several days after surgery. The World Health Organization (WHO) Surgical Safety Checklist recommends the use of appropriate prophylactic antibiotics before surgery.[7] However, the choice of antibiotics and its duration is often based on the perceptions of individual surgeons, which can be influenced by the local prevalence of drug-resistant bacteria and incidence of SSI in the region.[8–10]

A recent Cochrane review supports the use of preoperative antibiotic prophylaxis for breast cancer, without significant adverse reactions compared with placebo or no treatment.[1] However, standard infection prevention protocols with focused implementation are more effective in controlling SSIs. Our study demonstrates that postoperative antibiotics can be avoided in most patients having breast oncosurgery, despite the high prevalence of resistant organisms in the hospital. Early discharge following surgery, with the involvement of a multidisciplinary team, is feasible in these circumstances, with relatively low surgical site infection rates.

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From Dusk to Dawn: Understanding the Impact of Ertapenem Resistance Mechanisms on the In Vitro Potency of Other Drugs Among *Enterobacter cloacae* Complex Isolates

To the Editor—Carbapenem-resistant Enterobacteriaceae (CRE) have become a global public health threat.[1] Although *Klebsiella pneumoniae* carbapenemase (KPC)–producing *Klebsiella pneumoniae* have been highlighted as the most prevalent CRE agent in most nosocomial infections, *Enterobacter cloacae* complex has been characterized as a second major pathogen in most surveillance studies presenting limited treatment options and high mortality.[2,3]

The most common carbapenem-resistant associated mechanism is carbapenemase production. The $bla_{\text{KPC-2}}$ gene occurs most predominantly in Brazil, whereas the $bla_{\text{KPC-3}}$ and $bla_{\text{OXA-48}}$ are most predominant in the United States.[3–5] However, extended-spectrum β-lactamases (ESBLs), *amp*C β-lactamase overproduction, and decreased outer membrane protein expression combined with an active efflux pump may also result in a similar phenotype, particularly when ertapenem is used as a marker for carbapenem-resistance.[6]

Enterobacter cloacae complex was the second most prevalent CRE following far behind KPC-producing *K. pneumoniae*, and the major discrepancies between them have been described in a previous study.[7] However, the impact of this phenotype on in vitro activity of other drugs has not been evaluated. Therefore, we conducted an analysis of *E. cloacae* complex isolates from inpatients to assess the impact of the "carbapenem-resistance profile," using ertapenem (ETP) as a marker, on the in vitro potency of other 10 antimicrobial agents.

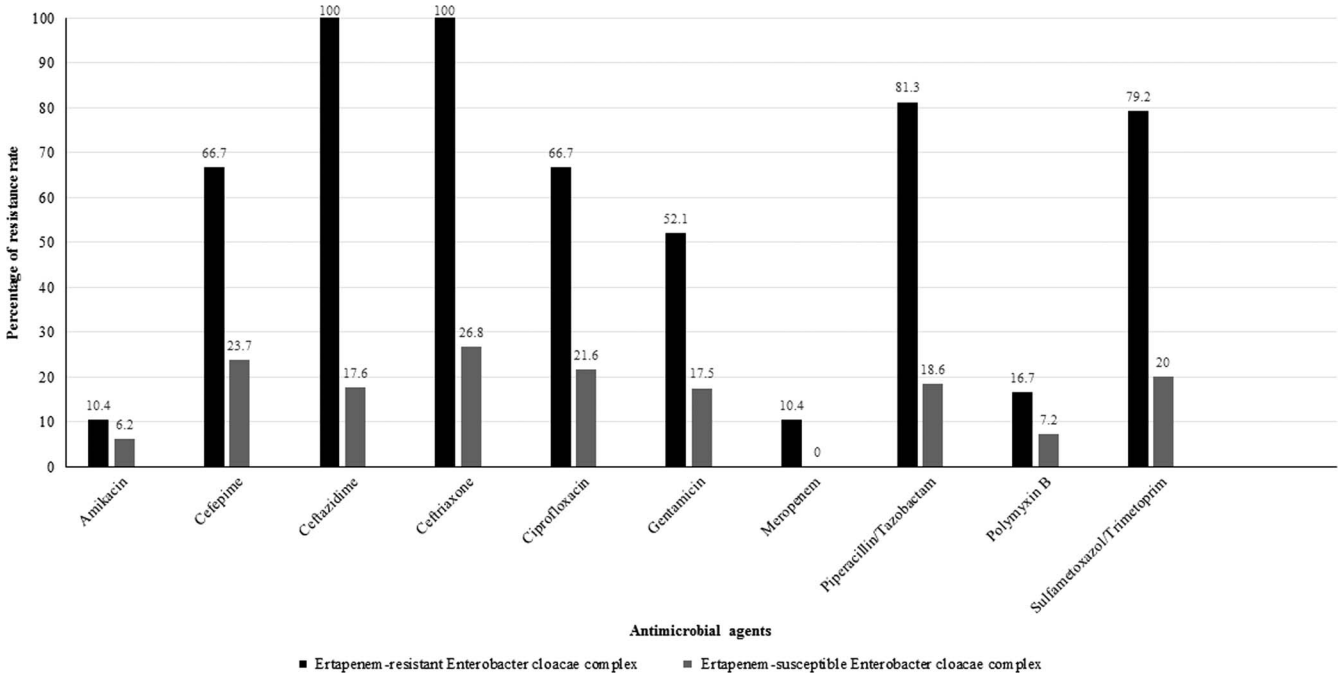

FIGURE 1. Antimicrobial resistance rates for the 145 *Enterobacter cloacae* complex isolates evaluated in this survey.

Enterobacter cloacae complex isolates were recovered from inpatients between January 1 and December 26, 2016, at a tertiary-care hospital in Porto Alegre, Southern Brazil. Bacterial identification was made using the MicroScan automated system (Beckman Coulter, Brea, CA). Testing for susceptibility to amikacin (AK), cefepime (FEP), ceftazidime (CAZ), ceftriaxone (CRO), ciprofloxacin (CIP), gentamicin (CN), meropenem (MEM), piperacillin/tazobactam (TZP) and sulfametoxazol/trimethoprim (SXT) was performed by disk diffusion. The polymyxin B minimum inhibitory concentrations (MICs) were determined by broth microdilution and were interpreted according to EUCAST break points for colistin (≤2 mg/L and >2 mg/L for susceptibility and resistance, respectively).[8] To attribute the resistance mechanism for the selected *E. cloacae* complex isolates confirmed to have reduced susceptibility to ETP, a synergistic test was applied using phenyl-boronic acid to detect KPC or using an enzymatic inhibition testing with clavulanic acid and cloxacillin to detect ESBLs and *amp*C enzymes, in that order, as reported elsewhere.[4]

A total of 145 isolates, recovered from distinct clinical specimens, were identified as *E. cloacae* complex during the study period. This sample represents 4.8% (145 of 3028) of all Enterobacteriaceae isolates identified from inpatients in this period. Of these 145 isolates, 48 (33.1%) and 97 (66.9%) were resistant and susceptible to ETP, respectively. The antimicrobial susceptibility profiles presented by ETP-resistant and ETP-susceptible isolates are shown in Figure 1. Meropenem and AK were the most active agents among ETP-resistant (89.6% of susceptibility for both) and ETP-susceptible isolates (100% and 92.8% of susceptibility, respectively). High resistance rates to CAZ (100%; 48 of 48), to CRO (100%; 48 of 48), to TZP (81.2%; 39 of 48), to STX (79.2%; 19 of 24), to FEP (66.7%; 32 of 48), and to CIP (66.7%; 32 of 48) were observed among the ETP-resistant group (Figure 1). In contrast, resistance rates of only ~ 20% were found to the same agents among ETP-susceptible group. No MEM resistance was observed among these later.

In this survey, no carbapenemase producer was found. All isolates were blue-carba test negative and/or gave negative results when EDTA or phenyl-boronic acid were applied. Notably, the inhibition of *amp*C enzymes using cloxacillin, among ETP-resistant isolates, was not able to bring antibiotics such as ETP, TZP and FEP up to the susceptibility level, which confirms an overlap of associated mechanisms (data not shown).

Meropenem resistance was observed only in 5 of 48 ETP-resistant isolates (10.4%). However, resistance to polymyxin B was observed in both groups: 16.7% (8 of 48) and 7.2% (7 of 97) of ETP-resistant and ETP-susceptible isolates.

Because therapeutics against CRE are scarce and the emergence of carbapenem-resistance mechanisms is a concern, all available options that still show some degree of susceptibility should be strictly monitored. Amikacin still showed a low resistance rate among *E. cloacae* complex; however, only in some specific site-related infections has their effectiveness been proven. An important matter, as previously reported, is polymyxin B resistance, which seems to be in an increasing trend, and is particularly associated with selection pressure related to higher use in clinical practice.[7,9]

In this survey, *E. cloacae* complex was the second most prevalent CRE, with an extremely low rate compared to KPC-producing *K. pneumoniae* (9.8% vs 81.4%). However, *E. cloacae* complex may contain genotypes with epidemic

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potential associated with increasing rates of antimicrobial resistance, which justifies strict monitoring. As expected, β-lactam agents suffered the most reduction in their susceptibility rates. Furthermore, marked reductions were also observed for CIP, AK, CN, STX, and PMB (Figure 1).

In conclusion, special attention must be focused on the widespread resistance of KPC producers, which has important repercussions in Brazilian hospitals. However, little is known about the resistance (in particular, to polymyxin B) among *Enterobacter cloacae* complex isolates. Although this study did not include molecular characterization and emerging genotypes, measures of infection control and prevention of spreading are mandatory for this pathogen, especially when worrisome resistance (eg, to polymyxins) is detected.

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Legionnaires' Disease and Use of Water Dispensers With an Ultraviolet Sterilizer

To the Editor—Legionnaires' disease (LD) is mainly transmitted by inhalation of infectious aerosol, while aspiration of contaminated water is another possible mode of transmission.[1–3] We report 3 LD cases with *Legionella pneumophila* (*Lp*) isolated in water samples from water dispensers with an ultraviolet (UV) sterilizer and a filter.

Legionnaires' disease is a notifiable infectious disease in Hong Kong. The Centre for Health Protection conducts epidemiological investigations for all cases and carries out environmental investigations according to local protocols. Water samples for *Legionella* culture and *Legionella* sequence-based typing of *Lp* isolates from human and water samples are performed as required.

Patient 1 was a 59-year-old bed-bound male patient with malignant brain tumor. He had been staying in hospital A for management of his malignancy since mid-December 2015. He presented with oxygen desaturation on June 8, 2016. On June 11, 2016, his tracheal aspirate was positive for *Lp* (non-serogroup 1) DNA but was negative for *Legionella* by culture.

The room where he stayed in the hospital had a water dispenser with a UV sterilizer and a filter, and a shower. He did not drink water from the water dispenser, but his helper used unboiled cold water from the water dispenser and the shower to perform sponge bathing and face washing for him. A cold-water sample from the water dispenser was positive for *Lp* (non-serogroup 1) at 0.4 colony-forming units (CFU)/mL. In addition, 2 hot-water samples from the shower were positive for *Lp* (non-serogroup 1) at 3.1 and 32.0 CFU/mL, respectively (Table 1). *Legionella pneumophila* isolates from the 3 water samples were all sequence type 583 (ST583), which is very rare in Hong Kong. Only 5 of the 7 alleles were amplifiable from this patient's tracheal aspirate, and they were identical to the corresponding alleles for ST583. The exact source of infection was undetermined because water samples from different sites were positive with the same sequence type.

Patient 2 was a 90-year-old female with multiple medical illnesses who was admitted to hospital B on March 14, 2017, for intestinal obstruction; surgery was performed on March 17. She developed shortness of breath on March 23 and was transferred to another hospital for management on April 11.