

Study: Antibiotic use in patients hospitalized with COVID-19 appears to have no beneficial effect on clinical outcomes

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Antibiotic treatment of adults hospitalized with moderate COVID-19 is associated with clinical deterioration, despite the drugs being given to over 40% of patients, according to new research being presented at this year's [ESCMID Global Congress](#) (formerly ECCMID) in Barcelona, Spain (27-30 April)

The findings underscore the need to discourage indiscriminate prescribing and improve antibiotic stewardship interventions, researchers say.

Antimicrobial resistance is among the ten greatest public health threats worldwide, underscoring the critical need for the conservative use of antibiotics. Using antibiotics in situations where they are not needed or beneficial leads to the growth of hard-to-treat resistant bacteria.

"In COVID-19 patients, [antibiotic therapy](#) should only be given for suspected or confirmed bacterial co- or superinfection, which occurs when a second infection develops on top of COVID-19," explains lead author Dr. Anette Friedrichs from University Hospital Schleswig-Holstein, Kiel in Germany.

"However, clinical symptoms of bacterial superinfections and advanced stages of COVID-19 can be similar, so high use of antibiotics among hospitalized patients diagnosed with COVID-19 has been reported, despite evidence that actual superinfections are uncommon, exacerbating the antibiotic resistance problem."

To explore this further, Dr. Friedrichs and colleagues analyzed data on 1,317 hospitalized adults (median age 59 years; 38% women) with confirmed SARS-CoV-2 infection between March 2020 and May 2023 from the German National Pandemic Cohort Network (NAPKON),

which includes patients from various hospitals across Germany who were hospitalized with a positive SARS-CoV-2 PCR test.

Using the WHO Clinical Progression Scale, they identified 1,149 patients who were classified as having moderate disease (WHO score 4-5), of whom 467 (41%) were treated with antibiotics commonly used for respiratory infections such as β -Lactam-antibiotics, macrolides, or moxifloxacin during their hospital stay.

A further 168 patients were classed as having [severe disease](#) (WHO score 6-9), of whom 118 (70%) also received antibiotic treatment. The data on these patients are still being analyzed.

Microbiological investigations of patients with moderate disease identified only 11 patients with a superinfection with a bacterium that can also cause pneumonia—eight patients treated with antibiotics and three who did not receive antibiotics. The authors note that the low number of patients with documented respiratory bacterial superinfection might be due to missing microbiological diagnostics or missing documentation of results. Other bacterial infections suggestive for antibiotic therapy were not included in the analysis.

Being male, older, more frail, with greater disease severity, a higher burden of comorbidities and no prior COVID-19 vaccination was associated with a significantly greater likelihood of being treated with antibiotics.

Researchers then analyzed the influence of antibiotic therapy on patients' clinical status after 14 days measured using the WHO Clinical Progression Scale, which reflects a patient's trajectory and resource use over the course of clinical illness. The score indicates disease severity incorporating hospital admission, oxygen requirement, ventilator support, admission to intensive care unit and organ replacement therapy.

The score was calculated for each patient at the initial clinician's consultation, and again 14 days later to see whether the score had improved, remained stable, or worsened.

After controlling for COVID-19 risk factors including age, sex, and underlying [medical conditions](#), the analyses found that clinical improvement in patients with moderate disease was significantly better for younger, female, and vaccinated patients.

Importantly, patients given antibiotics had five times greater risk of clinical deterioration after 14 days compared to those not treated with antibiotics. Similarly, being aged 65 or older trebled the likelihood of COVID-19 deterioration compared to those aged 18-50 years.

As Dr. Friedrichs explains, "This increased risk is possibly due to unknown additional factors that result in worse outcomes and are associated with antibiotic treatment. One potential factor that was only occasionally documented is a bacterial superinfection, as well as other bacterial infections. Importantly, however, clinical deterioration can also develop from the side effects of unnecessarily prescribed antibiotics."

She adds, "The COVID-19 pandemic is ripe with lessons for future viral pandemics. The overuse of antibiotics seen in the pandemic without a beneficial impact on outcomes highlights the need for more rational antibiotic use and points to a need to strengthen antibiotic stewardship programs. Rational antibiotic use should be limited to patients with a likely bacterial coinfection and started only after having performed the respective microbiological diagnostics to confirm a bacterial infection (e.g. blood and sputum cultures in case of suspected pneumonia). Antibiotics should be discontinued once a co-infection has been deemed unlikely."

Study limitations include the observational nature of the study, which

may have missed other important contributory factors, and that it only included patients hospitalized in Germany and might not be generalizable to other populations.

Provided by European Society of Clinical Microbiology and Infectious Diseases

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