by secondary intent
 - *No Eusol or mecuric antiseptic solutions*
 - *Benefit in referral to wound care specialist*

Guidelines

Post-operative *(cont...)*

💧 Antibiotic treatment

- Suspected SSI de-novo (cellulitis)
- Treatment failure for contaminated and dirty wounds
- Empiric principles

💧 SpO₂ > 95% in RR

💧 No insulin

- To non diabetics
- NICE Sugar (less than 10mmol/l)

Management

💧 Principles

- Most wound complications are not infections
 - *Exudation of tissue fluid or early failure to heal*
 - *Common in BMI > 35*
 - *Incomplete sealing of the wound*
 - ◆ Delayed primary or secondary suture
 - ◆ Approximation of wound with adhesive tape
 - ◆ Granulation or larger wounds with low bio-load
 - *Up to 15% inappropriately treated with antibiotics*

Management

(cont...)

💧 Established SSI

- Release of puss
- Debridement of necrotic tissue
- Parenteral antibiotics

Summary

- 💧 **SSI is a preventable disease**
- 💧 **Bundles / Guidelines**
 - More than the sum of their parts
 - Simple to institute and monitor
 - Rapid improvement in outcome
- 💧 **Antibiotic conservation and stewardship**



Thank you for
your Attention