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Abstract (publication only)

Extended-spectrum beta-lactamases are differentially expressed in specimens from normally sterile and non-sterile sites, in a hospital setting

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Objectives: To compare the prevalence of extended spectrum beta-lactamase (ESBL)-producing strains in isolates from normally sterile samples and non-sterile sources, in a Hospital setting. **Methods:** We reviewed all cultures of blood or urine (“B/U”), spontaneously expectorated sputum or bronchial aspirates (“sputum”) performed in our Lab, between January 2008 and October 2011, selecting all 12668 positive samples for *Escherichia coli* (EC) or *Klebsiella pneumoniae* (KP). Excluding duplicates, we obtained 10205 isolates, and compared the ratio of ESBL-producing *E. coli* (EPE) and *K. pneumoniae* (EPK) in each type of sample. **Results:** We obtained 6351 EC-positive isolates from urine, 1044 from blood and 307 from sputum, and 1632 KP-positive isolates from urine, 429 from blood and 442 from sputum. Considering the EC isolates, we found that 668 urine samples (10.5%), 114 blood samples (10.9%) and 76 sputum samples (24.8%) were positive for EPE ($p < 0.001$), while in the KP isolates, 746 urine samples (45.7%), 200 blood samples (46.6%) and 168 sputum samples (38.0%) were positive for EPK ($p = 0.01$). In both, the differences between urine and blood were not significant. The observed high incidence of EPK reflected a constant upward trend in the period considered, with isolates in B/U climbing from 22.1% in 2008 to 45.4% in 2009 and 53.5% in 2010 ($p < 0.001$), with a similar increase in sputum, from 27.7% in 2008 to 37.1% in 2009 and 45.4% in 2010 ($p = 0.03$). By contrast, EPE plateaued in B/U during the same period (9.1% in 2008, 10.6% in 2009 and 10.8% in 2010, $p = \text{NS}$). **Discussion:** We found that the prevalence of EPE was identical in blood and urine (11%), but increased 2.3-fold in bronchial samples (25%). Conversely, the prevalence of EPK was 17% lower in bronchial samples than in blood and urine (38% vs 46%). Considering that ESBL-producing strains are more frequent in the nosocomial setting than in the community, and that EC is part of the endogenous flora, our results suggest that, in our series, isolates resulting from colonization with Hospital flora colibacilli are more frequent in bronchial samples, while bacteriuria and bacteraemia are due to autologous strains in a higher percentage of cases. On the other hand, the presence of KP in blood and urine is typically of nosocomial origin; the lower percentage of EPK in bronchial samples suggests that a higher proportion of these specimens reflect colonization of the patient’s respiratory tract by strains acquired in the community.