News Release

Title

Antibody response to double SARS-CoV-2 mRNA vaccination in Japanese kidney transplant recipients.

Key Points

- Even after two doses of vaccination against SARS-CoV-2, the probability that post-kidney transplant recipients have acquired antibodies is only over 30%, and there is a possibility that a significant number of recipients have not acquired antibodies.
- Patients who have undergone kidney transplantation need to take precautions against infection of SARS-CoV-2 even after two doses of the vaccination.
- This fact may be a reason for aggressively recommending the third dose of vaccination.

Summary

A research group, Kumiko Fujieda, Akihito Tanaka, Shoji Saito, Kazuhiro Furuhashi, Shoichi Maruyama, Ryosuke Kikuchi, Nami Takai, Takashi Fujita, Masashi Kato, have investigated the acquisition rate of antibodies against SARS-CoV-2 after two vaccinations in post-kidney transplant patients. The acquisition rate of antibodies was not high, and it was considered that post-kidney transplant recipients should continue to take precautions against infection even after vaccination.

It has been reported from overseas that immunosuppressive treatment recipients, especially those who have undergone kidney transplantation, have lower antibody titers after SARS-CoV-2 mRNA vaccination. However, the situation surrounding kidney transplantation differs between Japan and other countries. Therefore, it was necessary to clarify whether there is a difference in the rate of antibody acquisition between Japan and other countries.

The research group conducted an observational study of post-kidney transplant patients attending Nagoya University Hospital. The amount of antibodies against SARS-CoV-2 was measured between 3 weeks and 3 months after vaccination. The results showed that the antibody acquisition rate was 31.5%, which was lower than that of healthy subjects. The low antibody acquisition rate was related to a low body mass index (BMI) and a short period of time between transplantation and vaccination. No patient was unable to receive two doses of the vaccine due to adverse effects.

This suggests that two vaccinations alone may not be sufficient to protect against SARS-CoV-2 infection in post-kidney transplant recipients, and that continued attention to infection control is needed. In addition, those who show low BMI and short period from transplantation to vaccination may have a lower rate of antibody acquisition and need to pay special attention to infection control measures.

Research Background

Patients who are receiving immunosuppressive treatment, especially kidney transplant recipients, are taking immunosuppressants to prevent rejection of the kidney grafts. It has been reported from overseas that the acquisition rate of antibodies after SARS-CoV-2 mRNA vaccination is lower in patients taking immunosuppressants. However, the situation surrounding transplantation, such as the ratio of living donor kidney transplantation, the ratio of ABO-incompatible kidney transplants, and types or doses of immunosuppressants, is different between Japan and other countries. Specifically, the percentage of living donor renal transplants is high in Japan due to the lack of donors, and ABO-incompatible kidney transplantation are aggressively performed in Japan. In order to overcome blood type incompatibility, the intensity of perioperative immunosuppression may be somewhat stronger. In addition, there may be ethnic differences. Therefore, there is a possibility that there are differences in the rate of antibody acquisition between Japan and other countries, and this needed to be clarified.

Research Results

Patient Background and Antibody Acquisition Rate

We studied 73 transplant recipients (45 men and 28 women) who received two doses of SARS-CoV-2 mRNA vaccine. The median age at the time of vaccination was 61 years (interquartile range [IQR], 50-69 years), and the median age at transplant was 53 years (IQR, 41-61 years). Median time from transplant to vaccination was 74 months (IQR, 30-131 months); median BMI was 22.5 (IQR, 21.0-25.7). Of them, 23 patients (31.5%) were antibody positive. No patient failed to receive the second vaccination due to anaphylaxis or other adverse reactions.

Examination of Factors Associated with Antibody Acquisition

Next, we used statistical methods to examine factors associated with antibody acquisition. The results suggested that BMI and time from transplantation to vaccination were significantly correlated with the antibody acquisition rate, even after statistically adjusting for various factors.

Regression Analysis of Antibody Titers and Time from Vaccination to Measurement

Due to the timing of outpatient visits and vaccination, antibody titers were measured between 3 weeks and 3 months after the two vaccinations. To examine the possibility of antibody levels declining over time, we evaluated the correlation between the number of days between the second vaccination and the measurement of antibody titers. No correlation, indicating that passed days and antibody decrease, was observed for this period.

Research Summary and Future Perspective

In Japan, it was shown that the rate of antibody acquisition after SARS-CoV-2 vaccination is lower in post-kidney transplant recipients. In the future, it will be necessary to investigate how antibody titers change over time after the second vaccination. In addition, it will be necessary to investigate the changes resulting from third vaccination.

Publication

Scientific Reports. 2022 Apr 27;12(1):6850.
DOI: 10.1038/s41598-022-10510-7

Japanese ver.
https://www.med.nagoya-u.ac.jp/medical_J/research/pdf/Sci_220512.pdf