

## **Deep Infections After Open and Closed Fracture: PREP-IT Investigators**

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### **INTRODUCTION:**

The results from the PREPARE and A-PREP studies from the PREP-IT investigators were recently published investigating the incidence of surgical site infection (SSI) in open and closed extremity fractures. Secondary analyses are being performed. The purpose of this study is to describe the culture and speciation results of patients with SSI.

**METHODS:** Among the two studies, a total of 484 cases (defined as anatomic fracture-area; some patients had multiple fractures each defined as a “case”) had cultures taken from deep or organ tissue. Culture positive rate was 96.9% (468/484; 95%CI: 94.9-98.3%). There were no statistically significant differences in culture positivity between open (97.5%; 274/281; 95%CI: 94.9%-99.0%) and closed (96.1%; 194/203; 95%CI: 92.4%-98.4%) fractures ( $p = 0.81$ ). Out of positive cultures, there was information of microbial species for 461 cases (95.2%). For patients with positive cultures, 73.3% (337/461) were polymicrobial infections. Open fractures (76.8%; 205/267) were significantly more likely to be polymicrobial ( $p = 0.044$ ) compared to infections in closed fractures (68.6%; 134/194). MSSA was the most common microbe, accounting for 16.5% (236/1427) of all positive cultures. MSSA significantly ( $p < 0.001$ ) accounted for more infections in closed fractures (21.6%; 119/551) as compared to open fracture (13.4%; 117/876).

### **RESULTS:**

Among the two studies, a total of 484 cases (defined as anatomic fracture-area; some patients had multiple fractures each defined as a “case”) had cultures taken from deep or organ tissue. Culture positive rate was 96.9% (468/484; 95%CI: 94.9-98.3%). There were no statistically significant differences in culture positivity between open (97.5%; 274/281; 95%CI: 94.9%-99.0%) and closed (96.1%; 194/203; 95%CI: 92.4%-98.4%) fractures ( $p = 0.81$ ). Out of positive cultures, there was information of microbial species for 461 cases (95.2%). For patients with positive cultures, 73.3% (337/461) were polymicrobial infections. Open fractures (76.8%; 205/267) were significantly more likely to be polymicrobial ( $p = 0.044$ ) compared to infections in closed fractures (68.6%; 134/194). MSSA was the most common microbe, accounting for 16.5% (236/1427) of all positive cultures. MSSA significantly ( $p < 0.001$ ) accounted for more infections in closed fractures (21.6%; 119/551) as compared to open fracture (13.4%; 117/876).

### **DISCUSSION AND CONCLUSION:**

In patients with suspected SSI, tissue samples yielded microbial culture results. There was a significantly higher incidence of polymicrobial results in open fractures. MSSA was more prevalent in closed versus open fractures. Analysis of incidences of specific microbes in polymicrobial cultures, antimicrobial treatments, and time to infection are ongoing. Clinicians should not hesitate to take deep tissue cultures in patients highly suspicious for infection and be prepared to encounter polymicrobial infections.