Artificial intelligence can help predict the bacteria responsible for pneumonia in emergency rooms

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A team of researchers showed that artificial intelligence (AI) could help predict the type of bacteria that caused the infection in patients with pneumonia. The research is presented at ASM Microbe Online, the annual meeting of the American Society for Microbiology.

"This research highlights the potential of AI as a supplementary tool for physicians in identifying causal pathogens of pneumonia, even before sputum culture results are available," said Joowhan Sung, M.D., hospitalist at MedStar Southern Maryland Hospital. "We demonstrated that physicians could be assisted by AI to decide appropriate antibiotics."

In the study, investigators showed that AI could use the information available in the emergency room and predict if the patient has MRSA or pseudomonas so that physicians can immediately prescribe specific antibiotics targeting specific bacteria.

Infection caused by antibiotic-resistant bacteria is difficult to treat and can be life-threatening. According to the CDC, "more than 2.8 million antibiotic-resistant infections occur, and more than 35,000 people die as a result".

Pneumonia caused by bacteria such as Methicillin-resistant Staphylococcus Aureus (MRSA) or pseudomonas can be fatal, as they are resistant to commonly prescribed antibiotics. Although there are

effective antibiotics against these infections, the test, sputum culture, takes at least 48 hours to incubate and identify these bacteria from the sputum, while these patients might deteriorate within hours.

The investigators presented an analysis of more than 50,000 intensive care unit (ICU) admissions data from Beth Israel Deaconess Medical Center (BIDMC) in Boston, Massachusetts. The researchers analyzed records of patients who were admitted with pneumonia and trained an AI, "neural network" agent using the dataset. The AI agent showed promising results in predicting bacteria that caused the infection.

"Similar techniques can be applied to future research on pneumonia amid the current pandemic, such as capturing bacterial co-infection in those with known COVID-19, which could be fatal if undetected," said Sung.

Jun Hyek Jang, M.S., senior researcher at AvoMD, Inc. and Joongheum Park, M.D., hospitalist at Beth Israel Deaconess Medical Center, also contributed to this work. This research received no external funding.

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