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Letters to the Editor

First report of emergence of OXA-48 carbapenemase-producing *Enterobacteriaceae* in Singapore: Proactive or reactive infection control strategy?

To the Editor:

Carbapenemase-producing *Enterobacteriaceae* (CPE), especially *Klebsiella pneumoniae* have successfully spread worldwide.[1] This epidemiologic success of CPE can be attributed, at least in part, to plasmid-mediated carbapenemase.[2] The carbapenem-hydrolysing β-lactamase OXA-48 was first identified in Turkey. Scattered cases and related outbreaks have been described in various countries since then.[3] Here, we describe a nosocomial cluster of OXA-48 *K pneumoniae*, which lends support to a proactive rather than a reactive infection control policy for control of CPE.

Since 2010, carbapenem-resistant *Enterobacteriaceae* (CRE) have regularly been clinically cultured at Tan Tock Seng Hospital (TTSH), a 1,500-bed teaching hospital in Singapore. When CRE is identified from clinical cultures, the patient is isolated in a single room with contact precaution comprising apron and gloves on entering the patient's room and dedicated equipment for routine medical and nursing care (ie, stethoscope, sphygmomanometer, and thermometer). Index patient's movement throughout the hospital is traced using an electronic Infection Control and Epidemiology Surveillance System (ICESS). Patients in the same ward as the index patient are pre-emptively placed on contact precaution and screened for CRE with 1 sample of rectal swab. Movements to and from the wards are restricted until screening has been completed except for discharges, transfers to intensive care units, and essential procedures. All patients identified as CPE carriers are tagged electronically and identified during subsequent admissions and outpatient clinic visits. A conventional multiplex polymerase chain reaction (PCR) incorporating specific primers targeting bla_{NDM}, bla_{KPC}, and $bla_{OXA\text{-}48\text{-}like}$ is routinely done on all clinical isolates of *Enterobacteriaceae* that are meropenem nonsusceptible.

In July 2013, a 75-year-old female patient was admitted for an infected sacral ulcer. She had multiple comorbidities without any recent travel history. She was antibiotic experienced with multiple past hospitalizations at various institutions in Singapore. The admission blood cultures were negative. She underwent bone biopsy 5 days later and became febrile on the same day. Repeat blood cultures and bone biopsy cultures grew carbapenem-resistant *Citrobacter koseri*. This isolate was found to harbor $bla_{OXA\text{-}48}$. Fifty patients across 3 wards who were epidemiologically linked to her were identified and screened using the modified Centers for Disease Control and Prevention broth method (Centers for Disease Control and Prevention, Atlanta, GA). Three carriers of carbapenem-resistant *K pneumoniae* were identified, of which 2 patients, A and B, tested positive for OXA-48. Repetitive element palindromic polymerase chain reaction (rep-PCR) fingerprinting was performed to determine clonal relatedness of the carbapenem-resistant *K pneumoniae*. rep-PCR primers enterobacterial repetitive intergenic consensus (ERIC) 1R (5'-ATGTAAGCTCCTGGGGATTCAC-3') and ERIC 2 (5'-AGTAAGTGACTGGGGTGAGCG-3') were used for amplification with HotStar Taq Plus Master Mix Kit (Qiagen, Hilden, Germany). Amplified DNA fragments were separated on 1.5% ethidium-bromide stained agarose gel, and gel images were analyzed with Bio-Numerics software (version 5.1; Bio-Numerics, Sint-Martens-Latem, Belgium) by calculating cluster analysis using the band-based Dice method to illustrate pairwise similarities among all isolates and the dendrogram-type unweighted-pair group method using average linkages. Band position tolerance of 1.00% was used.

To determine possible transmission route among these 3 patients, we charted overlap of medical equipment used for routine care and all health care workers (HCWs) with close contact. Although patients A and B did not share any medical equipment, there were 38 separate instances in which they shared HCWs. Surprisingly, patients A and B did not share HCWs or medical equipment with the index patient. There was possible horizontal transmission of OXA-48 between patients A and B unrelated to the index case confirmed by rep-PCR genotyping showing that the OXA-48-producer from patients A and B were clonal but distinct from OXA-48 in the index patient (Fig 1). Without HCW screening for CRE, we could not confirm the possibility of a HCW being a common source for the clonal OXA-48-positive isolate.

This is the first report of $bla_{OXA\text{-}48}$-positive *Enterobacteriaceae* in Singapore and provides evidence for its spread to Southeast Asia.[3] We were unable to narrow down the source of these isolates. Continuous surveillance did not reveal any further isolation of $bla_{OXA\text{-}48}$-positive *Enterobacteriaceae* in our center. International travel was associated with importation of $bla_{OXA\text{-}181}$-positive *K pneumoniae* to Singapore in the past,[4] but we found no such association with this cluster. The admission prevalence of CRE at TTSH was about 0.9%, and the majority of these was CPE from a recent point prevalence survey. The incidence of CPE has been increasing steadily since 2010 despite aggressive infection control measures. Average hand hygiene compliance rate at TTSH hovers around 45%, marginally higher than the international average of about 38.7%.[5] Transmission of multidrug-resistant organisms through HCWs' hands is the most common pattern of nosocomial dissemination in most settings.[6] Whereas timely detection and isolation has remained the main strategy to prevent transmission,[7] it is unclear whether an institution should adopt a reactive approach, involving contact screening after CPE detection, or a proactive approach,

Fig 1. Dendrogram and rep-PCR images of carbapenem-resistant isolates. American type culture collection (ATCC) isolate BAA-2146 was used was the control strain.

which aims to identify and contain CPE before symptomatic manifestation.[8] We believe that implementation of targeted surveillance culture for high-risk patients may expedite identification and isolation of silent CRE carriers and minimize horizontal transmission.[9] This measure should be coupled with enhancement of hand hygiene compliance.

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Vancomycin-resistant *Enterococcus* spp isolated from community acquired infections and colonizations in Querétaro City, Mexico

To the Editor:

Members of the genus *Enterococcus* are part of the human microbiota. They are found mainly in the gastrointestinal tract, but can also be detected colonizing the upper airways, the oral cavity, the skin, the vagina, and the urethra. Since the 1990s, enterococci have emerged as nosocomial pathogen, nowadays ranking as the third to fourth most common nosocomial agent worldwide; however, prevalence in Latin America has remained low. Enterococci have developed multidrug resistance (MDR) profiles, particularly to vancomycin (ie, that have become vancomycin-resistant enterococci [VRE]), that make them a global public health concern.[1,2] There have been reports of community-acquired (CA) infections and colonizations due to VRE.[3-6] The mechanism of spread in these cases is still unclear. It has been suggested that patients colonized while hospitalized could be the source of transmission.[3] Enterococci surveillance and monitoring studies have been scarce in México and have mainly focused on its nosocomial presence. Yet the studies that have been conducted have shown a significant increase in the rate of enterococcal nosocomial infections—and up to 26% frequency of VRE.[7,8] Moreover, a retrospective study held in Querétaro city[9] reported that 35% (*Enterococcus faecalis*) and 60% (*Enterococcus faecium*) of infecting enterococci strains were resistant to vancomycin, suggesting an incremental spread of VRE strains in this Mexican region. Thus, the aim of our study was to assess the frequency of CA VRE in Querétaro City, Mexico.

An observational study of enterococci-positive cultures identified in outpatients by 6 private clinical laboratories (authorized and certified by Mexican authorities) in Querétaro city, México, between August 2004 and November 2011 was carried out. For further analysis, samples classified as CA urinary tract infection (CUTI) (urine samples with a bacterial colony count $\geq$100,000 cfu/mL) and CA colonization (CAC) (from semen, female genital tract samples, and urethral discharge samples [none of the latter was part of segmented urine cultures]) were included. Enterococcal isolates were identified by conventional microbiologic testing.