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Change of gut microbiome after kidney transplantation: Korean prospective study

Hyunjeong Cho¹, Ji In Park², Dong Ki Kim³, Seung Hee Yang³, Jung Pyo Lee⁴, Yon Su Kim³, Hajeong Lee³

¹Department of Internal Medicine-Nephrology, Chungbuk National University Hospital, Korea, Republic of

²Department of Internal Medicine, Kangwon National University Hospital, Korea, Republic of

³Department of Internal Medicine, Seoul National University Hospital, Korea, Republic of

⁴Department of Internal Medicine, SMG-SNU Boramae Medical Center, Korea, Republic of

Objectives: Gut microbiota regulates the immune response, and imbalance of intestinal microorganisms is associated with various diseases. Previous studies on gut microbiome change after kidney transplantation, a major treatment for end stage renal disease, are very rare. The purpose of this study is to analyze the changes of gut microbiome after renal transplantation and to evaluate the association between bacterial composition and posttransplantation outcome.

Methods: We prospectively enrolled 36 renal transplant recipients. Three months after kidney transplantation, stool specimens from 21 recipients were collected and further analyzed. The Illumina MiSeq system was used for sequencing of the 16S rRNA V4-V5 variable region. We also analyzed the gut microbiome from posttransplant recipients who underwent bacterial infections.

Results: Alpha diversity analysis showed that the Chao index increased after renal transplantation ($p=0.000$), while the Shannon diversity index decreased ($p=0.024$). Phylum gut microbiota profile showed no significant differences after renal transplantation. The genera *Prevotella* ($p=0.005$), *Alistipes* ($p=0.22$) were significantly decreased in posttransplant patients. In contrast, the genera *Subdoligranulum* ($p=0.045$), *Clostridium_g24* ($p=0.006$) was significantly increased after operation. In patients with bacterial infections, no significant differences in the bacterial composition of phylum level were identified in comparison to the patients with no infection. Bacterial infections was associated with higher abundance of the genera *Clostridium_g24* ($p=0.05$), *Pseudoflavonifractor* ($p=0.05$) compared with no infection.

Conclusions: In this study, we found increased richness and decreased diversity of gut microbiome after kidney transplantation. Also, we showed that specific microbial changes occurred after operation. Further study should be conducted on the microbiota-targeted intervention that could improve posttransplant outcomes.