MANAGEMENT OF TOTAL JOINT ARTHROPLASTY INFECTIONS

Paul D. Holtom, MD
Professor of Medicine and Orthopaedics
USC Keck School of Medicine

TOTAL JOINT ARTHROPLASTIES

- In 2009: 1 million THA and TKA
- By 2030, estimate:
  - THA: 571,100
  - TKA: 3,480,000

Kurtz S, et al. JBJS 87:1487-97; 2005
Clinical Infectious Diseases 2013;56:1-25

INCIDENCE OF PROSTHETIC JOINT INFECTIONS

- Incidence highest in first 6 months
  - TKA > THA
- Reported incidence:
  - THA: 1.5-2.5%
  - TKA: 2.0-3.0%
- Mortality: 2.5%

Lentino JR. CID 36:1157; 2003
Clinical Infectious Diseases 2013;56:1-25
PREVENTION OF PJI

• Systemic prophylactic antibiotics
  – Introduced in late 1970’s
  – Most effective means of reducing the prevalence of postoperative wound infection
  – Timing, agent, and duration of administration of prophylactic antibiotics are controversial

PROPHYLACTIC ANTIBIOTICS

• Cefazolin (1 g)
  – 30 min before skin incision

• Vancomycin
  – Alternative in patients with true Type I hyper-sensitivity to penicillin

• No evidence to support administration of prophylactic antibiotics beyond 24 hours after surgery
**MICROBIOLOGY OF PJI**

- CNS 37%
- *S. aureus* 19%
- Streptococci 14%
- Gm + anaerobes 6%
- GNR 11%
- Anaerobes 12%


**CLASSIFICATION OF PJI**

- Expanded classification (Gustillo, 1994)
  - Positive intraoperative culture
  - Early postoperative infection
  - Acute hematogenous infection
  - Late chronic infection
POSITIVE INTRA-OPERATIVE CULTURES

• No clinical symptoms of infection
• 2 or more intra-op cultures positive for same organism
• Therapy:
  – No further surgery

POSITIVE INTRA-OPERATIVE CULTURES

• Antibiotic therapy
  – Staphylococcal infection:
    • 2-6 weeks of specific IV abx (？ + RIF) followed by oral antibiotics to complete 3 months of therapy
    • Possible indefinite oral suppressive therapy
  – Other organisms
    • 4-6 weeks of specific abx followed by indefinite oral suppressive therapy

EARLY POST-OPERATIVE INFECTION

• Occurs within 30 days of implantation
• Therapy:
  – Surgical debridement
  – Exchange of liners
  – Antibiotics based on organism
    • Staphylococci: 2-6 weeks of IV abx + RIF followed by 3-6 mo of oral abx + RIF
    • Non-staph: 4-6 weeks of appropriate abx followed by indefinite oral suppressive therapy
EARLY POST-OPERATIVE INFECTION

• Outcome:
  – THA: 74% success
  – TKA: 70% success

ACUTE HEMATOGENOUS INFECTION

• Acute infection symptoms <3 weeks
  – Well fixed prosthesis
  – No sinus tract
  – Susceptible to oral agents for prolonged suppression

• Surgical Therapy:
  – Surgical debridement
  – Exchange of liners
• Antibiotics as in early post-op infection

• Outcome:
  – THA: >80% success
  – TKA: >80% success
LATE CHRONIC INFECTION

- Most common type of infection
- Insidious clinical onset
- Several treatment options
  - Dependent on organism, whether the implant is mechanically stable, and the patient

LATE CHRONIC INFECTION: TREATMENT OPTIONS

- Antibiotic suppression
  - Success rate: 23% overall
    - Drancourt reported “cure” in 80% of THA and 69% of TKA
  - Only in patients unable to undergo surgery
  - Dangers include complications of antimicrobials and development of resistant organisms

- Debridement with retention of TJA
  - Generally poor results reported
LATE CHRONIC INFECTION: TREATMENT OPTIONS

- Antibiotic suppression
- Debridement with retention of TJA
- Removal and reimplantation

REIMPLANTATION

- One-stage exchange
  - TKA: 77% success
- Two-stage exchange without Ab-PMMA
  - TKA: 86% success
- Two-stage exchange with Ab-PMMA
  - TKA: 90% success
- Two-stage exchange with spacer/beads
  - TKA: 94% success

REIMPLANTATION: RECOMMENDATIONS

- Removal of components
  - Reaming of canal; removal of all cement
  - Antibiotic-impregnated spacer (or beads)
REIMPLANTATION: RECOMMENDATIONS

• Medical management 1-stage exchange
  – 4-6 weeks of appropriate antibiotics
  – RIF not routinely recommended since components (biofilm) has been removed

• Medical management 2-stage exchange
  – 4-6 weeks of appropriate antibiotics
  – RIF not routinely recommended since components (biofilm) has been removed

• Antibiotic-free period of 2-6 weeks
• Assessment of ESR/CRP
• Aspiration of joint for culture in selected cases
• Reimplantation if no evidence of infection
LATE CHRONIC INFECTION: TREATMENT OPTIONS

• Antibiotic suppression
• Debridement with retention of TJA
• Removal and reimplantation
• *Alternatives* in patients where reimplantation cannot be done:
  – Resection arthroplasty with brace
  – Arthrodesis (fusion)
  – Amputation

CONCLUSIONS

• PJI are devastating, difficult to treat infections
• There is little evidence-based literature to support current treatment recommendations

There is no subject, however complex, which if studied with patience and intelligence, will not become more complex.

THANK YOU