

Reducing Infections in Surgical Practice

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Introduction: How bacteria get in

The Host

Skin PREP

The Surgeon

Prophylactic Antibiotics

The Procedure

Local Antibiotics

The STAFF

Post op care

The HOST

Diabetes (HgbA1c)

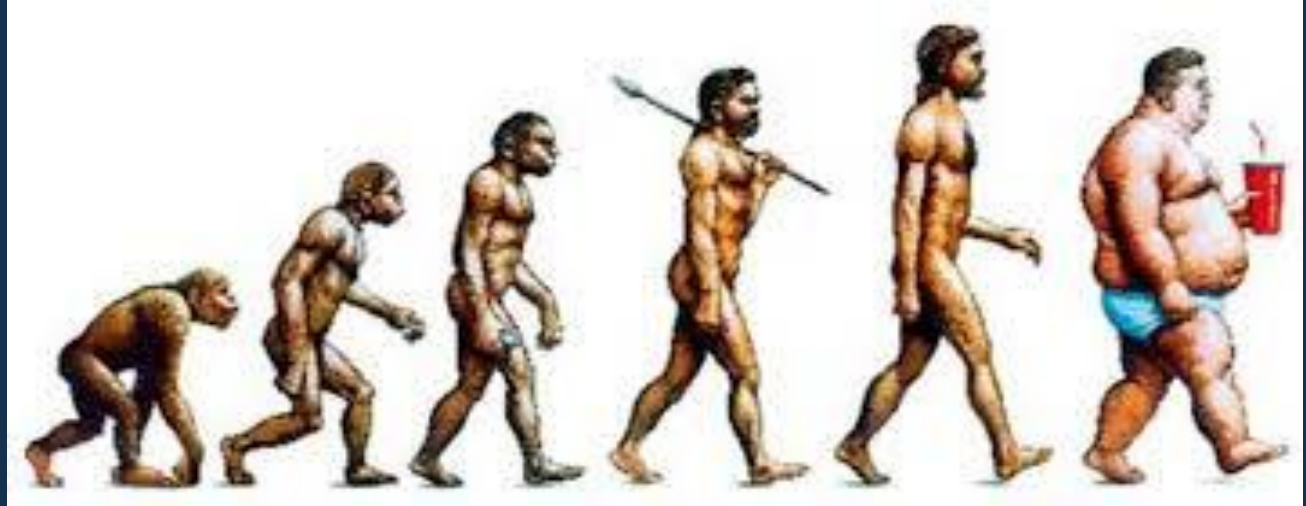
smoking

obesity

protein stores

Immune compromise (Rheumatoid meds etc)

renal failure, Liver failure etc



MRSA colonization- **screening effective???**

Decolonization help???

Mupirocin ?? Chorhexidine??

Hygiene

CONTAMINATION and WOUND HEALING

The Surgeon

Experience

Surgical technique

Hygiene

Dermatitis (eczema, dandruff)

Double glove

Change Gloves after drape?

Hand Prep- Chlorhexidine residual?

MRSA Colonization????

Decolonization???



The Procedure

Size of incision

Duration of procedure

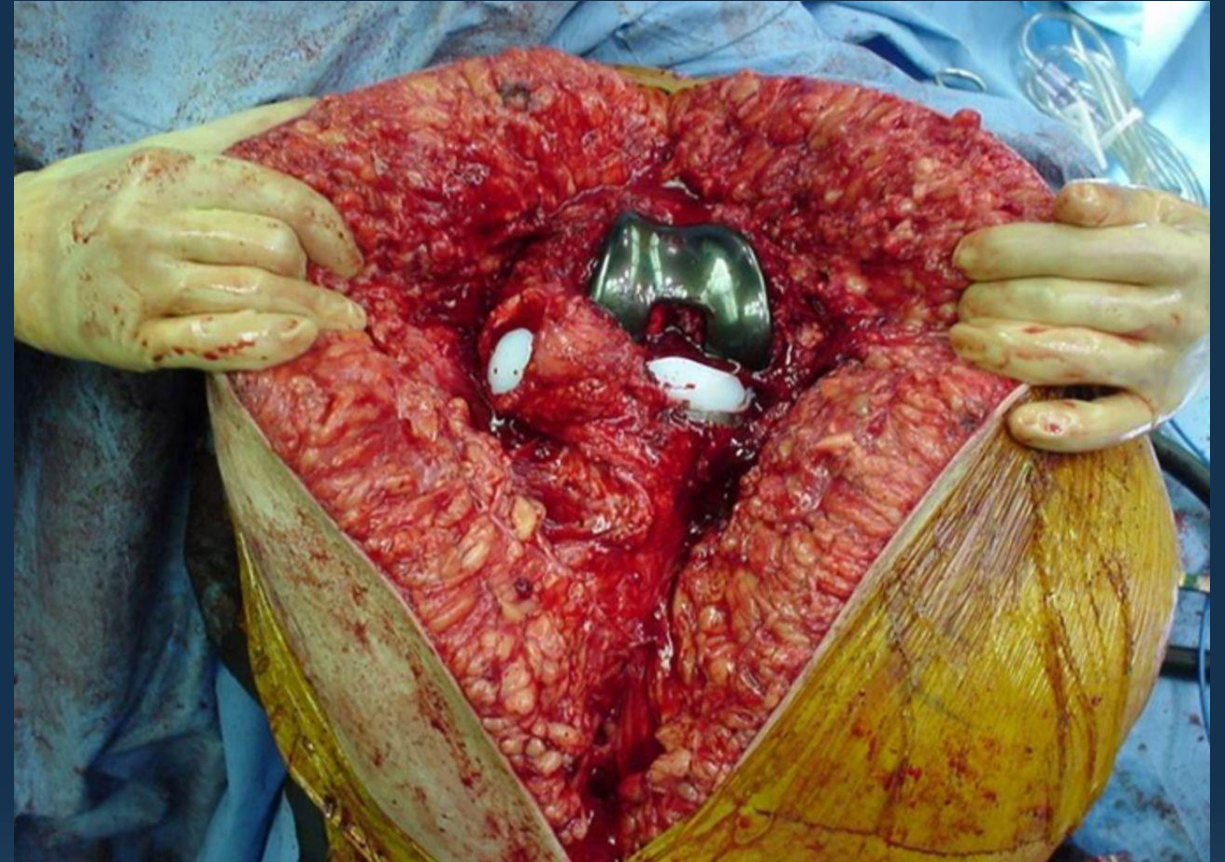
Blood loss

Tissue disruption

Implants

Microscope

Staff scrubbing in and out for breaks, set ups



The Staff

Number of OR STAFF (talking, in and out of room)

Experience and sterile technique

scrub -chlorhexidine residual?

double glove

Hair nets??? Vs hoods??

MRSA colonization?? Decolonization of staff???



Skin PREP

Chlorhexidine vs Iodine
Duraprep
Alcohol
Ioban

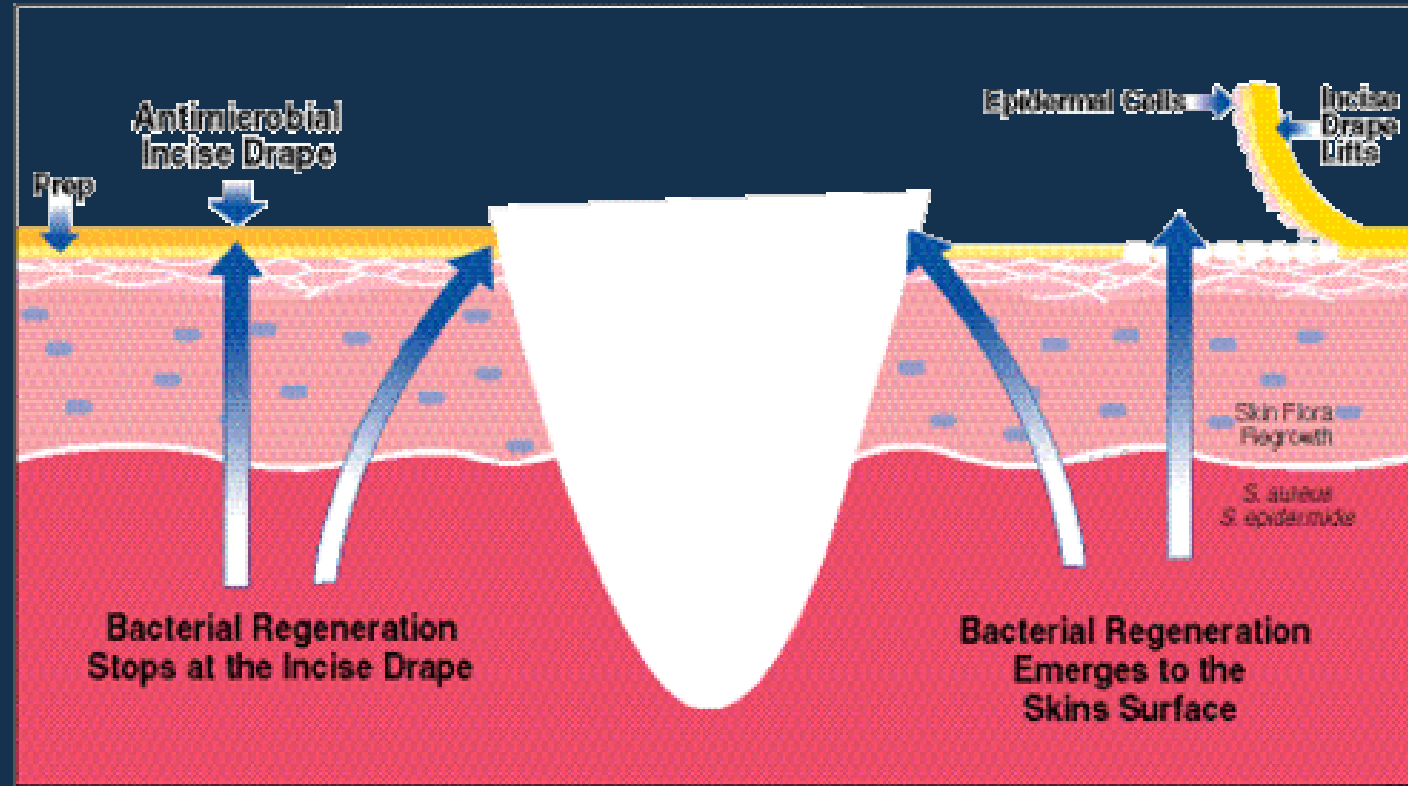


Figure 1. Ioban™ Antimicrobial Incise Drapes create a sterile surface and act as a barrier to block skin flora from migrating to the incision.

combination prep with adherent drape



Antibiotic Prophylaxis

Are we using the right agent for the procedure?

57% of staph resistant to Cefazolin

IV VANCO no better than Cefazolin

Ceftaroline or linezolid for MRSA prophylaxis??

Redosing for longer procedures?

Combination IV Antibiotics?

Cefazolin + Gent = 80-85% coverage

Cefazolin +Vancomycin IV ????

Antibiotic Prophylaxis

Role of Local Antimicrobials (not FDA APPROVED)

Vancomycin Powder- empiric, dose uncertain

Gentamicin Powder – dose by weight

Dilute Betadine Lavage ???

Post op CARE

Reduce wound contamination

non occlusive dressings

Skin closure –staples or nylon sutures?

Wound vacs??? (negative pressure therapy)

Study Design

Institutional Biologic Resource committee approval

120 adult male Sprague-Dawley Rats (440gms)

PTFE vascular graft - subcutaneous

10^6 Staph. Aureus (MSSA) inoculum

Study Design

Preop Intravenous

20 rats Vancomycin (15mg/kg)

20 rats Cefazolin (15mg/kg)

Intrawound

20 rats Vancomycin (15mg/kg)

20 rats Cefazolin (15mg/kg)

20 rats Tobramycin (5mg/kg)

20 rats 0.35% betadine x 3 min

Surgical Procedure

Anesthesia

IP ketamine + diazepam

Lidocaine + Meloxicam

Skin prep

Isopropyl Alcohol + Betadine prep

Iodine adhesive drape



Surgical Procedure

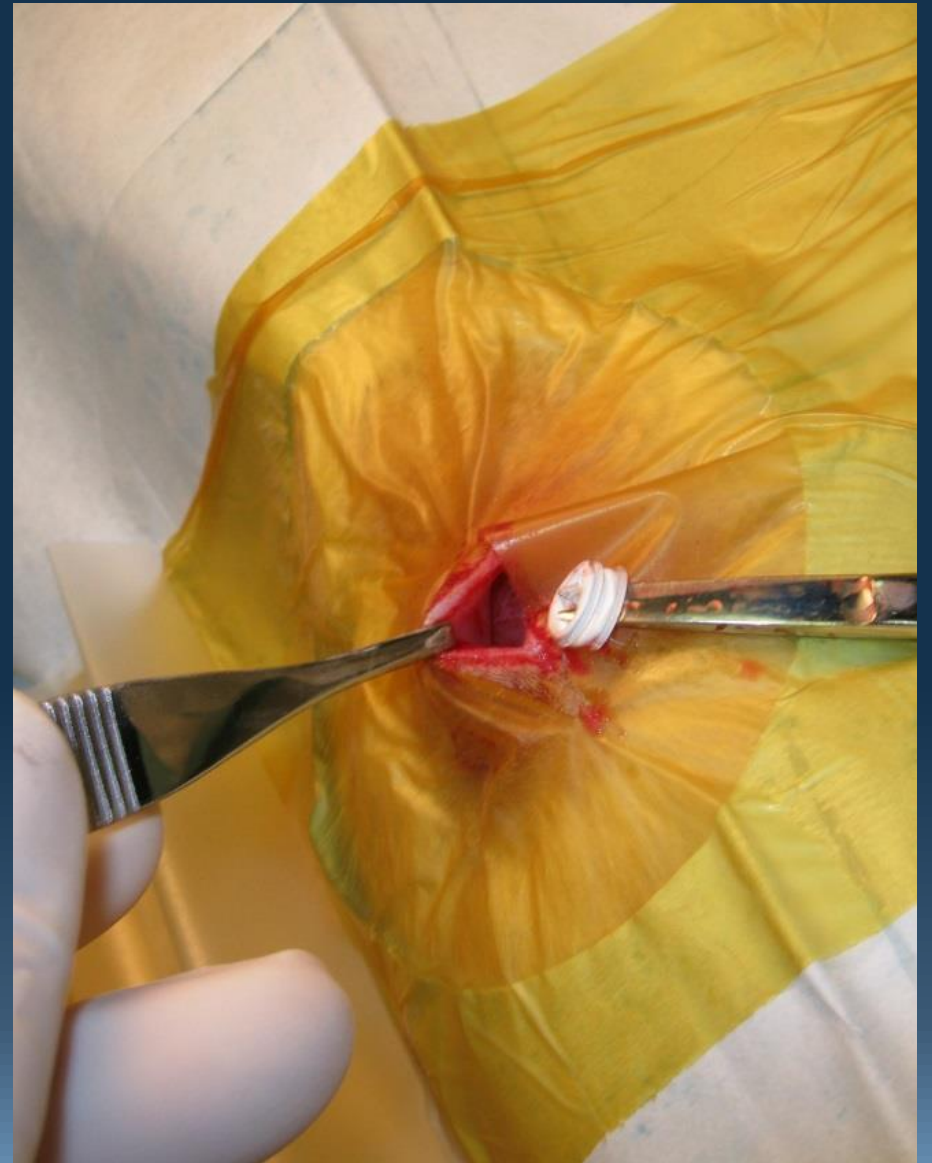
1 cm² PTFE vascular graft
sub-muscular thoracic spine

200ul 10⁸ CFU Staph Aureus inoculum

Antibiotic powder or betadine wash

Wound closure with Nylon suture

Ad lib food and water x 7 days



Bacteriologic Evaluation

Animals sacrificed POD 7

Vascular graft recovered sterile technique

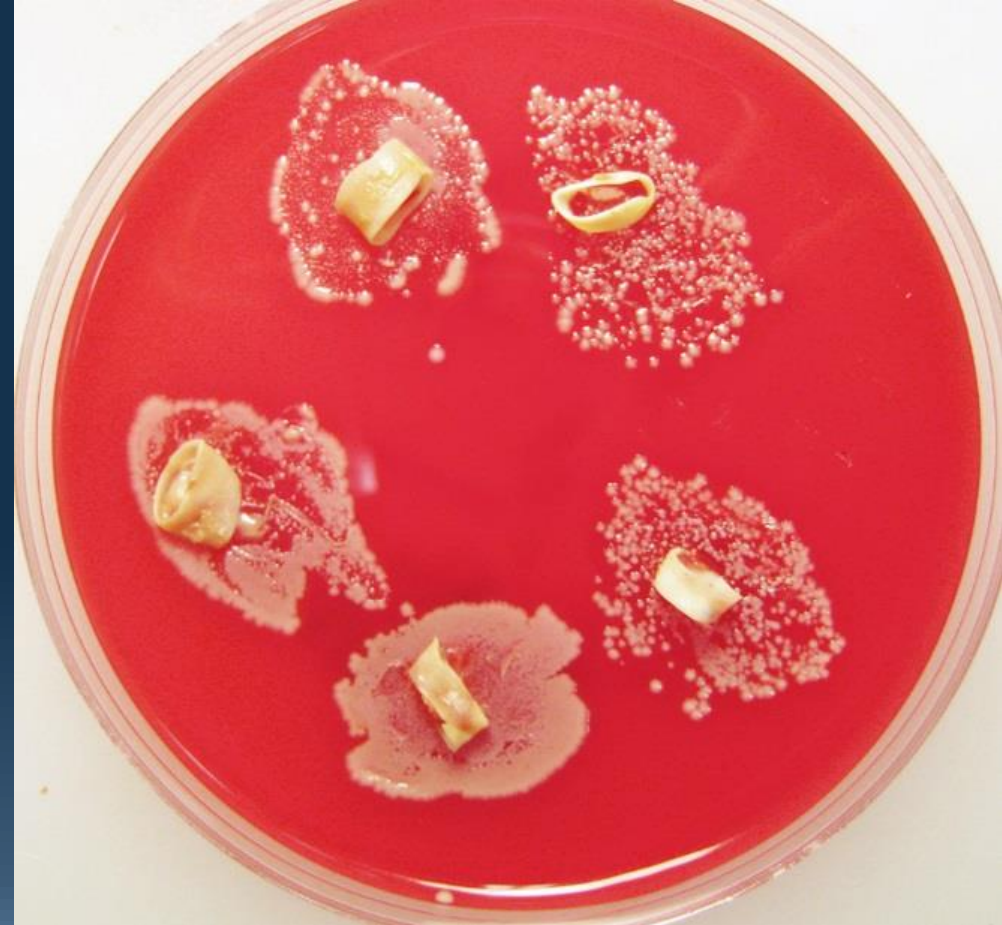
Cultured 5% Sheep Blood Agar Plate x 5 days

All positive cultures detected in 24 hrs

Bacteriologic Evaluation



Negative cultures



Positive cultures

Results

Intravenous

Vancomycin

Infection

100%

Cefazolin

100%

Intrawound

Vancomycin

20%

*P < 0.05%

Tobramycin

20%

*P < 0.05%

Cefazolin

85%

Betadine

100%

*Independent Sample T-tests.

Discussion

Intrawound Vanc & Tobra more effective than IV or other local agents

Results corroborate clinical and animal studies

Discussion

IV antibiotic prophylaxis depends on tissue concentrations for effect

Local antibiotics reach much higher local concentrations than IV

Reducing IV prophylaxis might reduce prevalence of resistant organisms???

Limitations

7 day incubation – miss chronic infection?

Results cannot extrapolate to other bacteria or other hosts (human)

Further clinical studies warranted

References

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