

Periprosthetic Shoulder Joint Infections:

Preventing Periprosthetic Joint Infection

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Disclosures

Consultant
-Exactech
Royalties
-Exactech

Periprosthetic Shoulder Infection

Estimated cost is 4 X greater than for the primary procedure + the personal cost to the patient

- Postoperative complications such as infection may not be reimbursed
- Need for improved infection prevention

INFECTION AFTER TSA

Etiology :

- 66% pt. factors
 - Diabetes
 - Immunosuppressive chemotherapy
 - Systemic steroid therapy
 - Multiple steroid injections
 - Previous surgery
 - Bacterial load on or in the skin
 - Coagulase – negative Staph - epidermidis
- - Propionibacterium acnes

INFECTION AFTER TSA

Patient factors

- Good Medical management
- Dental Screening – No association with mouth flora
- Nutritional supplement
 - Low Albumin level rather than morbid obesity
 - Nelson et al – CORR Sept 2015
- Off RA meds if possible (Embril)
- Screening Labs if previous surgery
 - Sed Rate, CRP & Interleukin 6
 - Intra-operative biopsy
 - Helpful if positive

General Considerations

Frequent Glove changes – after draping

Al-Maiyah ,et al JBJS 2005

Surgical exhaust gowns

- decrease in bacterial colony forming units
 - No correlation with a decrease in infection
- Ritter CORR 1999 and Der Tavitan JBJS 2005





General Considerations

- Decrease in operative time = less than 2 hrs.
- Operating room traffic correlates with length of the surgical procedure.
 - Dalstrom et al , JBJS 2008

Hand Washing = # 1 effective means of infection prevention

Skin Prep – Alcohol and Chlorhexidine more potent than iodine scrubs. Chlor-prep prevents return to normal bacterial levels for 6 hours.

General Considerations

- Preoperative Hair Shaving
 - No effect on P.acnes levels on skin
 - Marack et al JSES 2015
- Adhesive Drapes – iodophor impregnated
 - No effect on decreasing infection rate
- Antibiotics
 - Cefazolin (Ancef) 30 minutes prior to incision
 - MIC (Mean Inhibitory Concentration) 8-1
 - 3 doses post op
 - Does not cover P.acnes
 - Vancomycin – recommended if prior history of Methicillin resistant Staph aureus or colonization
 - Newer Cephalosporins (Ceftaroline) currently very expensive

Preadmission Showering

- 4% Chlorhexidine Gluconate 118ml per shower
- 2 showers – evening before and morning of
- Pause 1 minute before rinsing off
- Text , email or voicemail was used to remind pts. to complete the showers.
- Produced high concentration of chlorhexidine gluconate to decrease bacterial load on the skin.
- Edmiston et al JAMA Sept 2015

Benzoyl Peroxide

5% Benzoyl Peroxide cream 48 hours
Skin cultures before and after surgery
- decreased the positive cultures to 6%
before surgery & 10% after surgery.
Sabette et al, JSES 2015

Peroxide

- Two Peroxides
- Hydrogen Peroxide & Benzoyl Peroxide
- Both are used to treat acne
Compounds with one oxygen-oxygen single
bond
Strong oxidizers & are converted by living tissue
into oxygen



Hydrogen Peroxide

- Very strong oxidizer that living tissue breaks down into oxygen and water
- Acts as peeling agent by removing the film of dirt covering the skin
- Helps unclog skin pores which harbor P.acnes
- P.acnes is a primarily anaerobic organism and cannot survive in presence of high oxygen

Risk Factors

- Younger Age - 1 year age increase = 5% lower risk
- Male Gender 2.5 X female
- Reverse TSA 6 X aTSA
- TSA for trauma 3 X elective TSA

- CORR 2014
 - 3906 pts. Kaiser Permanente S. California
 - Harbor City, San Diego & Sacramento
 - Navarro, Singh, Dillon et al

Infection after Primary aTSA vs rTSA JSES 2015 Florschutz, Lane & Crosby

- 2004- 2012
- Only Primary procedures No revisions
 - Hoods worn for all TSA
 - Peri-operative antibiotics given in holding area
 - Skin prep Chlorihexidine
 - Limited traffic in OR
 - Procedures averaged 2 hrs or less

Results

Total # Primary Arthroplasties -2004-2012

- 814 Arthroplasties
- 350 Primary aTSA
- 464 Primary rTSA

- Organisms:
- Primarily Staphylococcus species
 - P.Acnes 4 out of last 6 infections
 - Escherichia coli



Conclusion

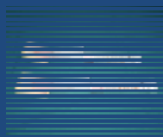
- Slightly higher infection rate in rTSA vs aTSA
 - 2.2% vs 1.7%
- Previous operative history rTSA and aTSA
 - Higher overall infection rate 4.3% **P=0.016**
- Previous operative history vs non operative history
 - rTSA 4.7% vs 1% **P = 0.016**

Is Previous Nonarthroplasty Surgery a Risk Factor for Periprosthetic Infection in Primary Shoulder Arthroplasty

- JSES April 2017 - Mayo Clinic
- 1970-2012 - 4577 pts
- 813 pts (18%) had previous surgery
- NO previous surgery 1.28% deep infection
- Previous surgery 2.46%

Current Changes

- Antibiotics
 - Ancef pre op and 3 doses post op
 - 1 gram of Vancomycin or Clindamycin intra op
- Skin Preparation
 - clean the skin with peroxide prior to prep with Chlorhexidine
 - Re-prep edges of wound prior to closing skin



Changes Since 2012

- 350 primary tsa
 - 2 infection E.coli (0.8%)
 - 1 P. Acnes
 - Previous surgery
 - biopsy + = spacer



Recommendations for Prevention:

1. Shower with 4% chlorhexidine gluconate
2. Benzoyl or hydrogen peroxide
3. Antibiotic specific to P.acnes
4. Intraoperative deep biopsy in all pts with prior history of surgery on same shoulder