

Controlling MDR Gram-negative bacteria

Successful control of an outbreak of nosocomial multidrug-resistant *Klebsiella pneumoniae* in haematologic malignancy patients: evaluation of reduction through infection control interventions and active surveillance

B. Martino¹, A. Barbaro², D. Ielo³, E.A. Martino³, C. Alati³, B.S. Rogolino², F. Ronco³, D. Rotilio⁴

¹OSPEDALI RIUNITI BMM- Department of Haematology, REGGIO CALABRIA, Italy

²Ospedali Riuniti- Department of Microbiology, Reggio Calabria, Italy

³Ospedali Riuniti- Department of Haematology, Reggio Calabria, Italy

⁴Ospedali Riuniti- Department of Haematology- Recipient of AIL grant, Reggio Calabria, Italy

Objectives: Bacterial infections are more frequent in persons with impaired function of the immune system and/or with neutropenia. In neutropenic patients with haematological malignancies the use of chemotherapeutic drugs contributes to a further immunosuppression with reduction of body's defence mechanisms. In our ward, between January 2010 and October 2013 there has been an outbreak of multidrug resistant *Klebsiella pneumoniae* which peaked in 2013. The aim of this study was to determine the prevalence of *K. pneumoniae* strains in patients with haematological malignancies during the outbreak period and over the course of one year interventions for infection control and to prevent transmission. **Methods:** During the four-year period (Jan.2010-Oct.2013) about 1600 inpatients were investigated. Hemocultures from 460 hospitalized patients were performed and isolated strains were identified by standard microbiological procedures. End October 2013 the Haematological department was no longer in use and moved to a new ward. Surveys of infection and transmission were conducted from November 2013 to September 2014. Interventions were implemented, such as rectal, pharyngeal and nasal swab within 24 h at patient admission and patients cared for in single rooms, hand hygiene, enhanced environmental cleaning, training of personnel, auditing of staff and cohorting of multidrug resistant *K. pneumoniae* patients. During November 2013-September 2014 period 415 patients were admitted, and 183 hemocultures (44%) were performed. **Results:** Over the four year period (2010-2013) a dramatic increase of new cases of *K. pneumoniae* of about five-fold was observed. In 170 inpatients out of 460 (37%) the presence of isolated strains was revealed. *K. pneumoniae* was present in 35 inpatients distributed as follow; 7% (n=3) in 2010, 11% (n=5) in 2011, 21% (n=12) in 2012 and 38% (n=15) in 2013. During the one year of targeted interventions 37 bloodstream infections out of 183 were detected and the presence of *K. pneumoniae* was revealed in only five patients (14%), three of which belonging to a multidrug resistant *K. pneumoniae* strain. Furthermore, during the four year period (2010-2013), the 80% of *K. pneumoniae* (n=28) belonged to a multidrug-resistant strain showing *in vitro* resistance mainly to carbapenems and fluoroquinolones, while 70% was sensitive only to colistin. The mortality was of 40% (n=14) and 93% was affected by multidrug resistant *K. pneumoniae*. **Conclusion:** The first strain of multidrug resistant *K. pneumoniae* was identified in our ward on 2010, since then there was a dramatic spread in the occurrence of this pathogen that peaked in 2013. An array of interventions was successful in preventing nosocomial spread of *K. pneumoniae* and in particular of the multidrug resistant strain. During one year surveillance and targeted interventions for infection control, the annual prevalence (%) of *K. pneumoniae* declined from 38% (end October 2013) to 14% .