First clinical case of a locally acquired carbapenem-resistant VIM-1 metallo-β-lactamase in *Pseudomonas aeruginosa* in Australia

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To the Editor: Nosocomial infections caused by *Pseudomonas aeruginosa* often prove difficult to treat because of their resistance to multiple drugs. Carbapenems play a pivotal role in the management of severe multidrug-resistant gram-negative Enterobacteriaceae and *P. aeruginosa* infections. However, reports in Australia of carbapenem resistance due to production of a variety of carbapenemases, including metallo-β-lactamases (MBLs), have been increasing alarmingly.[1,2] We wish to report the first clinical case of a VIM-1-producing MBL in Sydney. To our knowledge, this is the first reported locally acquired case of a *P. aeruginosa* strain producing acquired VIM-1 MBL in Australia.

The patient was an 81-year-old man with chronic rheumatoid arthritis, managed with prednisone. He had a prosthetic knee infection that was first diagnosed in 1997 and, because of multiple recurrences, had been managed with oral moxifloxacin since 2003. The patient had not travelled outside the Sydney area since before his knee surgery. He was hospitalised in November 2005, when he underwent repair of a colovesical fistula. Carbapenem-resistant *P. aeruginosa* was isolated repeatedly from both urine and sputum cultures from December 2005 until February 2008, when further testing was performed using newly available molecular real-time polymerase chain reaction (PCR) technology with VIM generic and specific primers and DNA sequencing. This testing detected a VIM-1 gene.

The *P. aeruginosa* isolates were routinely screened for antibiotic susceptibility. Multiresistance to numerous antibiotic classes was detected, with high minimum inhibitory concentrations for meropenem, gentamicin, ciprofloxacin, ceftazidime, cefepime, piperacillin–tazobactam, and ticarcillin–clavulanic acid. The isolates were susceptible to polymyxin B and aztreonam, and had intermediate resistance to amikacin.

Multiresistant *P. aeruginosa* is a therapeutic challenge when managing patients with such infections.[3] In the context of facilities such as large burns units or intensive care units, the presence of plasmid-transmissible carbapenem resistance within the gram-negative bacterial population has serious infection control implications. Until novel molecular real-time PCR methods became available, the underlying mechanism of carbapenem resistance in these organisms could not be adequately delineated. The increasing availability of such molecular technology and its routine application in the diagnostic laboratory will support appropriate antibiotic prescribing practices and enhance infection control measures in the hospital setting.

Identification of a plasmid-mediated carbapenem-resistant strain is a concern in our hospital and throughout Australia, as outbreaks of VIM-1 resistance have been reported in Europe and the United States.[4] As demonstrated by our isolates, such strains have a broad spectrum of hydrolytic activity against amino-, carboxyl- and ureido-penicillins, cephalosporins, cephamycins and carbapenems, but not monobactams. Our isolate was susceptible only to polymyxin and aztreonam.

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1 Peleg AY, Franklin C, Bell JM, Spelman DW. Dissemination of the metallo-β-lactamase gene bla_{IMP-4} among gram-negative pathogens in a clinical setting in Australia. *Clin Infect Dis* 2005; 41: 1549-1556.
2 Espedido BA, Thomas LC, Iredell JR. Metallo-β-lactamase or extended-spectrum β-lactamase: a wolf in sheep's clothing. *J Clin Microbiol* 2007; 45: 2034-2036.
3 Mesaros N, Nordmann P, Plésiat P, et al. *Pseudomonas aeruginosa:* resistance and therapeutic options at the turn of the new millennium. *Clin Microbiol Infect* 2007; 13: 560-578.
4 Walsh TR, Toleman MA, Poirel L, Nordmann P. Metallo-β-lactamases: the quiet before the storm? *Clin Microbiol Rev* 2005; 18: 306-325. ❑