

Five ways AI promises to transform organ transplants

March 21 2023, by Heather Carlson Kehren



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Artificial intelligence (AI) has the potential to become a valuable tool for transplant to save more patients' lives. Recent studies have already shown promise in using AI to analyze large sets of data to discover

important trends and patterns. In this expert alert, Mayo Clinic transplant experts share how this technology may improve outcomes for patients.

"Physicians once practiced medicine without CT scans and with only limited lab tests. Now, these tools are not only commonplace, but they are also critical to [treatment decisions](#). I predict AI will also become an important decision-making tool for physicians," says Mark Stegall, M.D., a Mayo Clinic [transplant](#) surgeon and researcher.

Here are five ways AI promises to improve transplant outcomes:

1. Preventing the need for a transplant

Research efforts are underway to use AI to detect [organ failure](#) earlier. AI also can be used to determine which early interventions delay the need for a transplant and, in some cases, prevent the need for one altogether.

"Transplantation is something that helps patients live longer, but it can be filled with potential complications. We always strive to discover ways to help patients recover on their own and have better quality and quantity of life," says Rohan Goswami, M.D., a transplant cardiologist and director of heart transplant research at Mayo Clinic in Florida.

2. Better match organ donors and recipients

Matching organ donors and recipients is complex. There is hope that AI could help improve the matching process. AI also can help determine whether a donated organ would make for a successful transplant. A [recent Mayo Clinic study](#) demonstrated how an AI-based scoring system could be used to analyze transplanted kidney biopsies to determine inflammation levels, important information that helps indicate the health

of the transplanted kidney.

3. Increasing the number of usable organs

Advances in transplant technology are helping expand the number of organs from deceased donors available for lifesaving transplants. Organ perfusion systems, which are a [mechanical device](#) that keep organs viable, allow more time for donor organs to survive outside the body before being transplanted.

[A study](#) about the use of this new technology to improve organ use rates was recently published by Dr. Goswami and colleagues in the International Journal of Scientific Research. The hope is that AI will help transplant experts better understand which organs would benefit from these technologies before transplant, and which are not suitable for donation.

4. Preventing organ rejection

The risk of organ rejection is one of the biggest challenges in transplant medicine. Researchers are turning to AI to help identify patients most at risk for organ rejection. A [recent Mayo study](#) published in the *European Heart Journal* found that an electrocardiogram could potentially be used to predict the risk of low-grade rejection for heart transplant patients, potentially without requiring a biopsy. There is hope that these advances also will help prevent transplant patient deaths.

5. Improving care after transplant

To help prevent rejection, transplant patients are given immunosuppression medication. Because these medications can cause potentially harmful side effects, it is critical to determine the minimum

dose necessary for patients to remain healthy. AI could one day be used to help determine how a patient's body reacts to immunosuppression and guide when medications should be adjusted.

A recent Mayo abstract at the International Society of Heart and Lung Transplant discussed the role of AI electrocardiographs as a predictor of high and at-risk patients after a heart transplant occurred. There is hope that AI could eventually make posttransplant care easier for patients, eliminating the need for routine biopsies and blood draws.

Experts stress that the success of AI depends upon the quality of the data it is based upon. The goal is not to replace a clinician's expertise with AI, but to create another tool to ensure patients get the best care possible.

"We don't use information blindly and will not follow AI tools blindly. One of the great hopes of AI decision tools is that they can help integrate many other tools, such as scans and labs, into a model that provides a fuller picture of the patient," Dr. Stegall says.

Provided by Mayo Clinic

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