Extended-spectrum β-lactamase producing Enterobacteriaceae in the faecal flora of Portuguese nursing home residents

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Objectives: Our previous work in community clinical isolates alerted us for the finding of extended-spectrum β-lactamase (ESBL) producers in particular niches, as nursing homes. In that way, the aim of our study was the detection and characterisation of ESBL producing Enterobacteriaceae in the faecal flora of nursing home residents, in Northern Portugal.

Methods: Faecal samples of nursing home residents from the North of Portugal were collected from January to July 2008. Samples were suspended in BHI. Isolates were selected in MacConkey agar with ceftazidime (2 mg/L), cefotaxima (2 mg/L), and aztreonam (2 mg/L). Lactose fermenters were randomly selected and susceptibility to antimicrobial agents was determined by agar diffusion methods according to the CLSI guidelines. Screening of ESBL producers was performed by the double disk synergy test and confirmed according to the CLSI. Identification of the selected strains was achieved by API 20 E. β-lactamases were characterised by isoelectric focusing. Conjugation assays were performed with Escherichia coli HB101.

Results: Of 184 faecal samples of residents in 6 nursing homes in the North of Portugal we screened 48 ESBL producing Enterobacteriaceae isolates: 39 Escherichia coli, 3 Klebsiella pneumoniae, 2 Citrobacter freundii, 2 Enterobacter cloacae, 1 Enterobacter aerogenes and 1 Proteus mirabilis, showing an ESBL of pl > 8 alone or in association with β-lactamases of pls 5.4 and 7.4. ESBL gene was successfully transferred coding a β-lactamase of pl > 8 alone or in combination with the other β-lactamases.

Conclusion: Our results showed that nursing homes are particular niches of community, acting as reservoirs of ESBL producing Enterobacteriaceae. β-lactamase isoelectric points, alert for the hypothesis of one successful track of community dispersion of CTX-M-15, in different combination with other β-lactamases, as in the CTX-M-15 producing Portuguese ST131 Escherichia coli epidemic clone, that needs further research. This reality poses questions in terms of hospital admission of patients originating from nursing homes, relating to prevention of hospital dissemination of ESBL producers, colonising those patients. Also the inverse, spreading to nursing homes and community in general, from colonised elderly patients discharged from hospital when return to the ancient care facility or even to family home, might create a cycle of dissemination of ESBL producing Enterobacteriaceae and ESBL coding genes.

P1678 The epidemiology of Staphylococcus aureus nasal and throat carriage in a large community-based population in northern Norway. The Tromso Staph and Skin Study


Objective: Staphylococcus aureus nasal carriage is associated with increased risk of bacteremia and skin/soft tissue infections as well as atopic dermatitis. Studies suggest that the tonsils also may be a significant reservoir for the microbe. Our aim was to study the epidemiology of S. aureus nasal and throat colonisation and carriage in a large community-based population in North Norway.

Methods: A cross-sectional study was done as part of the sixth Tromso Study in 2007–2008. Random samples of adult birth cohorts were invited to a health survey including clinical examinations, blood samples, and questionnaires on socio-demographic factors, lifestyle, health, chronic diseases and symptoms. The participation rate was about 66%. Nasal and throat swab cultures were performed in 3,996 participants for the assessment of S. aureus colonisation. A repeated set of cultures were performed in 2,986 participants for the assessment of S. aureus carriage (1,707 women and 1,279 men). Mean age was 54.5 years (range 30–87 years). Median length of the time interval between cultures was 28 days. All specimens were cultured within 24 hours on chromID S. aureus agar. Two carriage patterns for each site were distinguished: non-or-intermittent and persistent carriage.

Results: The prevalence of persistent S. aureus nasal and throat carriage were 25.1% and 6.0% respectively, and the results were almost constant across quartiles of the time interval between cultures (cut-off values: 18, 28 and 40 days). Considering culture results from both sites, 11.9% were defined as consistently persistent carriers, a minor group was single throat carriers (9.8%), and the majority was single nasal carriers (78.3%). Male sex was related to higher risk of nasal carriage (odds ratio, OR = 1.91; 95% confidence interval, 95% CI = 1.61–2.27; adjusted for age). Age was negatively related to nasal carriage (OR = 0.91 per 10 years; 95% CI = 0.85–0.98; adjusted for sex). S. aureus throat carriage was strongly related to nasal carriage (OR = 3.98 for nasal persistent carriage vs non-or-intermittent carriage; 95% CI = 2.90–5.46; adjusted for sex and age).

Conclusion: The nasal vestibulum is the major niche for S. aureus. Age and sex are predictors for nasal S. aureus carriage. The role of other potential risk factors in S. aureus nasal and throat carriage is currently under investigation. This project brings prospects to studies of the host-microbe-environment triad in S. aureus carriage, infection, and skin disease.