Surveillance of MDR Gram-negatives ESBL-producers and carbapenem resistant, in 12 years period (2003-2014) in Aveiro, Portugal

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Background and Objectives

Multidrug resistance has become a burden to the health care system. The present study was undertaken to determine the prevalence of multidrug resistant Gram-negatives (fermenters ESBL-producers and non-fermenters carbapenem resistant) in a 12 years timeframe, in Centro Hospitalar do Baixo Vouga (CHBV), Aveiro, Portugal.

Material and methods

Consecutive, non-duplicate bacterial pathogens were isolated from various clinical specimens, from inpatients and outpatients and exhibiting resistance to at least three different classes of antibiotics.

Four prevalent species were selected, namely *Escherichia coli* (EC), *Klebsiella pneumoniae* (KP), *Pseudomonas aeruginosa* (PA) and *Acinetobacter baumannii* (AB). Identification of the isolates was performed with the Vitek2 system and Advanced Expert System (VITEK 2 AES) (BioMérieux, Marcy L´Étoile, France).

Antimicrobial susceptibility profile to >20 antimicrobial agents was evaluated according to CLSI 2012/EUCAST 2014 guidelines.

ESBL producers were confirmed by Etest (AB Biodisk) ESBL with cefotaxime/cefotaxime + clavulanic acid and ceftazidime/ceftazidime + clavulanic acid strips, according to manufacturer's instructions.

Results

- 14209 isolates were included in this study, according to the criteria listed above.
- 11109 were fermenters, 8639 belong to EC species and 2425 belong to KP species.
- 11% (1549) isolates were ESBL producers;
- An ESBL phenotype was detected in 36% (869/2425) of the KP and 8% (680/8639) of the EC;
- The number of KP ESBL-producers was most of the time higher than EC ESBL-producers.
- 3100 were non-fermenters, 2446 belong to PA species and 654 belong to AB species.
- It was observed an increase of resistance rates to carbapenems: meropenem and imipenem.
- Resistance to colistin on the other hand did not show significative variation.

Conclusions

- KP isolates are a major concern since despite the total number being inferior to EC, the number of ESBL-producers belonging to that species is higher;
- The number of ESBL-producing isolates of these species has been significantly increasing in the last 12 years and requires surveillance.
- The increase of carbapenem resistance exhibited, in the last 5 years by the non- fermenters, was extremely high and compromises the use of these antibiotics to treat infections caused by these pathogens. This fact can be explained by the presence of an integron carrying a VIM gene among the PA isolates in our hospital.
- Also, long-term dissemination of a blaOXA-40 producer *A. baumannii* in the Iberian Peninsula has been reported by da Silva and co-workers, thus unsurprisingly it was detected in our hospital. However, this limits the therapeutic options available, thus becoming a cause of concern.
- Colistin remains the most active drug against both PA and AB in the isolates collected in CHBV.