J Health Inequal 2022; 8 (1): 89–90

Submitted: 10.07.2022; accepted: 12.07.2022

DOI: https://doi.org/10.5114/jhi.2022.118178

JOURNAL
of Health Inequalities

Book review: "*Clostridioides difficile*: Infections, Risk Factors, Prevention and Treatment" by Henning Sommermeyer and Jacek Piątek

Andrzej Wojtyła

Department of Health Sciences, Calisia University, Kalisz, Poland

ADDRESS FOR CORRESPONDENCE: Andrzej Wojtyła, Department of Health Sciences, Calisia University, Kalisz, Poland, e-mail: a.wojtyla55@gmail.com

The invention of antibiotic therapy in 1928 was a milestone in medical history and has saved millions of lives. However, recent developments suggest that mankind is about to lose this powerful tool to combat bacterial infections. Among these concerning developments is the growing spread of pathogenic bacteria that have developed resistance against one or even multiple antibiotics [1]. As of today, the first pathogenic germs have evolved that cannot be reached therapeutically with any of the existing antibiotics. This resistance development is caused by the widespread use of antibiotics. The emergence of antibiotic resistance has been historically countered by the invention of new classes of antibiotics. While this approach has been productive for decades, the recent cessation of development of new antibiotics by the pharmaceutical industry is exposing worldwide healthcare to the severe threat of being overrun by non-treatable bacterial infections in the not too distant future [2].

With healthcare being at the edge of losing the power of antibiotic therapy, interest in alternative approaches to stop the spread of bacterial infections by alternative approaches has recently risen sharply. Among these is the support of the colonization resistance provided by the gut microbiota, which under normal circumstances prevents the proliferation of pathogenic bacteria [3]. Strengthening of the colonization resistance can be achieved by administration of products containing probiotic bacteria without (probiotics) or with a prebiotic (synbiotics) component.

The team of the Microbiota Research Group at Calisia University has focused its research efforts in this area since the inauguration of the group in 2018. In several publications, the scientists have been able to demonstrate that certain products containing probiotic bacterial microorganisms are able to contribute to the clinical management of bacterial infections caused by *Salmonella Typhimurium* [4], *Klebsiella pneumonia* [5], and *Clostridioides difficile* [6, 7].

C. difficile infections (CDI) are of growing concern for physicians worldwide. While initially considered to be a problem in the hospital setting, nowadays a significant proportion of CDIs originate from the community [8]. Mutations have not only resulted in the emergence of highly virulent strains (e.g. *C. difficile* ribotype R027) but also in strains that exhibit a broad set of resistances against major classes of antibiotics. In the meantime, *C. difficile* strains have been identified that are resistant to metronidazole and vancomycin, which until recently were the two remaining effective antibiotics against multi-drug resistant *C. difficile* [9].

Two members of the Microbiota Research Group in Kalisz, Sommermeyer and Piątek, took on the challenge of summarizing current scientific knowledge about *C. difficile* in a book published in October 2021 by Springer Nature Switzerland AG. With *C. difficile* being a potential issue for nearly everyone working in healthcare, be it in a hospital or in a community setting, knowing about key features of the *C. difficile* microorganism and its potentially devastating effects in patients is of importance.

For the convenience of the readers the authors structured the book into separate chapters each addressing a particular aspect of *C. difficile* and the infections caused by this pathogen. Each chapter provides a comprehensive summary of current knowledge and is supported by a number of excellent figures. At the end of each chapter is an extensive list of references allowing the interested reader to delve deeper into the topic.

The chapter "Microbiology of *C. difficile*" sets the stage for the following chapters and provides highly interesting insights into the genetics and the life cycle of the spore-forming *C. difficile* bacterium during CDI. The chapter "Pathophysiology of *C. difficile*" provides all the information required to understand how *C. difficile* can cause disease, with a fascinating insight into the actions of the toxins excreted by this bacterium. A historical perspective of epidemiological developments is provided in the subsequent chapter, which sheds light on the emergence of hypervirulent and multi-drug resistant strains of *C. difficile*. What follows is an overview of the risk factors associated with *C. difficile* infections, which comprises, among others, staying in hospital or other medical service units, antibiotics, proton pump inhibitors, and advanced age. The final four chapters cover the "Diagnosis of CDI", its "Clinical picture", and options for "Treatment" and "Prophylaxis". The last two chapters place special emphasis on the potential role synbiotics can play in the management of CDI.

For physicians and other healthcare professionals it is important to be aware that the risk of CDI is always present. The authors stated in their general outlook at the end of the book that "Good knowledge of a problem can strongly contribute to a successful management of a problem". Reading the book "*Clostridioides difficile*: Infections, Risk Factors, Prevention and Treatment" can contribute to gaining this important knowledge. The book is available as paperback (ISBN 978-3-030-81099-3) or e-book (ISBN 978-3-030-81100-6) [10].

DISCLOSURE

The author reports no conflict of interest.

References

1. Aslam B, Wang W, Arshad MI, et al. Antibiotic resistance: a rundown of a global crisis. Infect Drug Resist 2018; 11: 1645-1658.
2. Durand GA, Raoult D, Dubourg G. Antibiotic discovery: history, methods and perspectives. Int J Antimicrob Agents 2019; 53(4): 371-382.
3. Rosa R, Donskey CJ, Munoz-Price LS. The intersection between colonization resistance, antimicrobial stewardship, and Clostridium difficile. Curr Infect Dis Rep 2018; 20(8): 27.
4. Piatek J, Sommermeyer H, Bernatek M, et al. Persistent infection by Salmonella enterica servovar Typhimurium: are synbiotics a therapeutic option? – a case report. Benef Microbes 2019; 10(2): 211-217.
5. Piątek J, Bernatek M, Ciechelska-Rybarczyk A, et al. Inhibition of carbapenem-resistant NDM-1 Klebsiella pneumoniae isolated from a hospital outbreak patient by a synbiotic: a nonantibiotic treatment option. IJMRHS 2019; 8: 12-20.
6. Sommermeyer H, Pituch HM, Wultanska D, et al. Inhibition of quinolone- and multi-drug-resistant Clostridioides difficile strains by multi strain synbiotics – an option for diarrhea management in nursing facilities. Int J Environ Res Public Health 2021; 18(11): 5871.
7. Piatek J, Bernatek M, Maciukaj J, Sommermeyer H. Breaking the cycle of recurrent clostridioides difficile Infections: can probiotic bacteria contribute? Ann Clin Med Res 2021; 2(6): 1046.
8. DePestel DD, Aronoff DM. Epidemiology of Clostridium difficile infection. J Pharm Pract 2013; 26(5): 464-475.
9. Lachowicz D, Pituch H, Wultańska D, et al. Surveillance of antimicrobial susceptibilities reveals high proportions of multidrug resistance in toxigenic Clostridium difficile strains in different areas of Poland. Anaerobe 2020; 62: 102167.
10. Sommermeyer H, Piątek J. Clostridioides difficile: Infections, Risk Factors, Prevention and Treatment. Springer Cham 2021, p. 1-86.