Methods. We conducted a national retrospective study of Veterans with a first CDI between 2010 and 2014, defined as a positive C. difficile toxin(s) and no episode in the year prior. Those treated with guideline recommended CDI treatment were included (10–14 days of PO or IV metronidazole, PO or PR vancomycin, or fidaxomycin). The exposure of interest was any non-CDI antibiotic use during CDI treatment. The outcome of interest was all cause death during 30 days of the first treatment for CDI. Inverse probability of treatment weighted Cox proportional hazards models were used to estimate the effect of concomitant antibiotic use on time to mortality. Weights were derived from propensity score modeling of the probability of exposure to antibiotics during CDI treatment as a function of potential confounders. Sensitivity analyses by antibiotic class were conducted.

Results. Of the 9,517 patients included in the study cohort, mean age was 65.3 years (±SD 14.6) and 92.5% (n = 8,602) were male, and 75.03% (n = 7,141) were white. Half were exposed to non-CDI antibiotics during CDI treatment (51.8%, n = 4,922) and 8.9% (n = 849) died. In unadjusted and adjusted analyses, concomitant antibiotic use was associated with death (HR 5.74, 95% CI 4.75–6.93; aHR 2.39, 95% CI 2.07–2.75). Advanced generation cephalosporins (aHR 2.36, 95% CI 2.05–2.71), β-lactam/β-lactamase inhibitor combinations (aHR 1.45, 95% CI 1.16–1.82), and clindamycin (aHR 1.95, 95% CI 1.26–3.02) were associated with death, while fluoroquinolone use was not (aHR 0.97, 95% CI 0.84–1.12).

Conclusion. Among our national cohort, concomitant antibiotic use was common during CDI, and any concomitant antibiotic increased the risk of death; however, results suggest risk might vary by antibiotic class. Results support continued efforts in the reduction of unnecessary antibiotic use during CDI treatment, and future studies into which antibiotics may have the least risk of death when treatment is necessary.

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471. Prevalence and Characteristics of Clostridiodes difficile Infection in Bangladesh
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472. Prevalence, Risk Factors, and Outcome of Postoperative Clostridiodes difficile Infection After Orthopedic Surgery

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Background. The patients undergoing orthopedic surgery may have many risk factors of Clostridiodes difficile infection (CDI), including increased age, multiple comorbidities, the use of concomitant antibiotics, and prolonged length of stay. The aim of this study was to identify prevalence, risk factor, and outcome of postoperative CDI in patients who underwent orthopedic surgery.

Methods. We performed a retrospective cohort study including all patients aged ≥18 years who underwent orthopedic surgery from January 2016 through December 2017 in a tertiary care hospital in Seoul, South Korea.

Results. During the study period, 7,369 episodes of orthopedic surgery were identified. The prevalence of C. difficile infection was 7.7 cases per 1,000 surgical procedures (95% confidence interval, 6.0–10.0). The risk of CDI was the highest among patients who underwent spine surgery (33.8 cases per 1,000 surgical procedures), followed by hip/foot surgery (12.4, knee (3.8)), and extremity (3.2). The risk of CDI increased according to the increase in duration of proton pump inhibitor: 0% (no use), 0.3% (1–7 days), and 2.7% (≥7 days, P < 0.001). The independent risk factors associated with postoperative CDI were age (odds ratio [OR] per 1-year increase, 1.04; P < 0.001), Charlson comorbidity index score (OR per 1-point increase, 1.26; P < 0.001), duration of proton pump inhibitor (OR per 1-day increase, 1.02; P < 0.001), and operation time (OR per 1-hour increase, 1.30; P = 0.003). Of 6,724 episodes of surgical procedure for which patients received exclusive perioperative antimicrobial prophylaxis, 22 episodes of postoperative CDI occurred (3.2 cases per 1,000 surgical procedures). Among this subgroup, the risk of CDI increased according to the increase in duration of antibiotic prophylaxis: 0% (≤24 hour), 0.28% (1–7 days), and 1.27 (≥7 days, P < 0.001). After adjusting confounding factors, duration of prophylaxis (per 1-day increase, 1.11; P < 0.001), Charlson comorbidity index (P < 0.001), and operation time (P < 0.001) remained a significant risk factor for postoperative CDI (OR per 1-day increase, 1.11; P < 0.001). Patients with CDI had a higher rate of postoperative mortality (10.5% vs. 0.6%; P < 0.001) and an increased length of hospital stay (mean 42 vs. 10 days; P < 0.001).

Conclusion. Judgment use of proton pump inhibitor and avoiding of extension of prophylactic antibiotics can reduce postoperative CDI after orthopedic surgery.

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473. Molecular Typing of Clostridiodes difficile: Concordance Between PCR-Ribotyping and Multilocus Sequence Typing (MLST)

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Background. Clostridiodes difficile infection (CDI) incidence has increased dramatically in the past decade, making CDI one of the most common causes of infectious diarrhea and an urgent public health threat. Understanding the biological features and transmission of C. difficile strains can help to target control efforts. PCR-ribotyping, the current method of choice for C. difficile typing, remains subjective and challenging for inter-laboratory comparisons. Multilocus sequence typing (MLST), based on the alleles of seven housekeeping genes, represents a more robust tool that would enhance interlaboratory reproducibility. However, a comprehensive translation system to ribotyping is in requisite. Here, we describe the concordance between MLST and PCR-ribotyping.

Methods. The Centers for Disease Control and Prevention’s (CDC) Emerging Infections Program (EIP) conducts CDI surveillance in 10 US sites. C. difficile isolates were cultured from a subset of cases underwent capillary-based PCR-ribotyping at CDC. A representative sample, selected from the top 30 ribotypes (RTs), underwent whole genome sequencing (WGS) at Minnesota Department of Health. An additional subset of isolates, representing the top 10 RTs, underwent WGS at CDC. At both laboratories, the Illumina MiSeq platform was used to obtain 250 bp paired-end sequencing reads. MLST analyses were done using the online software MLST.C difficile scheme.

Results. A total of 479 C. difficile isolates, including at least 10 isolates for each RT, were analyzed by WGS. Among the 30 RTs represented, 35 different MLST sequence types (STs) were identified. Twenty-two of the two-RTs (including 82) were each associated with a single unique ST, while 8 RTs (OR per 1-year increase, 1.04; P < 0.001) and 075) presented more genetic diversity with single-locus or double-locus variants, resulting in multiple STs within one ribotype. There were two instances of two different RTs sharing the same ST.

Multilocus sequence typing and PCR-Ribotyping showed comparable discriminatory abilities. However, the ST is not always predictive of the RT and vice versa. This represents the first step toward a transition to using WGS for standard C. difficile typing.

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Table 1: Demographic Data for All Stool Samples

| Variable                      | No toxicogenic C. difficile (n = 188) | Toxicogenic C. difficile (n = 16) | P     |
|-------------------------------|-------------------------------------|----------------------------------|-------|
| Female sex, n (%)             | 77 (41)                             | 9 (58)                           | 0.234 |
| Age, years, median (IQR)      | 46 (32–58)                          | 39 (25–53)                       | 0.212 |
| Hospital, A (%)               | 149 (79)                            | 13 (81)                          | >0.99 |
| Length of prior hospital stay, days, median (IQR) | 13 (7–23)                        | 14 (8–32)                        | 0.798 |
| Duration of previous antibiotics, days, median (IQR) | 10 (7–17)                        | 12 (6–20)                        | 0.878 |
| Number of patients in the same room, median (IQR) | 13 (7–19)                        | 19 (14–20)                       | 0.009 |

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