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Use of beta-lactams antibiotics in ICU patients

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Introduction

Large spectrum antibiotics have to be considered as first treatment of infection in ICU patients.

Objectives

To evaluate the antibiotic treatments in ICU patients and to compare treatments on admission and during ICU stay.

Methods

A Six-month prospective study in 5 ICUs of a hospital totalizing 44 ICU beds. Antibiotic treatments were divided in three groups: treatment started before ICU admission (1), treatments started the day of ICU admission (2) and treatments initiated during ICU stay (3). The type of beta-lactam antibiotics (BA) used was listed at the start of treatment and after 3 days.

Results

459 treatments given to 363 patients among 1131 hospitalized patients were analyzed. There were respectively 131, 167 and 161 treatments in group 1, 2 and 3. After 3 days, 79 (17.2%) treatments could be stopped because of no infections and 129 (28.1%) were changed mostly for streamlining. Table 1 shows the number of treatment with BA according to groups and to the time of treatment.

There was a tendency to use less BA during ICU stay, the difference was significant only at the start of treatment ($p = 0.027$). If we consider ampicillin, temocillin, penicillin, flucloxacillin and 2nd -generation cephalosporin as molecule with narrow spectrum of activity, these molecules were significantly more used after three days of treatment ($p < 0.0001$). Interestingly this difference already existed at the start of treatment when group 3 was compared to the two others ($p = 0.0159$). Among the 459 treatments, there were, in 49 patients, 51 inappropriate treatments according to the bacteriological results, 16 (12%) in group 1, 17 (10%) in group 2 and 18 (11%) in group 3 ($p = 0.857$). The ICU mortality was not different between those patients (11/49 = 22%) and the others (77/314 = 24.5%) ($p = 0859$).

Table 1

Type of BA	Before admission (group 1)	On admission (group 2)	During ICU stay (group 3)	After 3 days n = 96 (group 1)	After 3 days n = 133 (group 2)	After 3days n = 148 (group 3)
Ampicilline-Amoxicilline - Temocilline	2 (1,5%)	2 (1,2%)	3 (1,9%)	4 (4,2%)	9 (6,8%)	10 (6,8%)
Penicillin	1 (0,8%)	1 (0,6%)	0 (0%)	1 (1%)	4 (3%)	0 (0%)
Flucloxacillin	8 (6%)	0 (0%)	10 (6%)	11 (11,5%)	5 (3,8%)	11 (6,8%)
Amoxi-Clav	15 (11,5%)	35 (21%)	15 (9,3%)	1 (1%)	13 (9,8%)	7 (4,7%)
Pipera-Tazo	42 (32,1%)	54 (32,3%)	32 (19,9%)	17 (17,7%)	21 (15,8%)	13 (8,8%)
Cephal 2G	3 (2,3%)	5 (3%)	9 (5,6%)	8 (8,3%)	11 (8,3%)	15 (10,1%)
Cephal 3G	14 (10,7%)	34 (20,4%)	35 (21,7%)	19 (19,8%)	20 (15%)	26 (17,6%)
Cephal 4G	7 (5,3%)	1 (0,6%)	2 (1,2%)	2 (2,1%)	1 (0,8%)	1 (0,7%)
Carbapenem	17 (13%)	15 (8,9%)	19 (11,8%)	10 (10,4%)	12 (9%)	14 (9,5%)

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Table 2

TOTAL	109 (83,2%)	147 (88%)	125 (77,6%)	73 (76%)	96 (72,2%)	97 (65,5%)

Conclusions

Beta-lactam antibiotics remain the cornerstone of antibacterial therapy. A cautious strategy with narrow spectrum beta-lactam antibiotics could be supported in ICU patients when possible.

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