Debridement, Antibiotics and Implant Retention

AKA I&D with poly exchange

Joshua Drumm, D.O.
Debridement, Antibiotics and Implant Retention

- How I approach a DAIR
Debridement, Antibiotics and Implant Retention

- Sacred cows
Debridement, Antibiotics and Implant Retention

- Preoperative evaluation
  - Physical exam
    - Instability
    - Range of motion
  - Labs
    - ESR, CRP, CBC w/diff
    - Aspiration
      - Culture, crystal, cell count
  - Xrays
    - Correct poly liner
Debridement, Antibiotics and Implant Retention

- What it is...

- Meticulous procedure
  - POSTERIOR compartment
- Debridement & irrigation (not I&D)
- Healthy patient
- Wound dehiscence with arthrotomy disruption

THE DIFFERENCE BETWEEN SOMETHING GOOD AND SOMETHING GREAT IS ATTENTION TO DETAIL.

CHARLES R. SWINDOLL
Debridement, Antibiotics and Implant Retention

- What isn't it
  - Not a washout
  - Not a resident level case
  - Not a 30 minute case
  - Not an arthroscopic procedure
  - No sinus tract, immunocompromise, chronic (10 days), MRSA / Pseudomonas
  - No instability
  - Substitute for 2 stage
Failed Debridement and Implant Retention Does Not Compromise the Success of Subsequent Staged Revision in Infected Total Knee Arthroplasty (SW Young, JOA 2019)
Multicenter retrospective review over a 15-year period. Treatment success was defined as implant retention without the use of long-term suppressive antibiotics. This was compared between patients who underwent a staged revision as the first procedure for PJI (staged-only) and patients who failed DAIR before staged revision (F-DAIR).
Results: 63 staged revision, 228 underwent DAIR (first procedure) Of the 228 DAIR patients, 75 failed DAIR and underwent subsequent staged revision (F-DAIR). The success rate was 72% in the F-DAIR group and 81% in the staged-only group. On survival analysis, there was no significant difference in subdistribution hazard ratio comparing the probability of failure (implant retention) in the 2 treatments groups (subdistribution hazard ratio = 0.72; 95% confidence interval 0.32-1.61; $P = .42$).
Conclusion: This study suggested that a previously failed DAIR does not compromise the success rate of a subsequent staged revision.
My Approach

- **Step 1: Exposure**
  - Extensile exposure
  - Entire femoral component
  - Entire tibial component

- **Step 2: Debridement (repeat x2)**
  - Complete anterior / medial / lateral synovectomy
  - Poly removal
  - Posterior knee synovectomy
  - It's not a tumor, but it is!

- **Step 3: Irrigation (repeat x2)**
  - Pulse lavage 15 psi (controversial?, debridement vs trauma)
  - Betadine (Springer, J Bone Jt Infect, 2017)
  - Normal saline
  - Alcohol on all parts

- **Step 4: Closure**
  - Arthrotomy: 0 PDS, #2 barbed
  - Fat / subq: 2-0 PDS, 2-0 barbed
  - Skin: 3-0 barbed monocryl, +/- staples and glue
  - Drain 12-24 hours

"If you can't explain it simply, you don't understand it well enough."
Albert Einstein

"The more I learn, the more I realize how much I don't know."
My Approach

- Step 1: Exposure
  - Extensile exposure
  - Entire femoral & tibial components
My Approach

- Step 2: Debridement (repeat x2)
  - Complete anterior / medial / lateral synovectomy
  - Poly removal
  - Posterior knee synovectomy
  - It's not a tumor, but it is!
    - Abx = chemo
    - PJI sx = tumor resection
    - Recurrence = relapse
    - 5 year mortality
My Approach

- **Step 3: Irrigation (repeat x2)**
  - Pulse lavage 15 psi (controversial?, debridement vs trauma)
  - Normal saline (no antibiotics)
  - Betadine (Springer, J Bone Jt Infect, 2017)
  - Alcohol on all parts
My Approach

- **Step 4: Closure**
  - Arthrotomy: 0 PDS, #2 barbed
  - Fat / subq: 2-0 PDS, 2-0 barbed
  - Skin: 3-0 barbed monocryl, +/- staples and glue
  - Drain 12-24 hours
My Approach

- Please do NOT use
  - Intra-articular cocktail
    - Push bacteria in further
  - Powered Vancomycin
    - Wound complication
    - Possible decrease in early PJI
  - Systematic reviews = very weak evidence
  - Chlorhexadine / sodium hypochlorite / peroxide
My Approach

- Efficacy of Intraoperative Antiseptic Techniques in the Prevention of Periprosthetic Joint Infection: Superiority of Betadine. (Ghanem, JOA 2019)
BACKGROUND: Povidone-iodine (PI), chlorhexidine gluconate (CHG), and vancomycin (VANC) powder are common intrawound prophylactic agents to prevent periprosthetic joint infection during primary total joint arthroplasty. The aims of this study are (1) to determine the minimal inhibitory concentration (MIC) and time to death for PI, CHG, and VANC against multiple bacteria and (2) to determine time to death against bacteria dried on titanium discs.
METHODS: A standard quantitative suspension assay was performed to determine the MIC for PI, CHG, and VANC against (MRSA), Staphylococcus epidermidis, Haemophilus influenzae, Pseudomonas aeruginosa, Burkholderia cepacia, and Escherichia coli. Time to death assay was performed with time points of 0, 3, 30, and 60 minutes. Concentrations of antiseptic agents for time to death assay were 1% PI, 0.05% CHG, and 5 µg/mL VANC.
RESULTS: The MIC of PI was 0.63%, CHG was 0.0031%, and VANC was 1.56 µg/mL. All 7 bacterial isolates were completely killed by PI at all times tested. CHG failed to kill MRSA and B cepacia at 0- and 3-minute exposures. Vancomycin completely killed MRSA and S epidermidis isolates between 18-20 hours of exposure. E coli and S epidermidis were incompletely eliminated by CHG at 0 minutes, with all isolates eliminated at 3, 10, and 30 minutes.
CONCLUSION: Our study suggests that PI kills all bacteria tested immediately on contact and that the exposure time is not the key factor.
My Approach

- Antiseptics Commonly Used in Total Joint Arthroplasty Interact and May Form Toxic Products. (NJ Giori, J Arthroplasty 2018)
BACKGROUND: Our clinical experience is that chlorhexidine (CHX) and Dakin's solution (NaOCl) interact and form a precipitate. The purpose of this study is to determine whether this reaction could be replicated in a laboratory setting, and to determine if other commonly used antiseptics also visibly react when mixed.
METHODS: Four percent chlorhexidine gluconate (CHX), 0.5% sodium hypochlorite (NaOCl), 3% hydrogen peroxide (H₂O₂), and 10% povidone-iodine (BTD) solutions were obtained and all possible combinations were mixed. Any visible reactions were noted and recorded, and a literature search was performed to characterize the reaction and products.
RESULTS: CHX and NaOCl, CHX and H₂O₂, and CHX and BTD reacted instantly, forming a precipitate. NaOCl and H₂O₂ reacted to produce a gas. NaOCl and BTD reacted and produced a color change. The literature review revealed that at least 2 of the reactions tested (CHX + NaOCl and NaOCl + H₂O₂) could result in byproducts toxic to humans.
CONCLUSION: Surgeons must be aware of these interactions when using antiseptic solutions during procedures. Caution should be used combining or mixing antiseptics, and we recommend against concomitant introduction in a surgical wound.
My Approach

- Post op course

- 2-3 day stay (minimum)
  - Must have CULTURES prior to discharge
  - Pull drain following AM (blood = good media)

- PICC line
- ID consult

- IV antibiotics for 6 weeks / oral per ID (1-2 years)
My Approach

- **Step 1: Exposure**
  - Extensile exposure
  - Entire femoral component
  - Entire tibial component

- **Step 2: Debridement (repeat x2)**
  - Complete anterior / medial / lateral synovectomy
  - Poly removal
  - Posterior knee synovectomy
  - It's not a tumor, but it is!

- **Step 3: Irrigation (repeat x2)**
  - Pulse lavage 15 psi (controversial?, debridement vs trauma)
  - Betadine (Springer, J Bone Jt Infect, 2017)
  - Normal saline
  - Alcohol on all parts

- **Step 4: Closure**
  - Arthrotomy: 0 PDS, #2 barbed
  - Fat / subq: 2-0 PDS, 2-0 barbed
  - Skin: 3-0 barbed monocryl, +/- staples and glue
  - Drain 12-24 hours

---

"If you can't explain it simply, you don't understand it well enough."
Albert Einstein

---

"The more I learn, the more I realize how much I don't know."

Debridement, Antibiotics and Implant Retention

- How I approach a DAIR
Questions?

Joshua Drumm, D.O.