admitted to Rady Children's Hospital from July 2019 through July 2020. We excluded any patients with bone or joint surgery within 30 days prior to admission. Operative samples were chosen at the surgeon's discretion (joint aspirate, synovium, or bone) based on operative findings. We compared NGS testing to standard care culture from the same site.

**Results:** We enrolled 41 subjects. NGS of the operative samples identified a pathogen in 26 (63.4%) patients versus 18 (43.9%) by culture. Operative culture missed the diagnosis in 10 cases, though PCR identified the organism in 6 of those cases (5 were cases in which Kingella kingae was identified). In 4 subjects, NGS identified a putative organism where standard care testing (either PCR or culture) was negative. NGS was falsely positive in 1 subject and falsely negative for one other subject. Sensitivity was 96.3% (CI 95%, 66.1–99.8) for NGS versus 64.3% (CI 95%, 44.1–81.4) and 84.6% (CI 95%, 54.6–99.9%) for culture respectively.

**Conclusion:** In this single site prospective study of pediatric osteoarticular infections, we demonstrate improved sensitivity and specificity of NGS testing when compared to standard culture.

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330. Risk Factors for Acute Kidney Injury after the Use of Antibiotic Loaded Bone Cement in Orthopedic Surgery – a Retrospective Case-control Study Lucas Schulz, PharmD<sup>1</sup>; Darina Georgieva, BS<sup>2</sup>; Ambar Haleem, MD<sup>3</sup>; <sup>1</sup>University of Wisconsin Health, Verona, WI; <sup>2</sup>University of Wisconsin School of Pharmacy, Madison, Wisconsin; <sup>3</sup>University of Wisconsin School of Medicine and Public Health, Madison, WI, Madison, Wisconsin

#### Session: P-10. Bone and Joint

**Background:** As the number of joint replacement surgeries continues to rise, so does the number of joint infections. Many patients end up needing the implantation of antibiotic loaded bone cement (ALBC) to treat their infection. The use of localized high dose vanco-mycin, tobramycin, and gentamicin may be linked to acute kidney injury (AKI) in certain patients. Our hypothesis is that patients who developed AKI after receiving a joint space had a predisposition to AKI due to other comorbidities, high antibiotic doses in ALBC, immunosuppression, or the use of other nephrotoxic drugs pre-op. These patients may need close monitoring of their renal function and serum antibiotic levels after surgery.

**Methods:** We performed a chart review of 428 patients who underwent an orthopedic surgery that involved insertion of ALBC at our institution between 2015 and 2018. We excluded patients under age 18, those who had antibiotic irrigation only, trauma patients, non-arthroplasty surgeries (such as fractures and debridement of deep wounds), and patients with missing data for 30 days after the surgery. We identified 57 patients who fit our inclusion criteria and received a bone cement spacer or beads to treat an infection of the hip, knee, shoulder, or ankle. We matched patients who had AKI to 2 patients who did not have AKI. Matching was based on age ( $\pm$  5 years), joint operated on, and antibiotics used.

**Results:** 15 patients showed an elevated serum creatinine level of over 1.2 within 30 days of surgery. 86.7% of these patients were male, their average age was  $64.1 \pm 6.2$  years old, 40% had hip surgery, 46.7% knee surgery, 6.7% ankle, and 6.7% shoulder. All received vancomycin and tobramycin in Palacos bone cement. Compared to their case-control matches, these patients had more frequent use of immunosuppressive medication, a history of malignancy, a history of previous kidney disease, and obesity. The use of combined intravenous vancomycin and piperacillin-tazobactam post-operatively may also be linked to higher rates of AKI.

**Conclusion:** Immunosuppression, obesity, male gender, and history of kidney injury and cancer are factors associated with AKI after ALBC spacer implantation. Further analysis and study are needed to identify potential causation between ALBC use and AKI.

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#### 331. Septic arthritis: when is the joint clean enough?

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#### Session: P-10. Bone and Joint

**Background:** Septic arthritis is an orthopedic emergency that requires debridement. Previous authors reported that patients with inflammatory arthropathy, diabetes, infection with *S. aureus*, involvement of a large joint, and synovial fluid WBC >85,000 are associated with >1 debridements. The purpose of this study was to determine factors associated with 1 vs >1 debridements.

**Methods:** This is a retrospective cohort of adult patients hospitalized at Denver Health Medical Center with large joint septic arthritis between 7/1/2012 and 4/13/20. Patients with implanted orthopedic material, osteomyelitis, and recurrent septic arthritis were excluded. Septic arthritis was defined as a patient presenting with acute arthritis and positive culture OR negative culture and no other etiology. Both electronic capture and manual chart review were performed. Descriptive statistics were used to characterize the population. Statistical analyses included bivariate and multivariate analyses.

**Results:** Forty-four cases were included (26 knee [59.1%], 4 hip [9.1%], 6 elbow [13.6%], and 8 shoulder [18.2%]. The median age was 55.7 years (41.3–64.1], and 79.5% were male. The most common organisms were *S. aureus* (n=20, 45.5%) and beta-hemolytic *Streptococcus* (n=10, 22.7%). Three patients had no surgical debridement, 21 had 1 debridement, and 20 had >1 debridements.

As compared to those who had 1 debridement, those with >1 debridements were more likely to be male (95% vs 61.9%, p=0.02) and to have a higher synovial fluid leukocyte count (102,761 vs 49,154, p=0.001), CRP at admission (162.5 vs 97.7, p=0.039), and WBC the day prior to debridement (13.4 vs 9.8, p=0.007). Intra-operative purulence trended to association with >1 debridements. Pre- to post-operative changes in opiate use, temperature, and

ability to work with physical therapy were not associated with 1 vs >1 debridements. Both higher synovial fluid leukocyte counts and CRP value at admission were independently associated with >1 debridements (OR 2.31, p=0.015; OR 1.01, p=0.036 respectively).

**Conclusion:** Patients with higher synovial fluid leukocytes and CRP at admission were more likely to have >1 debridements. Additional studies with functional outcome scores are necessary to determine if >1 debridements are associated with better clinical outcomes.

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# 332. Spinal Infections: Clinical and Microbiological Characteristics in our Urban Referral Health Center

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# Session: P-10. Bone and Joint

**Background:** There has been an increasing trend in spinal infections (SI) in the U.S. over recent years. We sought to characterize the clinical and microbiological characteristics of SI at our hospital.

*Methods:* We conducted a retrospective review of SI over a 3-year period (2016 - 2019) utilizing ICD codes for data retrieval. Search terms included vertebral osteomyelitis, discitis, and epidural abscess. SPSS was used to compute the data.

**Results:** Of the initially screened 254 patients, 166 were included for analysis. Pertinent demographics were: mean age 59 years, male (61.4%), obese (44.5%), diabetic (25%), and drug-users (20%). Lumbosacral involvement was most common (69.8%); epidural abscess was present in 51.8% of patients. 15.7% had existing hardware. Overall, 79.5% (132/166) of cases had a positive culture from at least one site: blood 56.6% (94/166), CT-guided 83.5% (56/67), and surgical 51.1% (24/47). Of those patients with negative blood cultures, 22% (16/72) had pathogen recovery by CT-guided methods and 33% (24/72) from surgical specimens. S aureus was the most common pathogen isolated at 53.7% (71/132): MSSA comprised 38.6% (51/132) and MRSA 15.2% (20/132).

The mean CRP (8.46 vs 15.83 mg/dL; P < 0.001), and WBC (9.08 vs 13.18 k/mcL; P < 0.001) were higher in culture-positive as compared to culture-negative cases. Mean ESR and temperature more than 100.4 °F did not differ significantly between these two groups. The 8-week median recurrence rate was 11.4%, of which nearly half had index S aureus bacteremia.

Frequency of organisms isolated

Gram Positive	Organism	Frequency (%	
	MSSA	51 (38.6%)	
	MRSA	20 (15.2%)	
	Streptococci spp	16 (12.1%)	
	Coagulase negative Staph.	11(8.3%)	
	Others	11 (8.3%)	
Gram Negative	E.coli	3 (2.3%)	
	Pseudomonas	3 (2.3%)	
	Serratia	3 (2.3%)	
	Enterobacter	2 (1.5%)	
	Klebsiella pneumoniae	2 (1.5%)	
	Proteus	2 (1.5%)	
	Others	4 (3.0%)	
Fungi	C. Albicans	2 (1.5%)	
Polymicrobial	Polymicrobial	2 (1.5%)	

Association of mean inflammatory markers with positive cultures

		Temp (°C)	P value	ESR (mm/hr)	P value	CRP (mg/dL)	P value	WBC (k/mcL)	P value
Presence of Abscess	No	37.28	0.183	71.14	0.021	11.32	0.003	10.07	< 0.0001
	Yes	37.46		85.6		16.54		14.26	
Positive OR Culture	No	36.99	0.084	94.50	0.309	7.13	0.032	9.40	0.020
	Yes	37.54		79.33		14.90		14.06	
Positive IR Culture	No	37.33	0.488	64.85	0.336	8.37	0.024	9.02	0.024
	Yes	37.18		75.37		15.02		9.88	
Presence of Bacteremia	No	37.18	0.12	71.36	0.033	8.56	< 0.0001	9.35	<0.0001
	Yes	37.52		84.85		18.22		14.46	
Any Positive Culture	No	37.19	0.144	70.10	0.123	8.46	<0.0001	9.08	<0.0001
	Yes	37.43		81.74		15.83		13.18	

**Conclusion:** Our study affirmed that S aureus is the most common cause of SI, of which MSSA was predominant. Epidural abscess was encountered in a substantial

fraction of our case population. Leukocytosis and elevated CRP tended to predict culture-positive infection, whereas ESR and fever did not. As recommended in the IDSA Vertebral Osteomyelitis guidelines, blood cultures were obtained in all cases, which yielded positive results in more than half of patients. Pathogen recovery was further improved to nearly 80% with supplemental deep tissue sampling, thus highlighting the opportunity to enhance microbiological diagnosis at our institution.

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### 333. Tedizolid Activity against Gram-Positive Bacterial Isolates Causing Bone and Joint Infections in the United States (2015–2019)

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### Session: P-10. Bone and Joint

**Background:** Prolonged systemic antibiotic courses are frequently used to manage difficult-to-treat bone and joint infections (BJI). Tedizolid has been considered as a therapy candidate for BJI in adults and children. This study assessed the *in vitro* activity of tedizolid and comparator agents against a contemporary collection of Gram-positive (GP) isolates causing BJI in the US.

Methods: A total of 310 Staphylococcus aureus (SA), 79 β-hemolytic streptococci (BHS), 52 coagulase-negative staphylococci (CoNS), and 37 Enterococcus faecalis isolates were included in this study. These isolates were collected from patients with BJI from 30 medical centers in the US between 2015 and 2019 as a part of the Surveillance of Tedizolid Activity and Resistance (STAR) Program. Bacterial identification was confirmed by MALDI-TOF MS. MIC results were obtained by reference CLSI broth microdilution methods and interpretations used CLSI guidelines.

**Results:** Tedizolid (MIC<sub>50090</sub>, 0.12/0.25 mg/L) inhibited all SA at the CLSI breakpoint (≤0.5 mg/L) including methicillin-resistant SA (MRSA; 35.8% of SA; MIC<sub>5090</sub>, 0.12/0.25 mg/L). Linezolid, vancomycin, and daptomycin had 100% susceptibility rates against SA isolates (Table). All CoNS isolates were inhibited by tedizolid at ≤0.5 mg/L. Tedizolid was active against all BHS (100% susceptible) as follows: S. *pyogenes* (n=24; MIC<sub>5090</sub>, 0.12/0.25 mg/L), S. *agalactiae* (n=44; MIC<sub>5090</sub>, 0.12/0.25 mg/L), and S. *dysgalactiae* (n=11; MIC<sub>5090</sub>, 0.25/0.25 mg/L). Penicillin, linezolid, vancomycin, and daptomycin also were active against BHS (100% susceptible). Tedizolid (MIC<sub>5090</sub>, 0.25/0.25 mg/L), 100% susceptible). Tedizolid (MIC<sub>5090</sub>, 0.25/0.25 mg/L), and vancomycin (MIC<sub>5090</sub>, 1/2 mg/L) against *E. faecalis*. GP isolates resistant to oxazolidinone were not observed.

**Conclusion:** Tedizolid demonstrated potent *in vitro* activity against this collection of contemporary GP isolates causing BJI in US hospitals. Tedizolid and comparator agents showed high susceptibility rates against the most frequent organisms and organism groups, including MRSA. These findings support the clinical development of tedizolid as an additional option for treating BJI caused by GP pathogens. Table 1

Organism (no. tested)	MIC <sub>50</sub> /MIC <sub>90</sub> in mg/L (% susceptible by CLSI)						
Group/phenotype	Tedizolid	Linezolid	Vancomycin	Daptomycin			
MSSA (199)	0.12/0.25 (100)	1/2 (100)	0.5/1 (100)	0.25/0.5 (100)			
MRSA (111)	0.12/0.25 (100)	1/1 (100)	1/1 (100)	0.25/0.5 (100)			
CoNS (52)	0.12/0.12 (-)	0.5/1 (100)	1/2 (100)	0.25/0.5 (100)			
BHS (79)	0.25/0.25 (100)a	1/2 (100)	0.5/0.5 (100)	0.12/0.25 (100)			
E. faecalis (37)	0.25/0.25 (100)	1/1 (100)	1/2 (94.6)	1/1 (100)			

available. <sup>a</sup> Tedizolid breakpoint for S *pyogenes* and [S. *agalactiae* applied to the BHS group.

Cecilia G. Carvalhaes, MD, PhD, A. Menarini Industrie Disclosures: Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Cidara Therapeutics (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Fox Chase Chemical Diversity Center (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support) Merck (Research Grant or Support)Merck & Co, Inc. (Research Grant or Support) Pfizer (Research Grant or Support) Helio S. Sader, MD, PhD, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support) Cipla Ltd. (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Melinta (Research Grant or Support)Merck (Research Grant or Support)Merck (Research Grant or Support)Paratek Pharma, LLC (Research Grant or Support)Pfizer (Research Grant or Support) Jennifer M. Streit, BS, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support) Melinta Therapeutics, Inc. (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support) Merck (Research Grant or Support)Paratek Pharma, LLC (Research Grant or Support) Mariana Castanheira, PhD, 1928 Diagnostics (Research Grant or Support)A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Amplyx Pharmaceuticals (Research Grant or Support)Cidara Therapeutics (Research Grant or Support)Cidara Therapeutics (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Fox Chase Chemical Diversity Center (Research Grant or Support)GlaxoSmithKline (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support)Merck (Research Grant or Support)Merck & Co, Inc. (Research Grant or Support)Merck & Co, Inc. (Research Grant or Support)Paratek Pharma,

LLC (Research Grant or Support)Pfizer (Research Grant or Support)Qpex Biopharma (Research Grant or Support) Rodrigo E. Mendes, PhD, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Basilea Pharmaceutica International, Ltd (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Department of Health and Human Services (Research Grant or Support)GlaxoSmithKline (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support)Merck (Research Grant or Support)Pfizer (Research Grant or Support)

# 334. Treatment Duration of Antibiotics for Sacral Osteomyelitis After Skin Flap Procedure

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## Session: P-10. Bone and Joint

**Background:** Patients with spinal cord injuries frequently develop sacral osteomyelitis. Optimal treatment often involves intravenous antibiotics and skin flap closure of the ulcer; however, best practices for the duration of antibiotic therapy pre- and post-procedure are unknown.

**Methods:** This was a retrospective, cohort study of spinal cord injury patients at the VA St. Louis undergoing a skin flap procedure from 1 October 2014 to 31 March 2019. Patients aged 18 to 89 years with a documented spinal cord injury and receiving treatment for sacral osteomyelitis with antibiotics and skin flap placement were considered for inclusion. The primary outcome was to determine if there was a difference in antibiotic treatment duration, both pre-procedure and post-procedure, between those that failed combination therapy and those patients for which the treatment was successful. Treatment failure was defined as documentation of no resolution of sacral osteomyelitis after treatment, re-initiation of antibiotics for sacral osteomyelitis of the same area, documented flap break-down, or an unplanned flap-related procedure within 1 year of completion of antibiotic therapy.

**Results:** Twelve patients were identified for inclusion. Baseline characteristics were similar between groups; 5/8 patients successfully treated received vancomycin, compared to 4/4 patients that failed therapy. Overall, 75% (8/12) had a successful treatment outcome at 12 months. In qualifying patients, average days of pre-procedure and post-procedure antibiotics were similar between patients who achieved success and those who failed (45.5 vs. 44.3 days pre-procedure, respectively (p > 0.05) and 39 vs. 43 days post-procedure (p > 0.05), respectively). When evaluated by weeks of therapy, no statistically significant differences were noted in treatment success rates between those treated for less than 6 weeks versus those treated for longer (66.6% [2/3] vs. 63.6% [6/9], p > 0.05).

**Conclusion:** No difference in pre- or post-flap procedure antibiotic duration was observed in patients who failed therapy compared to those who were successfully treated.

Disclosures: All Authors: No reported disclosures

335. Using high temperatures to eradicate prosthetic joint associated biofilms on metal implants using alternating magnetic field: Efficacy and safety implications Sumbul Shaikh, B.S<sup>1</sup>; Bibin Prasad, PhD<sup>1</sup>; Carolyn Sturge, Ph. D<sup>2</sup>; Christine A. Pybus, MS<sup>3</sup>; Reed Pifer, PhD<sup>2</sup>; Qi Wang, MS<sup>2</sup>; Yonathan Chatzinoff, n/4<sup>4</sup>; Chenchen Bing, MS<sup>5</sup>; Rajiv Chopra, PhD<sup>1</sup>; David E. Greenberg, MD<sup>6</sup>; <sup>1</sup>UT Southwestern Medical Center, Farmers Branch, Texas; <sup>2</sup>UTSouthwestern Medical Center, Dallas, Texas; <sup>3</sup>UT SOUTHWESTERN MEDICAL CENTER, DALLAS, TX; <sup>4</sup>Pill Tracker, Dallas, TX

#### Session: P-10. Bone and Joint

**Background:** Prosthetic joint infection (PJI) is a significant complication of modern arthroplasty. Revision surgery is frequently required due to the formation pf biofilm. The presence of biofilm makes non surgical treatment difficult in part because traditional antibiotics are unable to penetrate this structure.

We have developed a noninvasive way to eradicate biofilm off the outer surface of metal implant utilizing alternating magnetic fields (AMF). AMF creates focused surface heating on metal lic implants and can be delivered in a fashion spares significant heating of surrounding tissue. The study was to determine efficacy and safety of AMF when combined with traditional antibiotics in animal models of implant infection.

**Methods:** Pseudomonas aeruginosa (PA) and staphylococcus aureus (SA) were grown individually on stainless steel ball that were implanted into the thigh muscle of the mice. Mice placed in a custom built solenoid coil for AMF treatments. AMD exposures generating peak temperature of 80 or 65 C on the implant were delivered once a day. Treatment groups included AMF alone, antibiotic alone, and combination therapy. Antibiotics tested included ciprofloxacin, ceftraixone and rifampin. Residual biofilm was measured by CFU counts. Histopathology was analyzed to determine area of damage in response to AMF treatment.

**Results:** Combination of a single AMF pulse with antibiotics lead to a greater biofilm reduction than either treatment alone. PA with AMD (80 C peak) and ciprofloxacin resulted in >2 log reduction of biofilm (p< 0.0001) compared to minimal reduction (AMF or ciprofloxacin alone) at Day 4. Similar treatment outcome was seen with SA and ceftraixone with combination treatment resulting on multi log reduction. Combined treatment effects were seen at lower temperatures (65 C). Histopathologic