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## **Strategies for safe use of tacrolimus in recipient with high intra-patient variability**

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Tacrolimus is the most important immunosuppressant used after kidney transplantation. Through many recent studies, it has been reported that the outcomes are poor after kidney transplantation when the trough level of tacrolimus fluctuates. This is because the therapeutic range of tacrolimus is narrow. This is because if it is maintained below the appropriate concentration, there is a problem that an immune response against graft occurs, and if it is maintained above the appropriate concentration, side effects of the drug occur and affect kidney function. Therefore, intra-patient variability (IPV) is an important subject of recent research in the field of kidney transplantation. In a recently published study, it has been found that long-lasting high-IPV has a more adverse effect on outcomes after kidney transplantation. In another study, high-IPV can also occur in any period after transplantation, and such occurrence also seems to have an adverse effect on transplant outcomes. Therefore, efforts are needed to improve such high IPV. To do so, it is important to find the cause of high IPV. The most important cause can be seen as non-adherence. In order to prevent high IPV from occurring or to reduce IPV for patients with high IPV, a method of improving adherence is needed. Recently, a method of increasing adherence using a device such as an electronic pill box is proposed. And that method showed somewhat positive result in terms of reducing IPV. In addition, a method of converting a twice daily drug into a once daily drug is also proposed. This method also seems to have positive result in terms of reducing IPV. However, since all methods require additional research and are not complete methods, clinicians need a lot of effort and consideration to increase patient's adherence after kidney transplantation.