IMMUNOCOMPROMISED HOSTS VIEWED FROM AN EPIDEMIOLOGICAL STANDPOINT

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Introduction

In the present time we come across a wide variety of states that are accompanied by the reduced immunity of the individual to defend himself against infections. The man then becomes endangered by microorganisms which in healthy individuals form common microflora or are only potentially pathogenic.

In addition the medical practice of the Czech Republic Army has shown that we should take into account these states both in peace-time and under emergency situations.

We can see immunosuppression states after extensive traumata, burns, gunshot wounds, or in connexion with malnutrition, infectious diseases, irradiation, chemotherapy, etc. An individual with an impaired immunological system is then exposed to a higher risk of infection (Table 1).

Table 1

What makes a host compromised?
- Burns, trauma, major surgery, gunshot
- malnutrition
- infectious diseases (EBV, HIV, mumps, M. tuberculosis, M. leprae)
- neoplasia
- irradiation
- chemotherapy

Those patients can suffer from infections both from endogenous and exogenous reservoirs. Endogenous infections often emerge from the respiratory, gastrointestinal or urogenital tracts. Exogenous infections in those patients are often induced by microorganisms that occur in the environment (water, air, soil) but also on hands of the medical staff, on medical instruments, etc. Changing patterns of infections in the immunocompromised patients are described (1).

Bacteria, viruses, fungi or parasites can act as causative agents of infection (Table 2).

Table 2

Which microbes cause infection in the compromised host?	
Bacteria:	staphylococci, streptococci, Listeria spp., M. tuberculosis, Legionella spp., Enterobacteriaceae, Ps. aeruginosa
Fungi:	Candida spp., Aspergillus spp., Cryptococcus neoformans
Parasites:	Toxoplasma gondii
Viruses:	herpes viruses (HSV, CMV, EBV)

In the care of those patients supportive therapy, as it is known, is also an integral part, which includes care of the psychic and nutritional status, control of pain and sleeping disorders, therapy of dyspepsia and also prevention of infectious complications.

The most important part of the supportive therapy is the prevention of infectious complications which can endanger the patient's life. Therefore, antibiotics and antimycotics are administered and treatment of the patient should take place in protective reverse isolation (Table 3).

Table 3

Supportive therapy in the immunocompromised hosts
care of psychic and nutrition status, mineral and water balance palliation of the pain treatment of dyspepsia, disorders of sleeping prevention of infectious complications (antimicrobial prophylaxis, protective isolation)

Protective reverse isolation of the patient means his isolation from the environment, which may for an immunocompromised host represent a risk of infection (the hospital environment, microflora of medical staff, medical instruments, etc.). We suppose that an observance of the prophylactic procedures can significantly reduce incidence of life-threatening infections in those immunocompromised hosts.

From the epidemiological point of view consistent monitoring of the environment may just play a significant role in the prevention of infection (Table 4).

Table 4

Protective reverse isolation
Reverse isolation = protection of the immunocompromised patient from the hospital environment (microflora of medical staff, air contamination, etc.), which may represent a risk of infection for those patients

Methods

Subject of our research

Our research group has been dealing with the prevention of infections in neutropenic patients for a number of years.

Those patients with attenuated immunity either in consequence of hematologic malignities or radiotherapy or chemotherapy often have syndromologically similar manifestations as a status after radiation exposure, which can also occur in everyday life, e.g., after a disaster at a nuclear power station, in a road accident during the transport of radioactive substances, etc.

We performed monitoring of microbial contamination of the air in the Clinical Haematology ward of the Teaching Hospital in Hradec Králové, where autologous peripheral stem cells transplantations have been carried out. The measurements were conducted using an aeroscope BIOTEST RCS PLUS (the manufacturer of this aeroscope is HYCON, Germany).

For detection of microorganisms we used strips with a culture medium providing growth of both gram-negative and gram-positive bacteria and fungi.

Results

In the course of our observation microbial air contamination (January-May 1998) was found in average 90 CFU in one m^3 of the air.

100 CFU in one m^3 of non-pathogens has been recommended for the intensive care unit.

During our observation practically no gram-negative bacilli were found. Findings of microscopical fungi were only sporadic. Coagulase-negative staphylococci, micrococci and sarcines were mostly confirmed.

No microbial isolate from the air was connected with the infection in the treated patients.

Discussion

These days we come across a wide variety of states which are accompanied by a reduced immunity. A variety of factors affecting innate or acquired immunity participate in that status. In addition the medical practice of the Czech Republic

Army has shown that we should take into account these states both in peace-time and under emergency situations. Therefore, it appears reasonable to work out and up-date the complex care system of immunoaltered persons and to search for new therapeutical-prophylactic procedures.

For the purpose of reducing the number of infections in these patients a series of procedures has already been designed. These days we see increasing resistance of microorganisms not only to antibiotics but also to a whole range of disinfectants, so that increasing attention is paid to the protective reverse isolation where the patient is treated.

Evolving risk factors for infectious complications of cancer therapy are described in literature (2)

Conclusion

In the treatment of immunocompromised patients we should pay attention to the prevention of life-threatening infections.

We conclude that it is very important to direct one's attention not only towards antimicrobial prophylaxis and therapy but also an observance of aseptic conditions in patient care.

Literature

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