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Abstract (poster session)

Emergence of carbapenem-non-susceptible extended-spectrum beta-lactamase-producing Klebsiella pneumoniae isolate after meropenem therapy

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Objectives: To investigate the resistance mechanisms of carbapenem susceptibility isolate recovered from one patient after treatment with meropenem. Methods: Since November 2010, an infection control program for ESBL-producing Enterobacteriaceae was introduced in an acute-care private hospital in Lisboa, Portugal. Seven Klebsiella pneumoniae isolates were recovered from one ICU inpatient. Cultures of rectal swabs and clinical samples were performed on a chromogenic medium (chromIDTM ESBL; bioMérieux). The isolates were studied by Etest MBL, PCR for blaCTX-M, blaimp, blavim, blaKPC, blaOXA-48 genes and ERIC fingerprinting. Experiments were performed to detect synergy between meropenem or other antimicrobials and the efflux pump inhibitor reserpine. Results: A 79 years old female patient was admitted to H.SAMS with large bowel angiodisplasy leading to hemicolectomy. She had a long recovery period in ICU with prolonged ventilatory support. She was colonized with K. pneumoniae K137 recovered from a rectal swab prior to meropenem therapy. After twenty seven days in ICU the patient had ventilator-associated pneumonia and urinary tract infection and two K. pneumoniae strains K138, K139 were identified from bronchial secretions and urine, respectively. The patient was subsequently treated with meropenem, after which, during one month, three K. pneumoniae isolates were once again isolated from rectal swab, bronchial secretions and urine. Thirty seven days after meropenem therapy one K. pneumoniae K168 isolate was recovered from a rectal swab with different antibiotics susceptibility, for imipenem and meropenem MIC values of 4mL/L and 1.5 mL/L, while MIC values to previous strains were 0.25 and 0.125mL/L, respectively. From ERIC electrophoresis profiling, all strains exhibited identical banding patterns and all were ESBL producing CTX-M-15 enzyme. They gave negative results in the MBL Etest and lacked genes encoding carbapenemases. Only the K. pneumoniae K168 exhibited synergy between meropenem, ertapenem and reserpine, indicating that efflux pump activity could contribute to less susceptibility to carbapenem. Conclusions: The carbapenem phenotype observed in K. pneumoniae K168 was attributable to a combination of ESBL CTX-M-15 enzyme and an up-regulated efflux pump. The clonal relationship observed between the initial and subsequent K. pneumoniae strains may explain the emergence of resistance under meropenem selective pressure.