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# Characteristics of colonisation with extended-spectrum beta-lactamase-producing enterobacteria

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Objectives: The aim of our study was to gain information about the course of colonisation, clonal relatedness of isolates and risk factors associated with prolonged colonisation with ESBL-producing enterobacteria needed for development of effective infection control measures.

Methods: Patients colonised or infected with ESBL-producing *Escherichia coli* or *Klebsiella pneumoniae* were included in a prospective study from November 2009 to December 2011. Rectal swab, urine culture and throat swab were performed in each patient. Sample collection was repeated every 3 months for 18 months, at every sample collection a questionnaire was filled out for information about potential risk factors for prolonged colonisation. Collected samples were inoculated on chromogenic agar selective for ESBL-producing bacteria. The clonal relatedness of ESBL-producing isolates was analysed by pulsed-field gel electrophoresis using the *Xba*I restriction enzyme, the results were interpreted according to the Tenover criteria. To evaluate potential risk factors for prolonged colonisation with ESBL-producing bacteria, univariate analysis with Fisher's exact test and multivariate logistic regression model were used. A p-value of <0.05 was considered significant.

Results: 50 patients (26 male, 24 female) completed the 18 months follow-up. Patients were 23 to 87 years old (59 years on average). 27 patients were colonised with *K. pneumoniae*, 9 patients with *E. coli*, in 14 patients both were isolated. 6 months after the initial sampling 20/50 (40%) patients had an ESBL-producing enterobacteria isolated from at least one clinical sample. 12 months after the initial sampling 13/50 (26%) patients were still ESBL positive, at 18 months follow-up 11/50 (22%) patients were ESBL positive. Antibiotic treatment (p=0,023), immobility (p<0,001) and chronic wound (p=0,033) were identified as risk factors for prolonged colonisation by univariate analysis. Immobility (p=0,007) remained a statistically significant risk factor in the final logistic regression model. Clonal relatedness of the isolates was analysed in 16 patients. 7 patients were colonised with one *E. coli* or *K. pneumoniae* pulsotype during the whole follow-up period, in others several different pulsotypes or even species of enterobacteria were isolated.

Conclusion: The high percentage of ESBL positive patients within 18 months of colonisation or infection with ESBL-producing enterobacteria calls for caution at readmission and need for isolation of patients, especially those who are bedridden. In the course of colonisation different species and strains of ESBL-producing enterobacteria are often isolated.