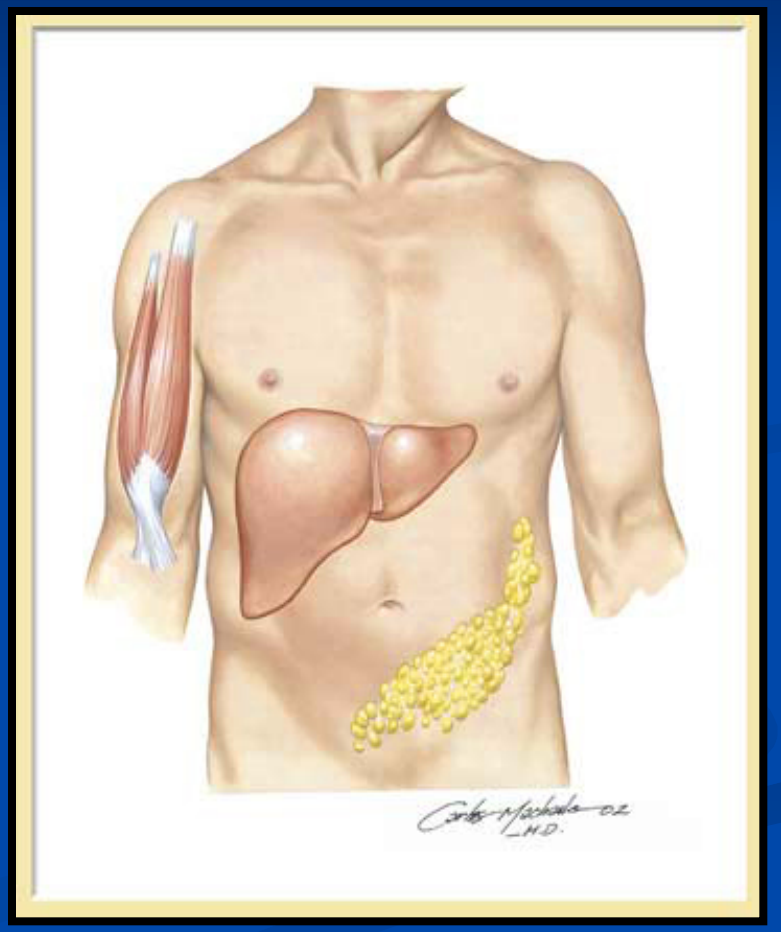
Infection Control

Resident Flora

- Isolated from most individuals. Low virulence.
  - Gram + micrococacceae
  - Gram + diptheroids
  - Pityrosporum
  - Proprionobacterium
  - Candida
  - Staph aureus*** (20-40% of adults are carriers)

Resident Flora

- Flora vary by location:
  - Head and trunk : staph epi, p. acnes
  - Axillae and perineum : gram neg rods, staph aureus



Transient Flora

- Organisms most commonly associated with wound infection. Pathogenic or "out of place."
  - E. coli
  - Enterococcus
  - Pseudomonas
  - Staph aureus***
  - Streptococcus

Host Factors and Flora

- Host characteristics may influence the expected flora.
  - Warm, moist environments: allow overgrowth (e.g. under occlusion)
  - Hospitalization: colonization with unusual microbes (e.g. MRSA, VRE)
  - Systemic disease (e.g. DM, HIV)
  - Skin disease: colonization, barrier breakdown (e.g. HSV)
  - Medicines (e.g. yeast overgrowth w/antibiotics, steroids and immuno-suppression, isotretinoin and staph colonization)

Wound Classification

- Class I: Clean
  - Non-contaminated skin with proper aseptic surgical techniques
  - NOT oropharynx or GU
  - Infection rate <5%
- Class II: Clean-contaminated
  - Elective techniques, in contaminant-prone areas (e.g. oropharynx)
  - Minor breaks in technique
  - Infection rate 5-15%

Wound Classification

- Class III: Contaminated
  - Fresh, traumatic
  - Incision through inflammation
  - Infection rate 20%
- Class IV: Dirty
  - Old traumatic wounds
  - Clinical infection
  - Infection rate>25%

Ways to Decrease Infection

- Preparation of the Instruments
- Preparation of the Surgeon
- Pre-op preparation of the patient
- Preparation of the Skin

Preparation of the Instruments

- Steps to proper preparation:
  - Remove organic debris:
    - Basin, scrub, ultrasonic
  - Instrument “milk” to lubricate joints
  - Packaging

Preparation of the Instruments

- Types of sterilization: most will get bacteria and viruses, but need to get spores too!
  - Steam autoclave: moisture sensitive
  - Chemiclave: chemical soln, no moisture problems
  - Dry Heat: higher temps, longer times
  - Gas: ethylene oxide is toxic; used if instrument can't withstand heat
  - Cold sterilization (chemical): no spores or HepB! Not approved by JCAHO

Sterilization Technique

Remove organic debris

Sterilization Technique

"Milk" lubricant

Package materials with test strip

Sterilization Technique

Test strip is black, and bag is dated

Internal control for autoclave

Preparation of the Surgeon

- Nails: harbor 90% of hand microbes. Should be trimmed short, without polish.
- Pre-op hand scrub
  - 5 minute v. 2 minute: to remove debris
  - Alcohols are bactericidal
- Gloves:
  - bacterial counts will increase with time worn
  - 1-3% of sterile gloves not intact
  - 30% will puncture during procedure, usually at tips
    - Non-dominant hand, thumb and second finger
- Post-op hand scrub
- Other: clean surgical attire, masks, decrease # of people in room

Pre-op Preparation of the Patient

- Endocarditis prophylaxis
  - The incidence of *bacteremia* with intact skin surgery is close to zero
  - AHA says antibiotics are not needed for "surgically scrubbed" skin in low risk situations
    - "High-risk" people: prosthetic valve, prior SBE, regurgitant murmur
  - Give antibiotics 1 hour before and 6 hours after
    - Cephalosporin: 1 gram, then 500mg
    - Dicloxacillin: 1 gram, then 500mg
    - Clindamycin: 300mg, then 150mg

Preparation of the Skin

- Adequate exposure:
  - Draping may be used to provide a sterile field for the surgeon
- Hair removal:
  - Infection rates are increased with pre-op shaving
  - Remove only what is necessary for exposure and bandages
  - Best to use “clippers” immediately pre-op

Preparation of the Skin

- Antiseptics are used to *diminish* the risk of bacterial contamination when incising intact skin
  - True "sterility" is not possible. 20% of skin flora live in adnexa. The goal is to decrease the number of resident flora.
- Ideal agent:
  - Broad activity (bacteria, virus, fungus)
  - Rapidly bactericidal
  - Long acting
  - Non-toxic, non-allergenic

Preparation of the Skin: Agents

- Key points:
  - Hydrogen peroxide
    - NOT truly antiseptic; cytotoxic
  - Isopropyl alcohol
    - Fast-acting; broad spectrum; FLAMMABLE
  - Chlorhexidine
    - Long-acting; KERATITIS; OTITIS

Preparation of the Skin: Agents

- Key Points:
  - Hexachlorophene
    - Very long acting; TERATOGEN; NEUROTOXIN
  - Iodophores
    - Need time for activation; stain; contact allergen
  - Triclosan
    - Not antiseptic quality; OTC washes
  - Benzalkonium chloride
    - Contact allergen (baby wipes)

Post-Operative Considerations

- Topical Antibiotics:
  - No proven benefit over petrolatum, and higher rates of contact allergy.
- Oral Antibiotics
  - *No* specific guidelines. Must weigh the probability of infection against the risks of antibiotics and their overuse.

Post-Operative Considerations

- Consider the following in the use of po antibiotics:
  - Patient risk factors (e.g. age, immunosuppression, DM, HIV)
  - Wound location (e.g. class II)
  - Length of procedure (e.g. infection rate doubles with each hour of surgery)
  - Flaps
  - Hypoxic wounds (e.g. tension, low blood flow)
- Ideally, antibiotics should be on board during the procedure. Some suggest an initial pre-op dose, or even intra-lesional doses.

Post-Operative Considerations

- Needle sticks:
  - HIV transmission 0.3%
  - HepC transmission 1%
- At UVA
  - ID fellow on call
  - Occupational health
  - Emergency room

Conclusion

- Rates of infection are low in cutaneous surgery when the proper steps in *preparation* are followed.
  - Instruments
  - Surgeon
  - Skin