

# **Antimicrobial Prophylaxis In Surgical Patients**

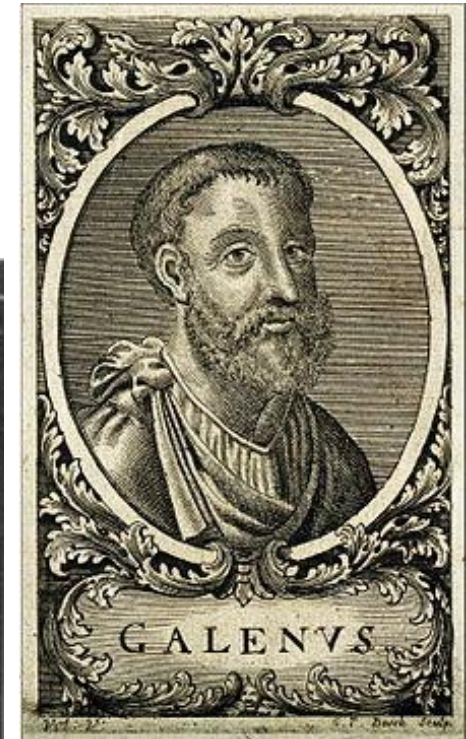
Prof. Naveed Jabbar Bandesha

SMC/UOS

Sargodha

# Introduction

- First concept of infection by Egyptians by mummification skills
- Hippocrates used wine & vinegar to irrigate open infected wound



# Introduction

- **Surgical antibiotic prophylaxis** means use of antibiotics to prevent infection
- Standard of care
- Right time
- Unnecessary antibiotics increase cost and resistance
- 40% of prescriptions were found to be inappropriate (2015)



# Surgical Wounds



# Clean Wound

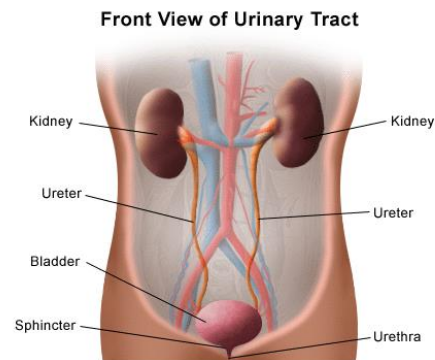
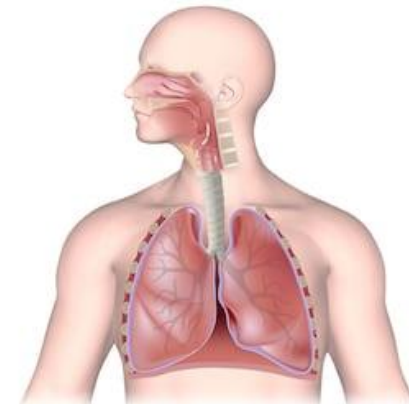
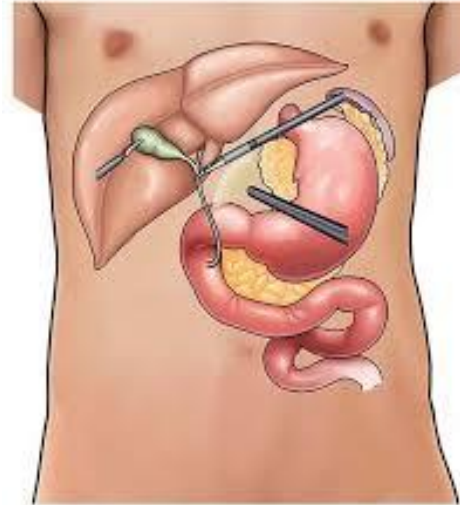
- An incision in which
- **A.** No inflammation
- **B.** No break in sterile technique
- **C.** Respiratory, alimentary or genitourinary tracts are not entered.
- Potential of infection is 1-5%
- Examples: Thyroidectomy, Mastectomy, Lipoma excision

THYROIDECTOMY



# Clean Contaminated Wound

- An incision in which the respiratory system, GIT or genitourinary system is entered under control conditions but without contamination
- Potential of infection rate 8-10%
- Examples: Simple appendectomy, Cholecystectomy



# Contaminated

- An incision undertaken during on operation in which there is

• OR

- Open traumatic wounds > 12-24/24 also fall in it

- Major break in sterile technique

- Infection rate is 15-30%

OR

- Gross spillage from GIT or incision in which acute non purulent inflammation is encountered.

-

# Dirty or Infected

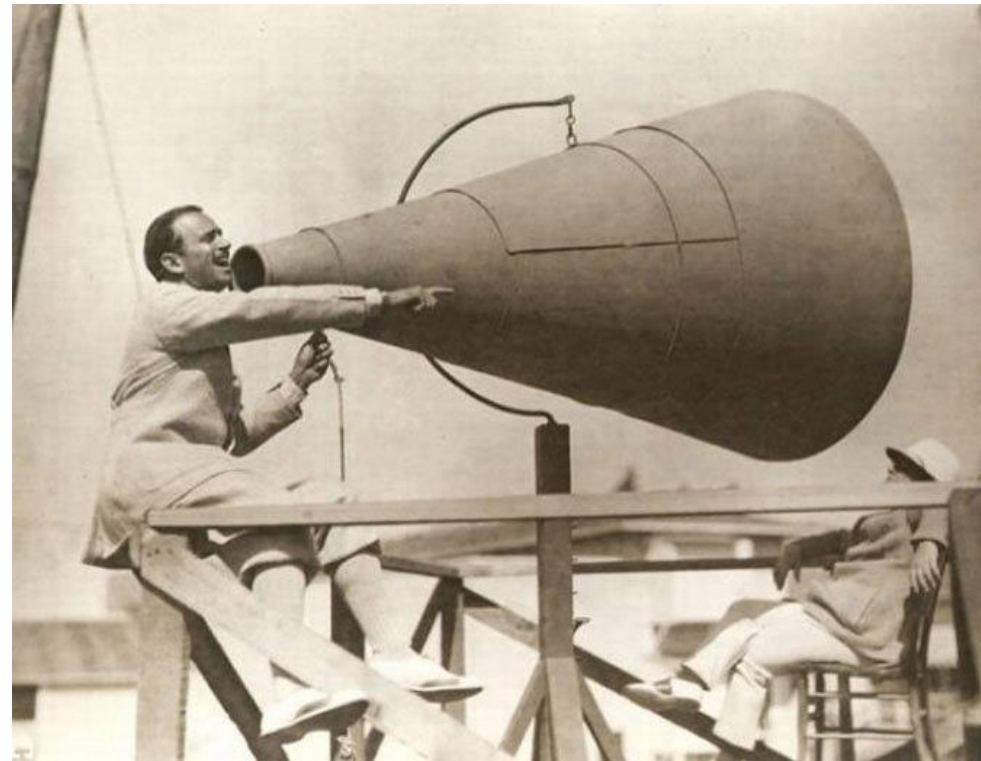
- An incision undertaken during an operation in which
- Viscera are perforated
- OR
- Acute pus is encountered (Fecal peritonitis)
- OR
- Traumatic wounds where treatment delayed
- OR
- There is fecal contamination
- OR
- Devitalized tissue present
- Infection rate is 40-70%



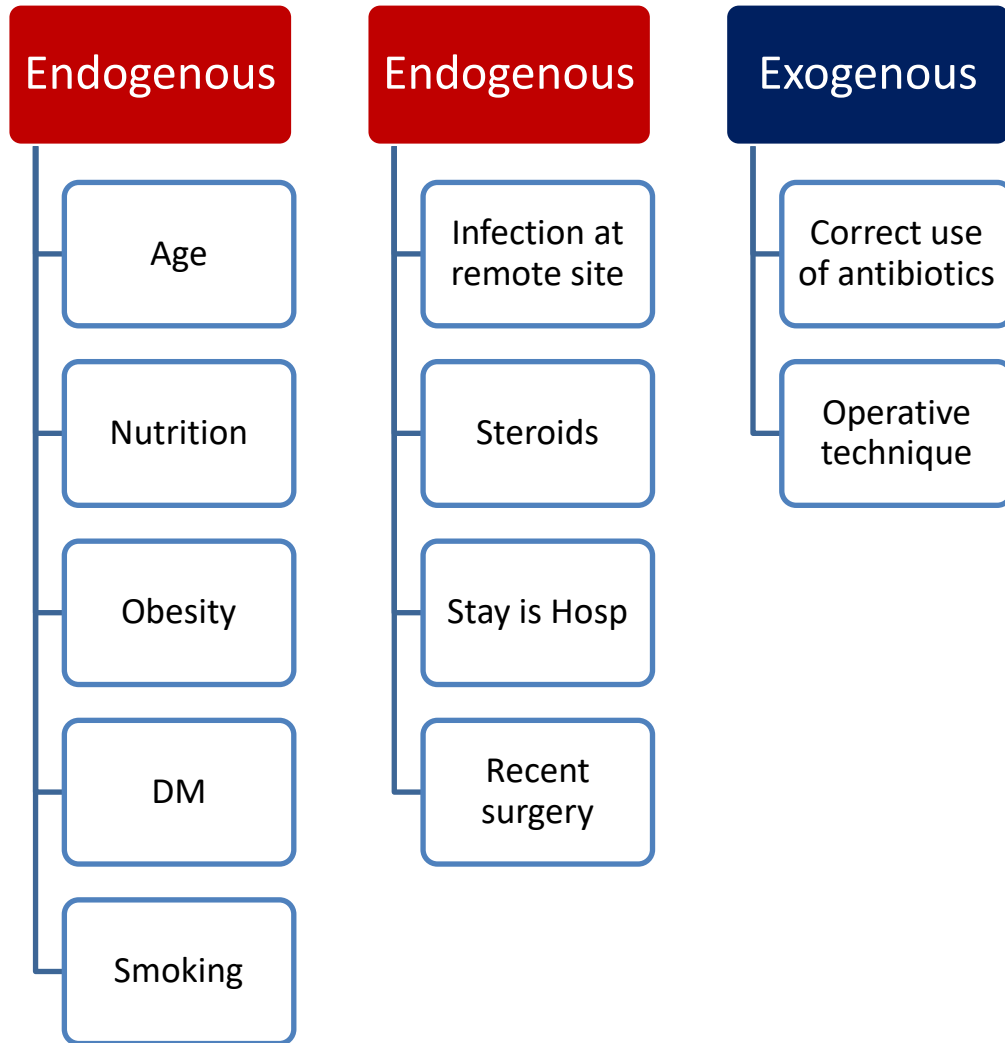
Type of Wound	Inflammation is encountered by incision	Break in Sterile Technique	Respiratory, Alimentary or Genitourinary Tracts Are Entered	Traumatic Wounds/ Faecal Contamination / Devitalised tissue is present
Clean	NO	NO	NO	-
Clean-contaminated	NO	NO	YES	-
Contaminated	YES	YES	YES	YES (12-24HRS OLD)
Dirty or infected	YES	YES	YES	YES

# Statement of Concern

- Up to 60% SSIs are preventable
- If SSI additional stay of 7-11/7
- Pts SSI have 2-11 times higher risk of death



# Factors Increasing Risk of SSI



# Common Surgical Pathogens

- Clean surgery skin flora, including *S. aureus* & coagulase-negative staphylococci (*S. epidermitis*)
- Clean-contaminated surgery including abdominal surgery & heart, renal % liver transplantation mostly
  - Gm -ve rods
  - &
  - Enterococci
  - In addition to skin flora

# Commonest postoperative infective pathogen by type of surgery<sup>1</sup>

Type of Surgery	Commonest postoperative pathogens
Insertion of prosthetic heart valves Insertion of prosthetic joints	Staphylococci
Instrumentation of the lower urinary tract	Enteric Gram-negative bacteria, enterococci
Colorectal surgery	Enteric Gram-negative bacteria, enterococci anaerobes
Upper respiratory tract surgery	Aerobic and microaerophilic streptococci, anaerobes

1. Munckhof W. Antibiotics for surgical prophylaxis, *Aust Prescr* 2005;28:38-40

# Need & Requirement

- Surgeon's experience
- OT ?
- Gowning & Scrubbing
- Antisepsis
- Hair removal
- Duration of Procedure
- Co-morbidity
- Disposable instrument

# Principles of surgical antibiotic prophylaxis

- Appropriate prophylaxis
- Bacterial flora
- Narrowest antibacterial spectrum
- Less expensive drug if two drugs are otherwise of equal antibacterial spectrum, efficacy, toxicity, and ease of administration
- Right time
- Avoid antibiotics likely to be of use in the treatment of serious sepsis
- Do not use antibiotic prophylaxis to overcome poor surgical technique
- Review antibiotic prophylaxis protocols
- Choice of antibiotic
- Always ask the patient about a prior history of antibiotic
- Intravenous 'first generation' cephalosporins – cephazolin or cephalothin
- Intravenous gentamicin ■ intravenous or rectal metronidazole (if anaerobic infection is likely)

# Dose Timing

- Within 120 minutes before incision, while considering the half-life of the antibiotic
- Best practice at the time of incision
- Single dose or 24/24



**World Health  
Organization**



# Commonly Used Antibiotics

- Commonly used surgical prophylactic antibiotics include:
  - intravenous first generation' cephalosporins – cephazolin or cephalothin
  - intravenous gentamicin
  - Intravenous or rectal metronidazole (if anaerobic infection is likely)
- Oral tinidazole (if anaerobic infection is likely)
- Intravenous flucloxacillin (if methicillin-susceptible staphylococcal infection is likely)
- Intravenous vancomycin (if methicillin-resistant staphylococcal infection is likely)

# Commonly Used Antibiotics

- Parenteral 'second generation' cephalosporins such as cefotetan have improved anaerobic and aerobic Gram-negative cover compared to first generation cephalosporins
- Used but more expensive

# Conclusion

- Prophylaxis is effective strategy
  - Right antibiotics
  - Right dose
  - Right time
  - Hospital protocols
- Horan TC, Culver DH, Gaynes RP, Jarvis WR, Edwards JR, Reid CR. Nosocomial infections in surgical patients in the United States, January 1986 – June 1992. *Infect Control Hosp Epidemiol* 1993;14:73-80.
  - 2. McGowan JE Jr. Cost and benefit of perioperative antimicrobial prophylaxis: methods for economic analysis. *Rev Infect Dis* 1991;13(Suppl 10):S879-89
  - . 3. Burke JF. The effective period of preventative antibiotic action in experimental incisions and dermal lesions. *Surgery* 1961;50:161-8
  - . Patchen Dellinger E, Gross PA, Barrett TL, Krause PJ, Martone WJ, McGowan JE Jr, et al. Quality standard for antimicrobial prophylaxis in surgical procedures. *Clin Infect Dis* 1994;18:422-7.
  - 5. Dettenkofer M, Forster DH, Ebner W, Gastmeier P, Ruden H, Daschner FD. The practice of perioperative antibiotic prophylaxis in eight German hospitals. *Infection* 2002;30:164-7.
  - 6. Howard JM, Barker WF, Culbertson WR, Grotzinger PJ, Iovine VM, Keehn RJ, et al. Postoperative wound infections: the influence of ultraviolet irradiation of the operative room and of various other factors. *Ann Surg* 1964;160(Suppl 2): 1-196.
  - 7. Therapeutic Guidelines: Antibiotic. Version 12. Melbourne: Therapeutic Guidelines Limited; 2003.
  - 8. McDonald M, Grabsch E, Marshall C, Forbes A. Single-versus multiple-dose antimicrobial prophylaxis for major surgery: a systematic review. *Aust N Z J Surg* 1998;68:388-96

***WE NEED TO IMPROVE  
THINGS***

Thanks