

Operative Cultures Rarely Necessitate Change to PJI Antibiotic Plan Based on Preoperative Aspiration

Merrick I. Ducharme, M.D.; Khalid A. Elmerawi, M.D.; Hervé Polivacha, M.D.; Charles F. Hannon, M.D., MBA; Matthew P. Abdel M.D.; Aaron J. Iande, M.D.; Nicholas A. Bedford, M.D.

Department of Orthopedic Surgery, Mayo Clinic, Rochester, MN; Division of Infectious Diseases, Mayo Clinic, Rochester, MN.

[illegible]

Background

- When managing PJI, surgeons routinely collect cultures preoperatively and during surgery
- Intraoperative cultures frequently take several days to result and waiting can prolong patient hospital stays

Purpose

- Evaluate the appropriateness of antibiotic regimens based on preoperative cultures in single organism PJs

Patients and Methods

- Mayo Clinic Total Joint Registry from 2013 – 2022
- Identified 925 PJTs (312 THAs and 613 TKAs) based on MSIS criteria
- Results of preoperative joint aspiration:
 - Cultures were monomicrobial in 641 (70%)
 - Negative in 171 (18%)
 - Polymicrobial in 107 (12%)
- For the 641 with monomicrobial cultures from preoperative aspiration, concordance between preoperative and operative cultures was assessed
- Discordant results were reviewed by an infectious diseases specialist to assess whether antibiotic plans based on preoperative culture would require modification following operative culture results

Results

Preoperative and Operative Culture Concordance

- Preoperative and operative cultures were concordant in **76% of PJIs (n=484) (Fig. 1)**
- Despite positive preoperative cultures, operative cultures were negative in **12% of PJIs (n=80)**
- Cultures were discordant with preoperative cultures in **12% of PJIs (n=77)**
 - Discordant due to contaminant: **8% of PJIs (n=52)**
 - True discordant: **4% of PJIs (n=25) (Fig. 2)**

Case Example: 60-year-old male with knee PJI (Fig. 2)

- Preoperative aspiration: *S. epidermidis*
- Operative culture: *S. epidermidis* & *S. aureus*
- Modification required to antibiotic regimen: NO



Results

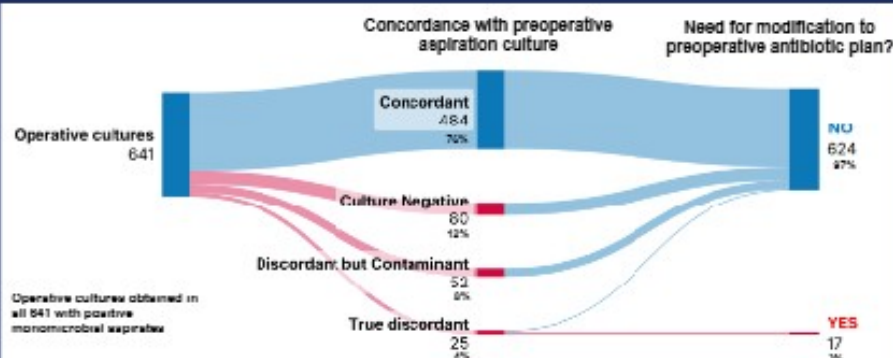
Antibiotic Coverage Based on Preoperative Culture

- Antibiotic plans based on preoperative aspirations were appropriate for **97% of monomicrobial PJIs**
- Among the 25 true discordant preoperative and operative cultures:
 - Modification to preoperative antibiotic plan would be needed for discordant organism: **17 PJIs (3%)**
 - Antibiotic plan based on preoperative culture would have covered discordant organism: **8 PJIs (1%)**

Figure 2. Anteroposterior Radiograph of Patient with TKA PJI and Discordant Preoperative and Operative Cultures



Figure 1. Sankey Diagram of Culture Concordance and Antibiotic Coverage



Conclusions

- Preoperative aspirations yielded a single organism in 70% of PJIs
- Only 3% of PJIs had discordant operative cultures requiring a change in antibiotic plan
- In PJIs with monomicrobial preoperative aspirates, an antibiotic regimen targeting this pathogen is highly likely to not require modification following surgery based on operative cultures.
- For monomicrobial PJIs, antibiotic plans could be safely developed preoperatively, potentially expediting insurance approval and shortening hospital stays