Abstract: P908

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Epidemiology of antibiotic resistance of bacterial pathogens from intensive care units: the SENTRY surveillance program in Europe 2000

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On behalf of the Euro SENTRY Program

Objectives:
To describe the frequency and resistance rates of bacterial pathogens from patients admitted to intensive care units (ICU) from a network of European hospitals.

Methods:
During the year 2000, 18 hospitals from 12 European countries referred a total of 8062 bacterial pathogens. In vitro susceptibility of 32 antimicrobial agents isolated from hospitalized patients (pts), was tested by broth microdilution method as described by the NCCLS.

Results:
Among all pathogens, 30% were from pts admitted to ICU. In these patients, the most frequent pathogens were S. aureus (20%), P. aeruginosa (15%), E. coli (11%), K. pneumoniae (8%), coagulase-negative staphylococci (7%), A. baumannii (7%), E. cloacae (5%) and E. faecalis (4%). Isolates from ICU pts were recovered from bloodstream (49%), lower respiratory tract (39%), skin (7%) and urinary tract infection (6%). The mean (intercenter range) proportion of P. aeruginosa isolates nonsusceptible to ceftazidime and cefepime was 31% (0-82) and 35% (0-82), respectively, in ICU pts, versus 25 and 23% in non-ICU pts (P = 0.07 and P < 0.01, respectively). Ciprofloxacin resistance rates in ICU was 33% (0-88). Rates of nonsusceptibility to imipenem and meropenem were 32 and 31%, respectively, versus 20 and 17% in non-ICU pts (P < 0.001). In K. pneumoniae, the proportion of decreased susceptibility to ceftazidime (MIC 32 µg/mL) was 43% versus 29 in non-ICU (P < 0.01); cefepime 15% versus 7% in non-ICU pts (P < 0.01). Resistance of A. baumannii to meropenem was seen in 43% isolates from ICU pts versus 16 in non-ICU pts (P < 0.01). The proportion of oxacillin resistance in S. aureus from ICU pts was 47% (0-100) versus 25% in non-ICU pts (P < 0.0001). Resistance to vancomycin was similarly low in ICU versus non-ICU pts in E. faecalis (1% vs. 3%). High level of gentamicin resistance was expressed by 36% of E. faecalis isolates from ICU pts versus 32% in non-ICU pts.

Conclusions:
These data confirm that the prevalence of antimicrobial resistance in several Gram-negative pathogens and S. aureus isolates is higher from patients admitted to ICU than to other wards in these hospitals. Large intercenter variation underline the need to adapt the therapeutic approach to local resistance data.
Epidemiology of antibiotic resistance of bacterial pathogens in Intensive Care Units from the SENTRY surveillance program in Europe 2000

H. Rodriguez-Villalobos, R.N. Jones, M.J. Struelens and the EUROPEAN SENTRY PARTICIPANTS

Table 1: List of participating centers

<table>
<thead>
<tr>
<th>Category</th>
<th>Euro SENTRY 2000</th>
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<tbody>
<tr>
<td>Other countries</td>
<td>6 Mediterranean countries and 6 other countries</td>
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<tr>
<td>Mediterranean countries</td>
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<td>Other countries</td>
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Methods

During the year 2000, 18 hospitals from 12 European countries: 6 Mediterranean countries and 6 other countries participated (Table 1). Of these centers, 11 (61%) had participated in the SENTRY program during 1997-98. As part of the SENTRY program, the monitored infections included the first 20 clinically significant consecutive blood isolates of any species per month (objective A), pneumonia in hospitalized patients (objective C), wound or skin and soft tissue infections (objective D) and urinary tract infections (objective E). Only 1 isolate per patient was submitted. All strains were sent to the regional monitor (RN Jones, University of Iowa, USA) for susceptibility testing to >20 antimicrobials and confirmation of organism identification. Antimicrobial susceptibility testing of isolates was performed using a broth microdilution method according to the National Committee for Clinical Laboratory Standards (NCCLS) guidelines. A total of 8061 pathogens recovered from objectives A, C, D, E, Only those with complete data concerning ICU admission (a total of 5966 pathogens) were included in this analysis.

Results

- Most isolates from both ICU and non-ICU patient groups were recovered from bloodstream infections followed by lower respiratory tract infection in ICU group.
- *S. aureus* was the most frequent etiologic agent of bloodstream and skin infection in ICU patients. *P. aeruginosa* was the most common cause of respiratory tract infection and *E. coli* was the most common cause of urinary tract infection (Table 2).
- Several leading ICU pathogens showed a significantly larger proportion of strains resistant to one or more classes of antimicrobial agents in isolates from ICU versus non-ICU patients:
  - Resistance to oxacillin, fluoroquinolones, macrolides, lincosamides in *S. aureus* and *CNS* (Table 3).
  - Susceptibility of ESBL-producing *K. pneumoniae* (Cefazidine MICs =>2µg/mL, 43% vs 29%, p<0.01).
  - Resistance to β-lactam antimicrobials in *P. aeruginosa* (Table 4).
  - Resistance to carbapenem in *A. baumannii* (Table 4).
- There was a large inter-center variation in the proportion of these resistant ICU strains (Fig 2-5). No obvious regional trend was noted with β-lactam resistant *P. aeruginosa* and *S. aureus*. In contrast carbapenem-resistant *A. baumannii* and ESBL-producing *K. pneumoniae* were more frequently seen in ICU in Mediterranean countries.
- The most active antimicrobials against these problem pathogens from ICU patients were:
  - *S. aureus* and CNS: glycopeptides, linezolid.
  - *E. coli*: piperacillin-tazobactam, amikacin, and piperacillin-tazobactam.
  - *A. baumannii*: carbapenems and amikacin.
  - Enterobacter spp: carbapenems, amikacin and cefepime.

Conclusions

- The prevalence of antimicrobial resistant *P. aeruginosa*, *K. pneumoniae*, *A. baumannii* and staphylococci was 1.5 to 3 fold higher in critical isolates from ICU patients compared to those admitted to other wards in this survey.
- Presumptive ESBL-producing *K. pneumoniae* and carbapenem resistant *A. baumannii* were especially common in ICU isolates from hospitals in Mediterranean countries as noted in previous surveys 1, whereas MRSA and β-lactam resistant *P. aeruginosa* were geographically more widespread.
- Large inter-center variation in the proportion of these resistant pathogens points to possible infection control problems and underlines the need for adapting therapeutic strategies to local epidemiology.

References