"Involvement of Clostridium difficile infection in the etiology of the diarrheal disease"

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Diarrheal disease is, after cardiovascular disease, the second cause of death worldwide and the third most frequent syndrome that is seen in medical practice. In many developing countries it is the first cause of infant mortality and cumulates alone, more cases of death than all other diseases together. Diarrheal disease represents a major health problem in developing countries, being also an important risk for the travelers that visit these countries. Globally, it is estimated that the number of deaths that are caused by diarrhea is about two millions every year (1.7-2.5 millions), being on the third place among all causes of death due to infectious disease.

The general part of the thesis provides current data from the specialty literature regarding the etiologic agents of diarrheal disease. The first part focuses on the most commonly involved species in the etiology of the bacterial diarrhea, with emphasis on the infection caused by Clostridium difficile. For each genus and species there are presented aspects about epidemiology, pathogenicity, treatments and particular aspects for every microbial species involved. This chapter further summarizes the viral, parasitological and fungal etiologies that are most frequently involved in the etiology of the diarrheal disease. The possible etiology of diarrhea is very extensive, in this thesis are presented over 30 microbial genera that are involved in this etiology.

The personal contributions consist in two separate studies, a case presentation and a last chapter which is a comparison between the results obtained in the first two studies. The personal research starts from well-defined hypotheses, in accordance with the specialty literature: Clostridium difficile is the major etiologic agent of nosocomial diarrhea.

The first study was conducted by processing data from the Clinic for Infectious Diseases Laboratory Târgu Mureş, in order to evaluate the etiology of acute diarrheal disease, the involvement of Clostridium difficile infection in this etiology and the evaluation of risk factors associated with Clostridium difficile infection. It was concluded that acute diarrheal disease was the most frequently identified in the age groups of children under 6 years old, the most common positive diagnosis was for Campylobacter spp., followed by Giardia lamblia, Salmonella spp., E. coli and only then by Rotavirus; infection caused by Clostridium difficile was detected in a low percentage, most patients diagnosed with this infection were presenting associated risk factors.
The second study was conducted by processing data from the Department of Microbiology from Tg.-Mures County Hospital Laboratory, in order to assess the involvement of \textit{C. difficile} infection in the etiology of nosocomial diarrhea and the utility of the rigorous stool samples selection for the diagnosis of this infection. In this study, selected samples for diagnosis of \textit{C. difficile} infection were tested in the same time in the Department of Microbiology from UMF Tg. Mures, trough immunofluorescence method (the County Hospital Laboratory used for this diagnosis an immunochromatographic method). It was concluded that the frequency of identifying \textit{C. difficile} as etiologic agent of nosocomial diarrhea and its incidence (per 100,000 inpatients reported) is much higher than in other countries in Europe; rigorous selection of the stool samples that are processed for \textit{C. difficile} greatly increases the percentage of samples positivity; the identification of other microorganisms as causative agents of nosocomial diarrhea is low.

The case report exemplifies the importance of diagnosis for \textit{C. difficile} infection in time and the benefits that this diagnosis brings to the patient and to the hospital. The case that was chosen for presentation was a classic case of hospital who acquired \textit{C. difficile} infection, diarrheal disease occurring to a hospitalized patient, a few days after surgery.

The final part of the thesis consist in a final discussion chapter that presents comparative aspects of the etiology of diarrhea and of the protocols that are used for identifying germs in the health care facilities included in the study. This chapter confirms the initial hypothesis of the study, that the routine detection for community enteropathogens (\textit{Salmonella} spp., \textit{Shigella} spp., \textit{E. coli}, \textit{Yersinia} spp., \textit{Campylobacter} spp., Rotavirus) should be directed towards clinics with infectious profile, where there are admitted more frequently patients in the age groups at risk for developing acute diarrheal disease. In the same time, noninfectious profile clinics where are hospitalized more frequently patients from the age groups of adults, or children whose primary diagnosis is not the acute diarrheal disease, sampling and diagnostic protocols should be directed toward routine testing for etiologic agents of nosocomial diarrhea.

The final conclusions of the study are the following: \textit{C. difficile} is the major etiologic agent of nosocomial diarrhea; using strict criteria in selecting the samples that were tested for \textit{C. difficile} infection increases the percentage of samples positivity; the incidence of \textit{C. difficile} infection, although during the 3-year study had a downward trend, is higher than that reported in many studies; involvement of the community enteropathogens in the etiology of nosocomial diarrhea is rare, they are frequently identified as causative agents of acute diarrhea.