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Microbial resistance to antibiotics in senior patients

The growing age of patients may bring about specific problems in using the antibiotics especially some types of these antimicrobials. Apart from specific problems connected with antibiotic treatment of seniors, there appear particular negative factors affecting the development of microbial resistance to antibiotics in senior patients.

Dynamics of microbial resistance to antibiotics

Currently we witness almost general and global intensification of unfavourable dynamics of the increase of resistance to many important antibiotics reaching in some of them, alarming dimensions. The same situation can also be seen in the Slovak Republic, where a significant increase of resistance in certain microbial types to many antibiotics (bug-drug relation) was observed by computer monitoring of microbial resistance isolated from patients with bacteremia within a short period of 2 years.

Certain "pan-resistant" strains of some bacterial species are said to emerge, i.e. variants or mutants resistant to all the existing antibiotics. The current period can be characterized as a decline of the antibiotic era (2,4). These "panresistant" or fully resistant strains appear in certain health care establishments and their at-risk departments. These departments can make justified, nonjustified, improper and sometimes even an incorrect indication and dosing of many antibiotics – or of their fixed "menu" (in a case report of one department "an antibiotic cocktail indication" was found). The selection and use of antibiotics are "irrational". There is a trend of an indiscriminate use of combinations of antibiotics (just to make sure). It can paradoxically support the dynamics of certain mechanisms of the appearance of resistance.

Some mechanisms of resistance development

Antibiotics frequently carry out a huge selection pressure on microbial populations.The strains of microorganisms are not homogenous from the aspect of sensitivity to antibiotics.. In every microbial population there exist scarce mutants with various degrees of insensitivity to concentrations of antibiotics in a patient's organism. Moreover, some microbes may contain the so called mutator factors, that increase the mutation frequency to the resistance. In improper strategy of antibiotic administration, mainly in concentrations with insufficient bacteriostatic or bactericidal activity, the growth or the activity of great microbial majority are suppressed, but despite the presence of antibiotic, "the spontaneous mutants" in particular remain vital and may form resistant population. Infectious process may thus continue when the antibiotic is present. In

the application of another antibiotic, other resistant or multiresistant microbial populations may arise.

This mechanical process of mutation and selection of resistance has been surpassed by the fact (as early as in the fifties of the past century) that the resistance genes have a high and frequent transferability among microbes. There is an explosive spread of the so called plasmids of resistance and multiresistance from resistant microbes to sensitive ones. Resistant strains are capable of transferring these plasmids to the sensitive bacteria, changing them immediately to multiresistant.

Over the past years while studying the striking development of resistance to the latest antibiotics (meropenem, fluoroquinolones, etc.) a simpler transfer of genes of resistance coded in the so called integrons, was also observed. Intergrons are simple DNA sequences with the so called insertion sequences. Besides them, there also emerge and spread completely new, previously unknown and nonexisting mechanisms of resistance. Although appearing lately, they already managed to devaluate many new effective antibiotics. These mechanisms involve the ability of producing the so called ESBL (extended-spectrum betalactamases, the enzymes capable of destroying all penicillins and cephalosporins) or the so called metalo-lactamases, destroying meropenem, or the changes on the sites where antibiotics are linked (e.g. vancomycin in enterococci), etc. The increasing ineffectiveness of many antibiotics forces clinicians to reach for unusual and so far unused antibiotics and their exotic combinations, as if in a desperate attempt to win over new, powerful types of microbes.

Specific problems in seniors, increasing the development of inefficiency of antibiotics

1. In senior patients the natural immune system generally decreases giving thus rise to diseases caused by not only pathogenic but also by the so called opportune microbes. In this way a wide spectrum of bacteria that has to be considered causal agents of diseases is being extended and new effective antimicrobial means have to be searched for. Currently we encounter the problems of infections induced by Acinetobacter sp. and others. (table 1).

2. Senior patients often show comorbidity. Infectious process is more frequently associated with already developed disease. This can influence a more intense outbreak of infection or, vice versa, a less pronounced onset and course, as compared to the patients of other age categories. Due to these reasons senior patients are more often exposed to infectious diseases also caused by opportune bacteria.

3. In senior patients a clinical picture of infectious diseases may be changed or atypical. Infections have frequently a subclinical course, they may often be disregarded and their treatment delayed. Therefore, in case of any suspected infection in a senior patient, microbiologic or immunologic examination is inevitable and until the results are completed, the so called empirical administration of antibiotics should be initiated. This procedure requires to be acquainted with the results of resistance surveillance to antibiotics in these departments in order to avoid irrational use of antibiotics. In older patients early treatment or strict application of prevention of infectious processes is necessary.

4. In contrast with adults, old patients are more exposed to developing microbial resistance to antibiotics. They are more frequently colonized and infected by resistant and polyresistant microbes, especially if hospitalized at department of special surgery (mainly abdominal or transplantation), trauma surgery, intensive care units, intensive care departments, etc.

5. In old patients resistance may occur earlier (2-87), whereas the selection of resistance depends on the serum concentration of an antibiotic. A great attention

Table 1. Some modalities of using specific antibiotics in infections in seniors caused by „pan-resistant microbes" (according to 2 – 7)

Authors	Age patients (in ICU)	Problem microbes	Resistance to antibiotics	Suggested used alternatives	Genetic basis of resistance
J. Qualle (2) [12]	Unstated	*P. aeruginosa* *Acinecobacter* *K. pneumoniae*	MER [8] FCH MER PEN, CEF, AMG, MER	COL (PMx) + RIF	VIM-metalobeta-laktamázy ESBL [9]
Petrosillo et al. (3) [11]	64 – 89	*Acinecobacter*	MER	COL + RIF	Metalo -integrons
Hsueh et et al. (4)	Seniors affected by 1. ventilator-associated pneumonia 2. catheter-associated pneumonia	*P. aeruginosa*	„pan-resistant" (fully resistant)	„Empirical" (variable and) desperate choice CEP + AMI CEP + MER CEP + MER + FCH CEP + MER + AMI Four-combination (!) [10]	blaVIM 3 „integrons of 1. Class"
Livermore et al. (5)	Mostly seniors (over 65 years) 11 000 strains	*E. coli* z bakteriémií	FCH	GEN, CEF	Unknown
Manuel (6)	Patients in ICU (high consumption of antibiotics)	*Acinecobacter* (imported from Spain)	MER, AMI	COL (i. v.)	Transferred by integrons

[8] Abbreviations: AMI amikacin, AMG aminoglycosides, CEF cephalosporins, CEP cefepime, COL colistin, FCH fluoroquinolones, GEN gentamicin, MER meropenem, PMX polymyxin, RIF rifampicin
[9] ESBL – Extended-spectrum beta-lactamase,
[10] Colistin is unavailable in Taiwan
[11] The authors report that despite the administration of combined antibiotics 50% of patients died
[12] In author's opinion polymyxin is often last resort antibiotic

must be paid to dosing of the antibiotic administered. The sensitivity to single antibiotics and blood concentrations of administered antibiotics have to be monitored. In adult patients the recommended blood dosage concentration should exceed the so called MIC (Minimal Inhibitory Concentration) by as much as 8-fold. However, in senior patients we have to consider the extent and quality of physiological functions of the kidneys and liver. If antibiotics or their metabolites excrete from the organism insufficiently and their concentration in blood increases, they may considerably damage the liver (especially aminoglycosides, some macrolides, tetracyclines, some cephalosporins, (cefoperazone). We must be particularly aware of antibiotics belonging among more toxic preparations which are chosen more frequently due to the increasing inefficiency of routine, common antibiotics (polymyxin, colistine, etc./. A follow up of concentration of antibiotics is mandatory if they are administered in combination. In older patients the function of kidneys, liver, internal environment must be followed up. Accordingly, a continuous follow-up of con-

centration of antibiotics in blood and monitoring of parameters showing the state of vital organs and internal environment have to be adhered to.

6. Some antibiotics may cause diarrhoea - especially those acting on microbes in the gastrointestinal tract of senior patiens. Due to this reason we have to be careful in the application of the so called wide spectrum antibiotics affecting also gramnegative bacteria (present in gastrointestinal tract of senior patients). For an illustration, it is recommended to treat respiratory tract infections when causal agents are known, rather by macrolide antibiotics because gramnegative bacteria may play also here a role of causal agents or concomitant factors.

7. Senior patients residing in caring homes, long-term care facilities or departments, old people's homes require a rational application of antibiotics. Moreover, epidemiologic situation of these environments should also be considered.

Literatúra

1. BLAHOVÁ, J., KRÁLIKOVÁ, K., KRČMÉRY, V., BABÁLOVÁ, M., MENKYNA, R., GLOSOVÁ, L., KNOTKOVÁ, H., LIŠKOVÁ, A., MOLOKÁČOVÁ, M., VACULÍKOVÁ, A.: Monitoring of antibiotic resistance in bacterial isolates from bacteremic patients. *J Chemother,* 16, 2004, s. 269-272.

2. QUALE, J.: How should clinicians control increasing resistance? *APUA Newsletter*, 22, 2005, s. 1-3.

3. PETROSILLO, N., CHINELLO, P., PROIETTI, M. F., NICASTRI, E.: Combined colistin and rifampicine therapy for carbapenem-resistant *Acinetobacter* infections. *Clin Microbiol Infect,* 11, 2005, s. 682-683.

4. HSUEH, P., TSENG, S., TENG, L, HO, S.: Pandrug resistant P. aeruginosa causing nosocomial infections. *Clin Microbiol Infect*, 11, 2005, s. 670-673.

5. LIVERMORE, D. M., NICHOLS, T., LAMAGUI T. L., DUCKWORTH, G.: Ciprofloxacin-resistant *E. coli* from bacteraemias in England. *J Antimicrob Chemother,* 52, 2003, s. 1040-1042.

6. MANUEL, R., SHIN, G. Y., FARRAG, N., HOLLIMAN, R.: Endemic carbapenem-resistant *Acinetobacter* in a London hospital. *J Antimicrob Chemother*, 52, 2003, s. 141-142.

7. REIS, A., LUZ, D. A. M., SADLER, H., GALES, A.: Polymyxin resistant *Acinetobacter* spp.: what is next? *Emerg Infect Dis*, 9, 2003, s. 1025-1027.

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Hospitalization of senior patient and health-social relations in hospital

J. Přehnal

Summary

One of the elementary attributes of geriatrics and geriatric medicine is the interconnection of health and social problems. This interconnection is not constant, but has its dynamics and variability. However, the system of health and social services does not frequently consider this quality of geriatrics. Both sectors usually tend to be restricted by their own budgets. These efforts do not permit to adopt necessary solutions for practical application. The paper deals with the problems of discharging the patient from institutional care. This process in seniors is not single acted. It represents a process that should be not only an integral part of hospitalization but might serve as one of the parameters in quality assessment of any workplace or any facility with subsequent care.

The submitted paper also analyzes hospitalization of seniors with clear and ambiguous symptomatology on admission, defines the critical parts of hospitalization, and suggests the mode of their solution including health-social aspects. A possibility of solution is seen in introducing the concept of health – social bed that could be able to manage those cases in which health and social needs of seniors overlap.

Key words: *hospitalized senior – health-social bed – health-social needs of senior patient*

Preoperative examination and its contribution to the improvement of operative and postoperative course in a senior

S. Haeberleová

Summary

The theoretical part of the paper describes the specific features of old organism and physiological and pathological processes undergoing in the main organ systems of seniors during and after the operation. The paper is supplemented by the illustrations of postoperative results of the author's group of operated patients with coronary disease. The conclusion contains the recommendations that should be involved in preoperative examination in order to provide the optimal operative and postoperative course of geriatric patient.

Key words: *geriatric patients – perioperative course – operative risks*

Long-term care in a hospitalized patient in surgical department

J. Pecháčková

Summary

The ageing process of the population puts a considerable burden on the overall system of health care. The increasing lifespan in western civilization results in a growing number of patients who need long-term hospitalization. Long-term hospital stays are not profitable for hospitals with the system of acute clinical beds. Accordingly, hospitals are forced to establish long-term beds at the expense of standard clinical beds. The submitted paper summarizes 2.5 year long experiences with long-term care in a small surgical hospital.

Key words: *ageing process of the population – acute care – long-term care – conception*

Management of patient with lower extremity defect 2.

T. Kopal

Summary

The treatment of skin defects on lower extremity is demanding from financial, time and nursing aspects. The first step in their management is to identify the cause. The majority of defects on lower extremities is of venous origin, arterial, neuropathic and other ulcers are less frequent.

The elimination of the cause shortens the time of treatment and improves the chances of complete healing of the defect. The following phase requires effective general and local treatment of ulcers – classic or modern methods, wet treatment of wounds. The treatment of lower extremity ulcers calls for interdisciplinary cooperation of doctors. A thoroughful education of the patients is an inevitable part of care.

Key words: *ulcer - wet treatment – compressive treatment*

The course of abdominal aortic aneurysm in a 79 year old male

H. Šimáčková, P. Weber, Z. Šilhart, M. Mechl

Summary

The authors describe a case of spontaneous rupture of abdominal aortic aneurysm (AAA) in a 79 year old male that manifested by severe abdominal pain and hemorrhagic shock. Successful and early operation saves the patient's life in such a case. AAA diagnostics ranks among significant problems of geriatric medicine. Its course is often asymptomatic in old age and the rupture usually appears as one of the first clinical symptoms. The prognosis of effectively operated AAA is markedly better as compared with those operated urgently.

In their paper the authors discuss the diagnostics and treatment modalities of AAA and point at their own observations. The stress is laid on a possible course and complications mainly the risk of the rupture. In this case the therapy is unambiguously surgical and a favourable course and patient's perspective underline the fact that the patients must be repeatedly told about their high risk of possible rupture, especially if they do not agree with surgical management. The authors consider this case quite unusual due to vague gastrointestinal complaints as primary and rather slow clinical symptoms of large abdominal aortic aneurysm. In concurrent biliary disease some clinical symptoms may also be difficult to interpret. The size of aneurysm unequivocally shows a high degree of risk of the rupture. The submitted case clearly illustrates its impendence when after 2 weeks since the AAA size (6x5.5cm) was confirmed, spontaneous rupture occured.

Key words: *abdominal aortic aneurysm – etiopathogenesis - rupture – diagnostics – therapy*