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Dissemination of extended-spectrum beta-lactamase producers in natural environments in Northern Portugal

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Objectives: The aim of this study was to detect ESBL producers, in natural water streams reaching the sea and compare with those isolated from sea water samples. Our previous work, showed contamination of marine coastal water with antimicrobial resistant bacteria, namely ESBL (extended-spectrum β-lactamases) producers. This question alerted us to the origin of this contamination. In that way, it was our purpose to look for possible contamination sources, in water streams reaching the beach.
Methods: Natural water streams (probably including raining water streams) reaching the sea, were collected in July 2004 and 2005 (beach season, in Portugal), from 3 beaches of the Porto area. Isolates were selected by membrane filtration technique and the filters were placed on Mac Conkey agar and Mac Conkey agar with ceftazidime (2°mg/l) or cefotaxime (2°mg/l). Colonies of lactose fermenters were randomly selected and screened for ESBL production by the double disc synergy test. Identification of the selected strains was achieved by classic biochemical tools and ID 32 GN. Susceptibility to antimicrobial agents was determined according to the CLSI guidelines. β-lactamases were characterized by isoelectric focusing.
Results: The natural water streams accessed, in this work, seem to be impacted by faecal contamination of unknown origin, with antimicrobial resistant strains, namely ESBL producers. At least 4 water streams isolates, were able to transfer the ESBL gene, by conjugation.
Conclusion: Our tries to understand coastal sea water contamination with ESBL producers, showed that natural water streams reaching the seashore, are, in at least some part, responsible for seawater contamination with ESBL producers. Future work intends to find the origin of contamination of these natural environments. This situation seems relevant in terms of public health and environmental protection, once these are some of the beaches used by the Porto population. The incoming of ESBL producers to natural environments and the transferability of the ESBL genes by conjugation, might provide a track for environmental dissemination of resistant bacteria and genes, that may create a source of transferable traits for environmental bacteria, influencing natural reservoirs of resistance.

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The presence of extended-spectrum β-lactamase-producing *Escherichia coli* is a prognostic factor for patients with *E. coli* bacteraemia

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Objectives: *Escherichia coli* is one of the first causal agents of bacteraemia. However the published information about their prognostic factors is scarce, and not recent, so we decided to analyse this aspect in our patients with *Escherichia coli* bacteraemia.
Methods: Cases of Escherichia coli bacteraemia were identified by using the microbiology laboratory database. The charts of all patients with Escherichia coli bacteraemia attended at our hospital between January 2001 and December 2004 were reviewed with a questionnaire. Blood cultures had been incubated in the BacT/ALERT system (BioMerieux). In statistical analyses, Student's *t*-test was used for the comparison of mean values and chi square test and Fisher's exact test for the comparison of categorical data (two tailed). A stepwise logistic regression was performed for multivariate analysis.
Results: During the period of the study blood cultures were performed in 10132 patients, 372 of them (3.7%) with *Escherichia coli* isolation. The origin of the bacteraemia was a urinary infection in 219 (80.5%), unknown in 61 (16.4%), biliar in 57 (15.3%) and other origins in 35 (9.4%). Twenty three patients (6.2%) died during the admission. Patients who died were older (76.8°±°10.5 years vs 70.4°±°16.1 years), had a higher Charlson index (2.1°±°2 vs 1.1°±°1.6), more frequently had an antecedent of dementia (17.4% vs 3.6%), a non-urinary origin of the bacteraemia (59.6% vs 37.6%), a severe sepsis or shock (56.5% vs 8.3%), had a lower albumin plasmatic concentration (2.2°±°0.6°mg/dL vs 2.7°±°0.5°mg/dL) and more frequently had a bacteraemia cause by Extended-Spectrum β-Lactamase producing *Escherichia coli* (21.7% vs 2.7%). In the multivariate analysis only a non urinary origin of the bacteremia (OR: 3.36; 95% CI, 1.2–9.38), the presence of severe sepsis or shock (OR: 9.14; 95% CI, 3.47–24.07) and the presence of extended-spectrum β-lactamase producing *Escherichia coli* in the blood cultures (OR: 5.78; 95% CI, 1.38–24.47) were associated with the prognosis.
Conclusions: *Escherichia coli* bacteraemia, had a relatively low mortality among our patients. The existence of severe sepsis or shock, a non-urinary origin of the bacteraemia, and the presence of extended-spectrum β-lactamase producing *Escherichia coli* in the blood cultures were prognostic factors.

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Extended-spectrum β-lactamase producing *Enterobacteriaceae* in Lebanese ICU patients: epidemiology and patterns of resistance

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Introduction: The objective of this study is to assess the faecal carriage of ESBL producing bacteria in patients and health workers of intensive care unit of five Lebanese hospitals over a three-month period.
Methods: Faecal samples were collected in a period of 4 months from 378 patients that were admitted to the ICU in addition to 58 health workers of the same units. ESBL production was detected by double disk synergy as described by Jarlier et al. Then antibiotic susceptibility of ESBL-producing strains was determined by disk diffusion method and an enhancement of the zone of inhibition zone around ceftazidime, cefepime, aztreonam, and cefotaxime towards the clavunate-containing disk indicated the presence of ESBL's. Antibiotic susceptibility and MIC were determined by E-test.
Results: In total, 1442 faecal samples were collected during the whole study period from 278 ICU patients of the participating 5 hospitals. 118 strains isolated from 72 subjects were identified as ESBL-PS including 95 (80.5%) *E. coli*, 16 (13.6%) *Klebsiella pneumoniae* and 7 (5.6%) *Enterobacter cloacae*. The general characteristics of patients are represented in the table 1. Fourty one new patients, for whom a conversion from negative carriage at ICU admission to positive carriage after admission was noted, in addition to 18 patients who were previously colonized (at admission) then recolonized after at least 48 hours of ESBL producing strain eradication, were considered as acquisition cases (59 patients and 86 isolates). A higher rate of multiple carriages was detected among these acquisition cases (21double carriages and 3 triple carriages of ESBL-PS).