

SURGICAL INFECTIONS

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Infection

Infection is defined by:

- 1. Microorganisms in host tissue or the bloodstream**
- 2. Inflammatory response to their presence.**

Inflammatory Response

Localized:

- ▣ **Rubor, Calor, Dolor, Tumor, and functio laesa (loss of function)**

Systemic:

- ▣ **Systemic Inflammatory Response Syndrome (SIRS)**

Cellulitis

Definition: Diffuse infection with severe inflammation of dermal and subcutaneous layers of the skin

Diagnosis: Pain, Warmth, Hyperesthesia

Treatment: Antibiotics.

**Common Pathogens: Skin Flora
(Streptococcus/Staphylococcus)**

Cellulitis



Cellulitis



Fig. 2



FURUNCLES AND CARBUNCLES

- Furuncles and carbuncles are cutaneous abscess that begin in skin glands and hair follicles.
- If the pilosebaceous apparatus becomes obstructed at the skin level, the development of a furuncle can be anticipate
- A carbuncle is a deep –seated mass of fistulous tracts between infected hair follicles.
- Funruncles are the most common surgical infections, but carbuncles are rare

Furuncle



Carbuncle



HIDRADENITIS

- Serious skin infection of the axillae or groin
Consisting of multiple abscesses of the apocrine sweat glands.
- The condition often becomes chronic
- The cause is unknown but may involve a defect of terminal follicular epithelium

Hiradenitis



TREATMENT

- The classic therapy of furuncle is drainage, not antibiotics.
- Invasive carbuncles must be treated by excision and antibiotics.
- Hidradenitis is usually treated by drainage of the individual abscess and followed by careful hygiene

Abscess



Abscess

Definition: Infectious accumulation of purulent material (Neutrophils) in a closed cavity

Diagnosis: Fluctuant: Moveable and compressible

Treatment: Drainage

DIFFUSE NECROTIZING INFECTIONS

- Particular dangerous
- Difficult to diagnose, extremely toxic, spread rapidly, often leading to limb amputation

Pathogenic factors

- Anaerobic
- wound Bacterial exotoxins
- Bacterial synergy
- Thrombosis of nutrient bridging vessels

Clinical Findings

- Crepitant abscess or cellulitis
- Invasion is usually superficial to the deep fascia and may spread very quickly, producing discoloration.
- Delayed debridement of injured tissue after devascularizing injury is the common setting.

Gas Gangrene



Necrotizing Soft Tissue Infection



Necrotizing



TREATMENT

- Broad-spectrum antibiotic therapy
- Resuscitative therapy
- Treat diabetes mellitus aggressively
- Hyperbaric oxygenation inhibit bacterial invasion but does not eliminate the focus of infection.

TREATMENT

- Complete debridement and depress tight fascial compartment. Amputation.

Post-Operative Infections

- **Fever After Surgery**
- **The “Five W’ s”**
 - ▣ **Wind: Atelectasis**
 - ▣ **Water: UTI**
 - ▣ **Walking: DVT**
 - ▣ **Wonder Drug: Medication Induced**
 - ▣ **Wound: Surgical Site Infection**

Surgical Site Infections

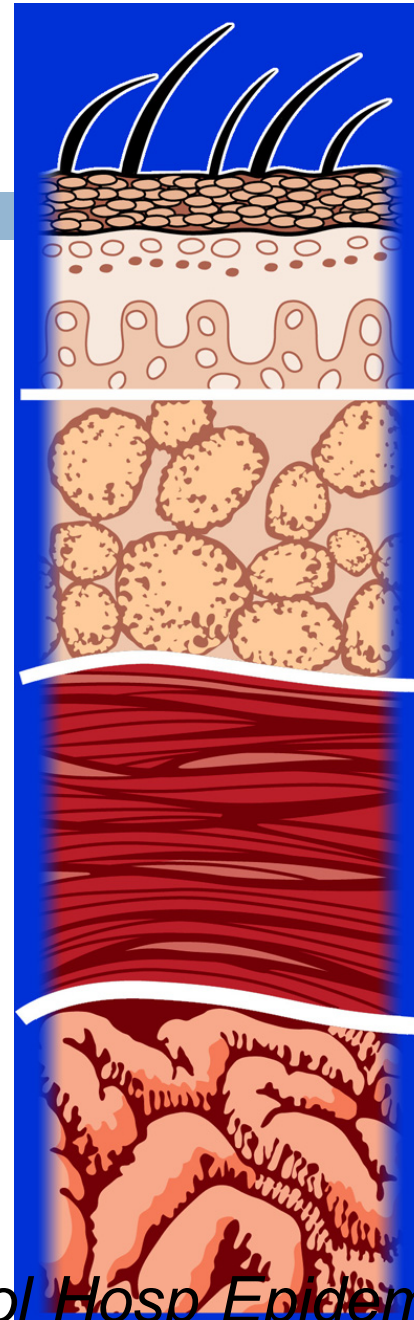
- **3rd most common hospital infection**
- **Incisional**
 - **Superficial**
 - **Deep**
- **Organ Space**
 - **Generalized (peritonitis)**
 - **Abscess**

SSI – Definitions

- Infection
 - Systemic and local signs of inflammation
 - Bacterial counts $\geq 10^5$ cfu/mL
 - Purulent versus nonpurulent
 - LOS effect
 - Economic effect
- Surgical wound infection is SSI

type of surgical infection

Organ/space



Deep incisional SSI

Organ/space SSI

Mangram AJ et al. *Infect Control Hosp Epidemiol.*

1999;22:259-272

SSI – Risk Factors

Operation Factors

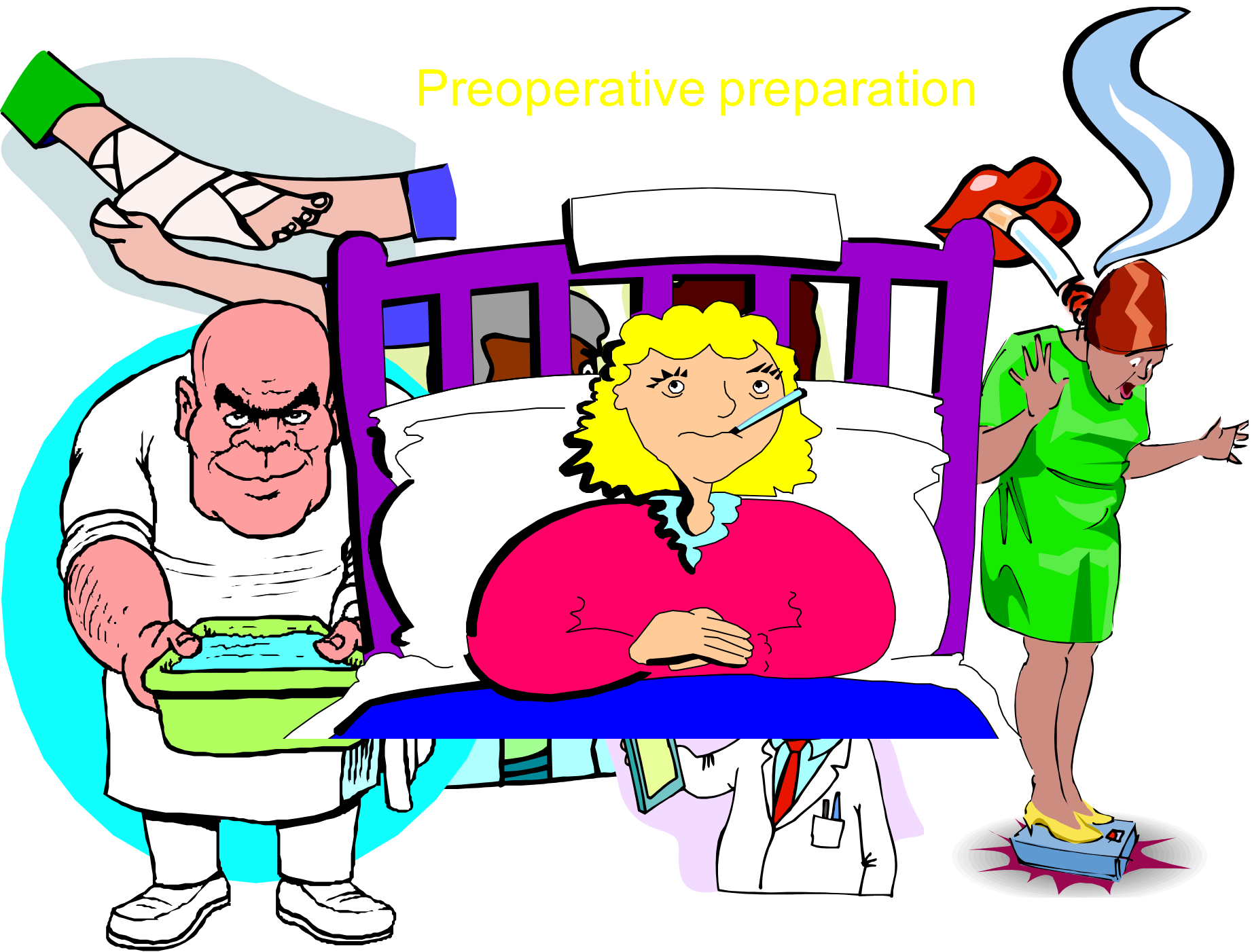
- Duration of surgical scrub
- Maintain body temp
- Skin antiseptics
- Preoperative shaving
- Duration of operation
- Antimicrobial prophylaxis
- Operating room ventilation
- Inadequate sterilization of instruments
- Foreign material at surgical site
- Surgical drains
- Surgical technique
 - Poor hemostasis
 - Failure to obliterate dead space
 - Tissue trauma

SSI – Risk Factors

Patient Characteristics

- Age
- Diabetes
 - ▣ HbA_{1C} and SSI
 - ▣ Glucose > 200 mg/dL postoperative period (<48 hours)
- Nicotine use: delays primary wound healing
- Steroid use: controversial
- Malnutrition: no epidemiological association
- Obesity: 20% over ideal body weight
- Prolonged preoperative stay: surrogate of the severity of illness and comorbid conditions
- Preoperative nares colonization with *Staphylococcus aureus*: significant association
- Perioperative transfusion: controversial
- Coexistent infections at a remote body site
- Altered immune response

Preoperative preparation



PRE-OPERATIVE SHAVING



Pre-operative shaving

- Shaving the surgical site with a razor induces small skin lacerations
 - potential sites for infection
 - disturbs hair follicles which are often colonized with *S. aureus*
 - Risk greatest when done the night before
 - Patient education
 - *be sure patients know that they should not do you a favor and shave before they come to the hospital!*

Prophylactic Antibiotics

*Antibiotics given for the purpose of preventing infection when infection is **not** present but the risk of postoperative infection **is** present*

Prophylactic Antibiotics

Questions

- Which cases benefit?
- Which drug should you use?
- When should you start?
- How much should you give?
- How long should antibiotics be continued?

Surgical site prevention

Use antibiotics
appropriately

Avoid shaving
Site

Maintain normal
Body temp

Optimize oxygen
tension

Maintain normal
Blood glucose

Treatment

- **Incisional: open surgical wound, antibiotics for cellulitis or sepsis**
- **Deep/Organ space: Source control, antibiotics for sepsis**

Types of Surgery

Clean	Hernia repair breast biopsy	1.5%
Clean- Contaminated	Cholecystectomy planned bowel resection	2-5%
Contaminated	Non-preped bowel resection	5-30%
Dirty/infected	perforation, abscess	5-30%

Occupational Blood Borne Virus Infections

	HBV	HCV	HIV
Risk from Needle stick	30%	2%	0.3%
Chemoprophylaxis	Yes	No	Yes
Vaccine	Yes	No	No

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