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Application of Flow Cytometry to Measure Anti-A/B antibody in ABO Incompatible Kidney Transplantation : A Prospective Multicenter Cohort Study

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Introduction: Current methods of measuring anti-ABO antibody titer by hemagglutination are subjective and not reproducible. However, the flow cytometry (FCM)-based method was suggested to be reproducible and yield semi-quantitative results. The aim of this study is to compare anti-ABO antibody levels by FCM with the levels by column agglutination test (CAT) and the clinical outcome according to baseline mean fluorescence intensity (MFI) ratio obtained by FCM.

Methods: We reviewed 21 cases of ABO-incompatible kidney transplantation (ABO-i KT) performed from February 2012 to March 2014. In these patients, baseline IgG titers were measured using both FCM and CAT methods. We investigated the correlation between levels measured by FCM and levels measured by CAT using correlation coefficient. Patients were classified as the high MFI ratio group (≥200, n=7) or the low MFI ratio group (<200, n=14).

Results: The MFI ratio of FCM-based method was highly correlated with the titer of CAT (r=0.890, p=0.01). An equation between MFI ratio and CAT titer is as follows: Log (MFI ratio)=0.879×log (CAT titer)+0.298. The number of pre-transplant plasmapheresis significantly increased with the increase of baseline MFI ratio (r=0.838, p=0.01). The allograft function was immediately recovered and stable. The pre-transplant MFI ratios were reduced from 221.3 (baseline) to 8.0 (day of transplantation) and the highest MFI ratio at kidney transplantation was 32.6. There was no acute rejection in ether group during follow-up. The postoperative bleeding requiring reoperation immediately after KT occurred in 2 and 1 patients of the high MFI ratio and low MFI ratio groups, respectively.

Conclusions: Anti-ABO antibody levels measured by FCM-based method were highly correlated with the levels by CAT in ABO-i KT. The decreased level of anti-ABO antibody by FCM after plasmapheresis suggested its potential as effective method for assessment of anti-ABO antibody level.

Key Words: 신장이식, 항ABO항체, 유세포계수법
Kidney transplantation, Anti-ABO antibody, Flow cytometry