

Methods: Remnant synovial fluid specimens, which were collected for routine clinical care at 13 study sites in the US and Europe, underwent testing using an IUO version of the BioFire BJI Panel. Performance of this test was determined by comparison to Standard of Care (SoC) consisting of bacterial culture performed at each study site according to their routine procedures.

Results: A total of 1544 synovial fluid specimens were collected and tested with the BioFire BJI Panel. The majority of specimens were from knee joints (77.9%) and arthrocentesis (79.4%) was the most common collection method. Compared to SoC culture, overall sensitivity was 90.2% and specificity was 99.8%. The BioFire BJI Panel yielded a total of 268 Detected results, whereas SoC yielded a total of 215 positive results for on-panel analytes.

Conclusion: The BioFire BJI Panel is a sensitive, specific, and robust test for rapid detection of a wide range of analytes in synovial fluid specimens. The number of microorganisms and resistance genes included in the BioFire BJI Panel, together with a reduced time-to-result and increased diagnostic yield compared to culture, is expected to aid in the timely diagnosis and appropriate management of BJIs.

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323. First case of Prosthetic joint infection due to *Nocardia veterana-elegans*

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Session: P-10. Bone and Joint

Background: *Nocardia* are Gram-positive filamentous bacteria that cause Nocardiosis, a rare opportunistic infection. The most common site of infection is the lungs, with metastatic spread usually to the central nervous system. Prosthetic joint infection due to *Nocardia* is very rare.

Methods: We report the first case of prosthetic joint infection due to *Nocardia veterana-elegans*, and review the literature regarding *Nocardia* septic arthritis, with particular attention to prosthetic joint infection.

Results: The patient was a 35 year old male with history of Hodgkin's Lymphoma for which he received chemotherapy previously, poorly controlled diabetes, motor vehicle accident in 2003 with right open tibial plateau fracture requiring hardware placement, who was admitted with a two week history of right knee pain and swelling. Knee aspiration revealed purulent fluid and synovial culture grew *Nocardia* species. He underwent right knee arthroscopy and debridement with removal of hardware. The *Nocardia* species was speciated as *N. veterana-elegans*, sensitive to trimethoprim/sulfamethoxazole, linezolid, clarithromycin, imipenem and amikacin. He was placed on oral linezolid for four weeks, which was then switched to oral trimethoprim/sulfamethoxazole, with a plan for a six month course of therapy. He has completed two months of therapy thus far and is doing well clinically.

Nocardia is an uncommon cause of septic arthritis. We found only 37 cases reported in the English literature thus far. Amongst these, only six involved prosthetic joints, including our case, which is the first one to be caused by *N. veterana-elegans*. Three cases were caused by *N. nova* and one each by *N. farcinica* and *asteroides*. Septic arthritis due to *Nocardia* has a favorable outcome with a combination of surgical debridement and prolonged antimicrobial therapy of three to six months. For prosthetic joint infections, removal of hardware seems to carry a better prognosis. Trimethoprim/sulfamethoxazole is the preferred antimicrobial, including for bone and joint infection, although susceptibilities can vary amongst the different species.

Conclusion: *Nocardia* is an uncommon cause of septic arthritis. Prosthetic joint infection is very rare. Prognosis is fair with a combination of hardware removal and prolonged antibiotic therapy.

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324. Implant Sonication Improves Microbiologic Diagnosis of Elbow Prosthetic Joint Infection

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Session: P-10. Bone and Joint

Background: With a reported incidence of up to 12%, periprosthetic joint infection (PJI) is a frequent complication of total elbow arthroplasty (TEA). Its microbiologic diagnosis is usually based on periprosthetic tissue culture (hereafter referred to as tissue culture), despite the poor sensitivity of this technique. Although implant sonication cultures have been shown to be superior to tissue cultures for hip and knee PJI diagnosis, only a single small study (including fewer than 10 infected implants) has assessed sonication of elbow arthroplasties.

Methods: We retrospectively analysed 116 sonicate fluid cultures from patients who underwent revision of a TEA at our Institution between 2007 and 2019, comparing results to tissue cultures. Nine elbows who had fewer than 2 tissue samples obtained during surgery were excluded. Using the IDSA guidelines to define PJI, there were 46 infected cases and 61 aseptic failures. We reviewed clinical characteristics and calculated the sensitivity and specificity of periprosthetic tissue culture compared to culture of samples obtained by implant sonication. In addition, we compared the sensitivity of tissue culture to the combination of tissue and sonicate fluid culture.

Results: A total of 107 elbows were included. Median ages in the aseptic failure and PJI groups were 60 and 67 years, respectively. Gender distribution was similar for both groups (PJI

group 62% females; aseptic group 65% females). The most common pathogens were coagulase negative *Staphylococcus* species (66%), followed by *Staphylococcus aureus* (18%). The sensitivity of tissue culture was 63% and the sensitivity of sonicate fluid culture was 76% ($p=0.14$). The specificity of tissue culture was 86% and the specificity of sonicate fluid culture was 100%. Sensitivity of sonicate fluid culture in combination with tissue culture was 91% ($p=0.045$).

Table. Comparison of tests for microbiologic diagnosis of PJI

	PJI (n=46)	Aseptic Failure (n=61)	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	Positive Predictive Value (%) (95% CI)	Negative Predictive Value (%) (95% CI)
Periprosthetic tissue culture ¹	29	7	63 (48-77)	89 (78-95)	81 (67-90)	76 (68-82)
Sonicate fluid culture ²	35	0	76* (61-87)	100 (94-100)	100 (100-100)	85 (77-90)
Sonicate fluid and/or periprosthetic tissue culture	42	7	91** (79-98)	89 (78-95)	86 (75-92)	93 (84-97)

¹Positive tissue culture was defined as ≥1 positive tissue for *Staphylococcus aureus* and ≥2 positive tissues for less virulent organisms

²Positive sonicate fluid culture was defined as growth of ≥20 CFU/10 ml sonicate fluid

*p<0.05, in comparison to positive tissue culture

**p<0.05, in comparison to positive tissue culture

Conclusion: The combination of sonicate fluid culture and tissue culture had a greater sensitivity than tissue culture alone for microbiologic diagnosis of elbow TEA infection.

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325. Invasive and Non-Invasive Osteomyelitis Caused by Group B Streptococcus Infection Among Veterans

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Session: P-10. Bone and Joint

Background: Epidemiological studies that assess invasive Group B Streptococcus (GBS) infections may not capture cases of osteomyelitis diagnosed using non-invasive cultures in combination with imaging, laboratory tests, and clinical assessment. Here, we compare GBS osteomyelitis among individuals diagnosed using invasive and non-invasive cultures.

Methods: Using the Veterans Health Administration corporate data warehouse, we studied a national retrospective cohort review of Veterans diagnosed with GBS osteomyelitis between 2008 – 2017. Invasive cases were defined as an International Classification of Disease (ICD) code for osteomyelitis accompanied by a blood or bone culture positive for GBS within 2 weeks. Non-invasive cases were defined as an ICD code for osteomyelitis and a non-invasive culture positive for GBS from a concordant site within 2 weeks. We compared demographics, comorbid conditions, mortality, and time to below- or above-knee amputation among patients with invasive and non-invasive GBS osteomyelitis.

Results: We identified 1167 cases of invasive osteomyelitis among 1077 patients and 692 cases of non-invasive osteomyelitis among 644 patients. Most patients were male (98%) with an average age of 63.2 years (± standard deviation (SD) 10.1 years). The Charlson Comorbidity Index (CCI) was similar among patients with invasive and non-invasive disease (3.85 ± SD 2.3 and 3.83 ± SD2.4, respectively). Among those with lower extremity osteomyelitis, 11% of invasive cases had an amputation at 30 days while 2% of non-invasive cases had an amputation in the same time frame (Figure 1). Mortality was similar among those with invasive and non-invasive GBS osteomyelitis at 30-days (1% and 1%, respectively) and at 1-year (11% and 9%, respectively) (Figure 2).

Figure 1: Time to Amputation

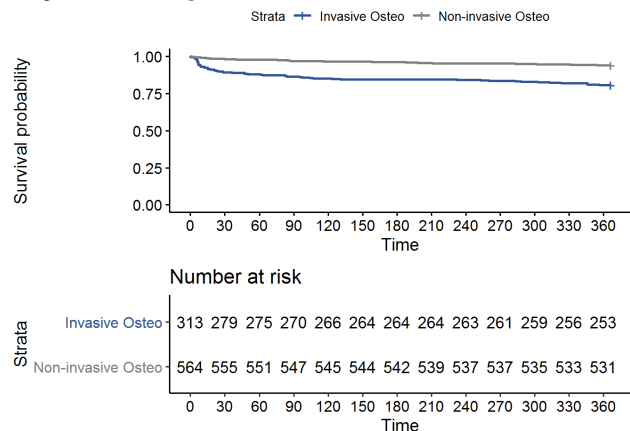
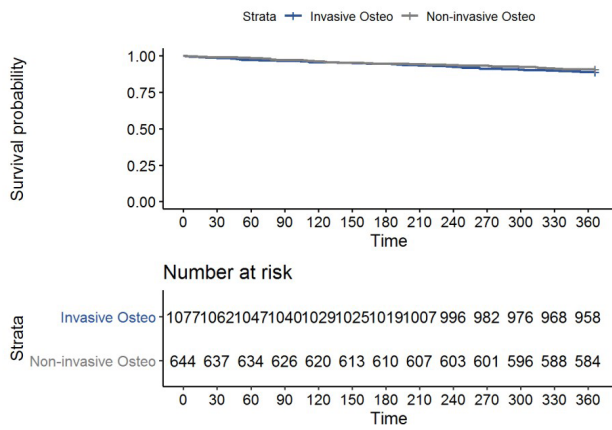


Figure 2: Survival



Conclusion: Over 1/3 of the cases of osteomyelitis caused by GBS do not meet the case definition for invasive disease. Whether diagnosed using invasive or non-invasive microbiological cultures, survival outcomes for people with GBS osteomyelitis were similar. These findings suggest that non-invasive GBS osteomyelitis is as clinically important as invasive GBS osteomyelitis and that the rates of GBS osteomyelitis may be higher than previously reported.

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326. More Specialties, Less Problems: Creating collaborative competency between Infectious Disease, Podiatry, and Pathology co-managing diabetic foot infections
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Session: P-10. Bone and Joint

Background: According to the 2016 and 2017 National Health Interview Survey, 9.7% of the US population is estimated to have diabetes mellitus (either type 1 or type 2).¹ Among patients with diabetes, there is a 15% lifetime risk of developing a foot ulcer, making it an extremely common medical problem seen in both outpatient and inpatient settings.² In fact, Medicare spends \$9–13 billion/year on diabetic foot osteomyelitis (DFO).³ Despite this high prevalence and cost, experts have not agreed on a set of diagnostic criteria for diagnosing DFO,⁴ nor the optimal antibiotic management.⁵ For example, while traditionally diabetic foot osteomyelitis has been treated with 4–6 weeks of IV antibiotics in the United States, oral antibiotics have been shown to be effective with similar cure rates in multiple studies^{6–8}, non-inferior in a Cochrane review,⁵ and are recommended in the most recent (2012) Infectious Disease Society of America (IDSA) DFO clinical practice guidelines.⁹

Methods: Representatives from ID, Podiatry, and Pathology collaborated to develop consensus on aspects of management of DFO. We created an educational session, inviting providers from all three departments to develop consensus on some of the controversial aspects of DFO. We assessed for knowledge gain by having these providers complete a pre-test survey as well as a post-test survey 2 weeks after the intervention.

Level of Training	Number (N=27)	Percentage of Total Participants
Nurse (or Nursing Student)	2	7%
Resident	2	7%
Pharmacist (or Pharmacy Student)	4	15%
Fellow	9	33%
Attending	10	37%
Primary Specialty		
Podiatry	3	11%
Pathology	2	7%
Infectious Disease	22	81%
Diabetic Foot Infection Cases Seen		
Less than 1 per month	5	19%
1 to 5 per month	11	41%
More than 5 per month	11	41%

Table 1: Characteristics of Participants.

Results: 27 providers completed both a pre and post-tests after attending the educational session. Significant improvements were observed in learners understanding of duration of antibiotic treatment and the role of oral antibiotics in certain cases of diabetic

foot osteomyelitis to obviate the need for an unnecessary intravenous antibiotics and Peripherally Inserted Central Catheter (PICC) lines. Additionally, by working as an interdisciplinary group, many solvable misunderstandings were identified, and processes were adjusted to improve the quality and efficiency of care provided to these patients.

Figure 1: Results of the Pre- and Post- Assessment

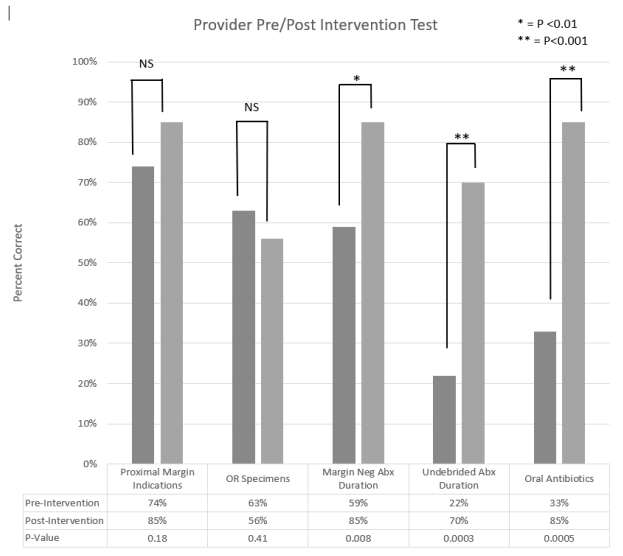


Figure 1: Results from the Pre and Post Surveys of Providers after the Educational Session.

Conclusion: This multidisciplinary, educational session regarding management of DFO led to improved provider knowledge and collaborative competency between these three departments. Further study is being completed assessing patient outcomes before and after this intervention and will be available by IDWeek.

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327. Oritavancin Activity against Staphylococcus aureus Isolates Causing Bone and Joint Infections in European Hospitals (2010–2019)

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Session: P-10. Bone and Joint

Background: Bone and joint infections (BJI) frequently are caused by *Staphylococcus aureus* (SA), and since prolonged therapy courses typically are required, agents with convenient administration are preferred. Oritavancin (ORI) is a long-acting lipoglycopeptide approved as a single dose regimen for treating skin and skin structure infections. This study evaluates the activity of ORI and comparators against SA causing BJI in European (EU) hospitals.

Methods: A total of 575 SA isolates from the SENTRY Antimicrobial Surveillance Program causing BJI in 15 EU countries from 2010 to 2019 were included. Bacterial identification was confirmed by MALDI-TOF MS. Broth microdilution susceptibility (S) testing and interpretation was performed following current CLSI guidelines. The activities of ORI and comparators were evaluated across the years and by EU region: western Europe (W-EU; 491 isolates) and eastern EU/Mediterranean region (E-EU; 84 isolates).

Results: Methicillin resistance (MRSA) was observed in 20.5% of SA (18.5% in W-EU and 32.1% in E-EU), ranging from 31.1% in 2011 to 14.6% in 2016. MRSA rates were slightly lower in 2016–2019 (14.6%–19.2%) than previous years (2011–2013; 24.4%–31.1%). ORI exhibited 100.0% susceptibility across the entire SA collection with yearly MIC₅₀ and MIC₉₀ variations within 1 doubling dilutions (MIC₅₀ and MIC₉₀, 0.015–0.03 and 0.03–0.06 mg/L, respectively), regardless the MRSA phenotype or EU region. Daptomycin, vancomycin, teicoplanin, and linezolid also showed complete coverage against SA. Clindamycin (CLI; >99.0%S) and levofloxacin (> 95.0%S) were active against methicillin-susceptible SA, but less active against MRSA (67.8%S and 16.1%S, respectively). E-EU MRSA isolates displayed lower S rates than W-EU MRSA isolates to ceftaroline (83.3% vs. 90.6%), CLI (44.4% vs. 74.7%) and tetracycline (66.7% vs. 89.0%), respectively.

Conclusion: MRSA rates among isolates causing BJI varied within regions. Although several drugs were *in vitro* active against MSSA, options remained limited against MRSA. ORI showed *in vitro* activity against the entire collection of European SA isolates and may be a consideration for treating BJI with the convenience of drug administration.