

NOSOCOMIAL INFECTIONS: PREVENTION AND TREATMENT

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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)

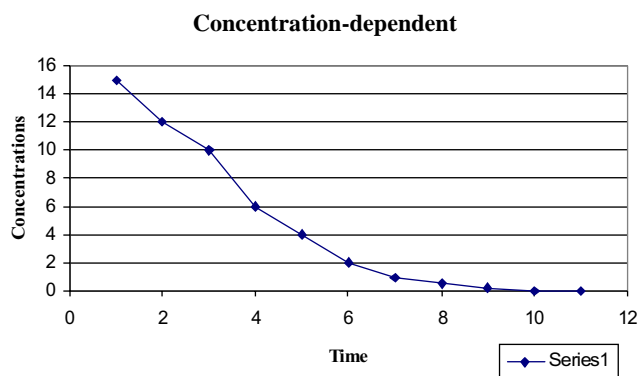
Cause	Drug	Dose/day
Pseudomonas aeruginosa	Ceftazidim, Piperacilline+Ciprofloxacin Tobramycine+Clindamycine	2 x 4 g iv 4 n 4 g + 2 x 200 mg iv 0.5 mg/kg +3-4 x 600 mg iv
Klebsiella Type B	Ceftriaxone	1 x 2 g iv
Serratia	Amikacin Tobramycine	15 mg/kg/24 h iv 0.5 mg/kg/24 h iv
Staphylococcus aeruginosa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

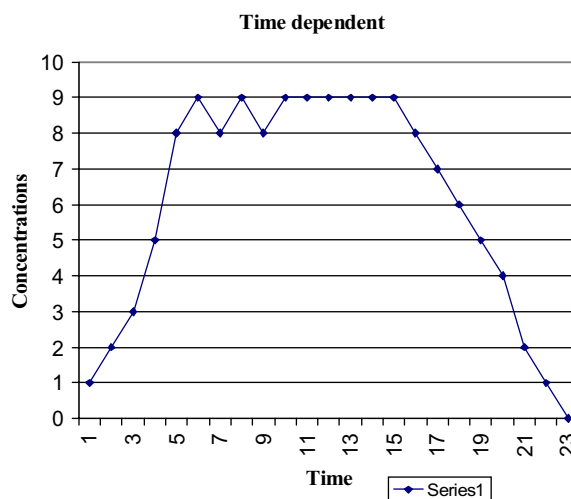
Table 3: Antimicrobial drugs according to their mechanism of action (2, 3, 4, 5)

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