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Risk factors for multidrug-resistant Gram-negatives in the first episode of intensive care unit infection

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Background: Multidrug resistant gram negatives (MDR-GN) are increasing threat for intensive care units (ICUs). Inadequate empiric antibiotic therapy is associated with increased morbidity and mortality. To identify the risk factors for the patients who have MDR-GN in their first episode of ICU infection will optimize the empiric antibiotic therapy.

Material/methods: This is a prospective observational study conducted over a year. The study included all patients who were followed by Infection Control Committee in ICUs for nosocomial infection (NI). Patients' first ICU-infection episode was evaluated and Centres for Disease Control and Prevention (CDC) definitions were used for NI definition. Case was defined as a patient who had MDR- GN in their first episode of ICU infection and control was defined as a patient who had non-MDR-GN in their first episode of ICU infection. Patients who had Candida or gram positive infection or without any isolated pathogen in their first episode were excluded. For risk factor analysis, demographic characteristics of patients (age, gender, comorbidity index), APACHE II score, transfer from another unit, transfer from another hospital, community-acquired infection on admission, NI before admission, antibiotic use before ICU infection, time for the first episode of ICU infection, invasive devices and operation were evaluated.

Results: During the study period 100 patients included into the study. Thirty six patients were in Medical ICU, 33 were in General Surgery, 18 in Neurosurgery and 13 in Anaesthesiology and

Reanimation ICU. Sixty-two patients had MDR-GN and 38 patients had non-MDR pathogen in their first ICU infection episode. The mean age was 61.2 ± 16.0 years and 49% was male. Forty-one patients had pneumonia, 24 patients had urinary tract infection, 20 patients had bacteraemia, 14 patients had surgical site infection and one patient had skin-soft tissue infection. Ninety-four patients had monomicrobial infection, and 107 gram negative microorganisms were isolated. In case patients, the most prevalent GN were *A.baumannii* (56%), *P.aeruginosa* (14%), *K.pneumoniae* (14%) and *E.coli* (7.5%). In control patients, the most prevalent pathogens were *K.pneumoniae* (25.5%) *P.aeruginosa* (23.2%) and *E.coli* (23.2%). All *A.baumannii* isolates were extremely drug resistant. In univariate analysis APACHE II score, community acquired infection, nosocomial infection before ICU, transfer from another hospital, antibiotic use before ICU infection, central venous and arterial catheter were significant risk factors, whereas APACHE II score, transfer from another hospital, antibiotic use before ICU infection and arterial catheter were the most significant risk factors for MDR-GN ICU infection (Table 1). Mortality was 58% in cases and 39.5% in controls ($p=0.07$).

Conclusions: Patients who have high APACHE II score, transferred from another hospital, used antibiotic before ICU infection and arterial catheter are at great risk for MDR-GN infections.