

## NOSOCOMIAL INFECTIONS: PREVENTION AND TREATMENT

N. Bakracheva

Department of Clinical Pharmacology and Therapeutics

University Hospital "Queen Giovanna" - Sofia

Medical University - Sofia, Bulgaria

Nosocomial infection means inhospital infectious disease. The nosocomial infections are very often and the prevention and the treatment of them costs very much (Table 1):

Table 1: Economical aspects of nosocomial infections

Infection	Prolonged stay in hospital	Mortality due to nosocomial infections	Expenditures per patient
Sepsis	7 – 21 days	23% - 50%	40 000 \$
Surgery wounds	7 – 8 days	6% - 35%	2 734 \$
Kidney	1 – 4 days	6% - 35%	593 \$

The nosocomial infections appeared because problems with the hospital or with the patients:

### THE HOSPITAL:

- Absence of drug policy and drug formulary,
- Contaminated buildings,
- Very long stay of patients more than 20 days and long duration of the antibiotic therapy.

### THE PATIENT:

- Acute and chronic ill patients are situated in the same room,
- Presence of disease, which decreases the immune status (AIDS),
- Presence of catheters, venous cannulas and etc. in the body for long time.

The prevention of a nosocomial infection is consistent with:

- Development of a strategy for hand washing and education of the hospital personnel,
- Introduction of modern approaches for automatization and organization of the hospital disinfections services,
- Introduction of patient's Health Care policy,
- Introduction of drug policy.

When the nurse washes her hands after each patient the incidence of nosocomial infections decreases by 91 %.

The main microorganisms, which cause nosocomial infections and the treatment regarded, are shown in Table 2.

Table 2: Main microorganisms, which cause nosocomial infections, and the specialized treatment (1)

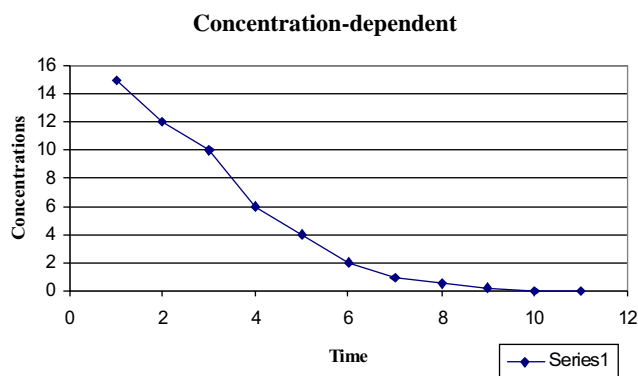
Cause	Drug	Dose/day
Pseudomonas aeruginosa	Ceftazidim, Piperacilline+Ciprofloxacin Tobramycine+Clindamycine	2 x 4 g iv 4 x 4 g + 2 x 200 mg iv 0.5 mg/kg + 3-4 x 600 mg iv
Klebsiella Type B	Ceftriaxone	1 x 2 g iv
Serratia	Amikacin Tobramycine	15 mg/kg/24 h iv 0.5 mg/kg/24 h iv
Staphylococcus aeruginosa	Vancomycin Teicoplanin	2 x 1 g/24 h iv 1 x 400 mg iv
Escherichia Coli	Ciprofloxacin	2 x 200 mg/day iv

There are different types of antimicrobial drugs according to their target of action (Table 3).

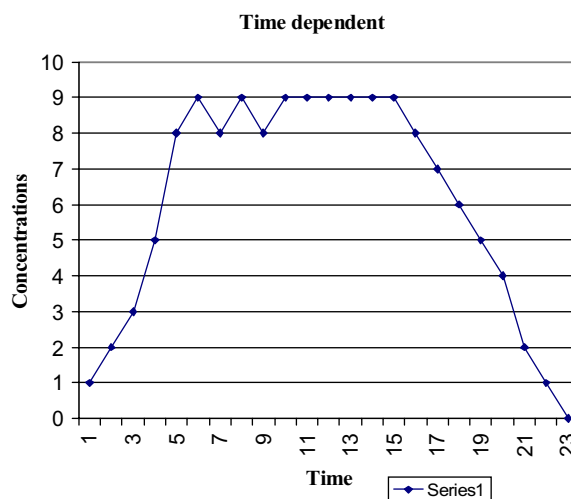
Table 3: Antimicrobial drugs according to their mechanism of action (2, 3, 4, 5)

Drug	Pharmacokinetic characteristics	Target for dosing regimen	Pharmacodynamic parameter correlating to efficacy
Aminoglycosides, Quinolons, Metronidazol	$C_{max}$ dependent + PABE*	The value of $C_{max}$	$C_{max}$ 5-10 x $MIC_{90}$
Penicillins, Cephalosporins, Aztreonam	$t_{max}$ dependent - PABE*	The value of $t_{max}$	$t_{max}$ 2-3 x $MIC_{90}$
Carbapenems, Vancomycine, Clindamycine	$t_{max}$ dependent + PABE*	The value of $t_{max}$	$t_{max}$ 2-3 x $MIC_{90}$

The antimicrobial drugs dependent on the value of  $C_{max}$  are shown in Figure 1:



The antimicrobial drugs dependent on the value of  $t_{max}$  are shown in Figure2:



**In conclusion**, the success of treatment of nosocomial infections depends on:

1. The procedure of hand washing,
2. The resistance of microorganisms to bacterial agents.

When these factors are taken in consideration, the therapy of nosocomial infections will be very successful.

## REFERENCES

1. Гачев, Е. - Избор на предпочитано антибактериално средство., Българска медицинска практика (2003) 2:9-12
2. Е. Гачев, И. Богданов, Н. Бакрачева, Р. Койчев и В. Влахов. Информативна стойност на фармакодинамичните характеристики на някои цефалоспоринови антибиотици по отношение на клиничната им ефективност., Съвременна Медицина (2003), 3:72-75
3. Гачев Е., Н. Бакрачева, И. Богданов, Р. Койчев и В. Влахов. Информативна стойност на фармакодинамичните характеристики на някои флуорхинолони и макролиди по отношение на клиничната им ефективност. (2003), 2:13-16
4. Gatchev E., M. Kinzig-Schippers, G. Ruesingp K. Doser, U. Tyroff Friesinger, C. Rauch, V. Vlahov, F. Soergel. Results from pharmacokinetic studies analyzed by LC-MS/MS- do we need to retrieve the PK of "Old" antibiotics? , European Journal of Clinical Pharmacology, (1997)Suppl. To volume 52:6-7, abstr. 7
5. Gatchev E, I. Bogdanov, R. Koytchev, N. Bakracheva, V. Kirkov, V. Vlahov. Is the pharmacodynamic characteristic of cephalosporines informative for their clinical effectiveness. Eur. J. Clin Pharmacol (2000) 56:6-7q abstr. 7