Intestinal infections caused by *Clostridioides difficile* - How to determine whether antibiotics work?

- New scientific findings on infection management

Professor Oliver A. Cornely from CECAD Cluster of Excellence for Aging Research at the University of Cologne and the University Hospital of Cologne, together with other experts, has identified new criteria on how and at what time antibiotic efficacy should be assessed in *Clostridioides difficil*e infections (CDI). The results were published today in The Lancet Infectious Diseases and form a basis for the development of new antibiotics.

"CDI is particularly common in advanced age. That is why research in this field is of particular importance at CECAD," Cornely says. Since the 1980s, clinical studies have been investigating which therapy recommendations should be made for CDI. While results on success were previously measured exclusively after the end of antibiotic therapy, the long-term condition 30 days after the end of therapy is now also to be decisive in order to be able to confirm with certainty that the bacteria were successfully combated and to rule out a recurrence of this severe infection. The criteria for evaluating the success of the therapy have also been adapted by the scientists. They suggest: Fewer than three unformed bowel movements per day, a reduction in unformed bowel movements of more than 50% per day, a reduction in stool volume of more than 75% in patients with ostomies, or achieving Bristol Stool Form Scale type 1-4 bowel movements.

"*Clostridioides difficile* is a rod-shaped bacterium and is a prominent cause of hospital-acquired infections ", Cornely explains. "Therapies with antibiotics disrupt the balance of the intestinal flora and can lead to a proliferation of *Clostridioides difficile*. This can cause serious diarrhea with high water loss and fever. Even with a mild course, these pose a risk to vulnerable patients that should not be underestimated and are life-threatening if left untreated." It is not only antibiotic therapy that increases the risk of infection, but also other factors such as age, the use of immunosuppressive drugs or chronic illnesses.

By forming spores, the bacteria can survive in the air and contaminate surfaces. They are excreted in the stool and are resistant to both, heat, and disinfectants. Poor hygiene also contributes to the risk of infection. The most common sites of transmission include retirement homes, hospitals and sanitary facilities.

To fight *Clostridioides difficile* infection, the pathogen must be killed with antibiotics. However, a large number of patients experience a recurrence of the infection after the end of the therapy. This leads to further therapy of the relapse, which is often followed by further episodes of severe diarrhea.

"Our new definitions allow to assess the success of antibiotic therapy. This is an important step towards developing new antibiotics against CDI", Cornely sums up. CDI treatment is currently making great progress. In the future, it will be important to further investigate the success of individual treatment approaches as well as combined therapies.

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