

COMPARISON OF AUTOMATED COLUMN AGGLUTINATION TECHNIQUE (AUTO-CAT) WITH CONVENTIONAL TEST TUBE (CTT) TECHNIQUE FOR ABO ANTIBODY TITRATION: CONCEPT OF CLINICALLY ACCEPTABLE CONCORDANCE RATE (CACR)



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Background and Objectives

High titer of ABO (anti-A/anti-B) antibody can cause antibody- mediated rejection (ABMR) in ABO-incompatible living kidney transplantation (ABOi-LDKT). Desensitization therapy to achieve ABOi-LDKT involves repeated measurements of ABO antibody titers; baseline, during the course of desensitization (pre-op), to decide the appropriate time of surgery and for post-transplant (post-op) monitoring. This requires precise and reproducible ABO antibody titer testing. Though the conventional test-tube technique (CTT) is considered gold standard test for ABO antibody titer measurement, it has several limitations like being cumbersome and subjective. Several centres are, therefore, moving to automated techniques for performing ABO antibody titers. This study aimed to evaluate automated column agglutination technique (auto-CAT) as an alternative to CTT for titration of anti-A/anti-B antibodies in ABOi-LDKT.

Methods

This was a prospective evaluation study, carried out in a large tertiary healthcare center between April-June 2024. Total (IgG and IgM) anti-A/anti-B antibody titers were performed using auto-CAT and CTT method in ABOi-LDKT recipients, in parallel. Auto-CAT was compared with CTT, where the latter was considered as the gold-standard for the evaluation. Since variation of titer values is usually considered clinically acceptable if the variation is limited to one-tube dilution (higher or lower), we used a new term; clinically acceptable concordance rate (CACR), published earlier in Japan¹. CACR was defined as titer value in auto-CAT which was either completely concordant titer value with CTT or the variation was limited to one-tube, only. Statistical analysis (correlation coefficient) was performed to evaluate CACR of auto-CAT with the gold standard (CTT).

Results

We examined 70 samples from 10 consecutive ABOi-LDKT recipients, at baseline, pre-op and post-op. As shown in table 1, the CACR (identical in 30 and one-tube variation in 29) of auto-CAT for the total antibody titer was found to be very good at 84.3%. The correlation coefficient of the two methods was high at >0.9. Time of performing the titer, for e.g. baseline, pre-op or post-op, did not influence the correlation coefficient value.

Item	Numbers	Subtotal	Percentage	P value
Samples with completely concordant titre value	30	59 (CACR)	84.3% (CACR)	<0.0001
Samples with one-tube variation in titer value	29			
Samples with two-tube variation in titer value	11	11	15.7%	-
Total number of samples	70	70	100%	-

Table 1: Comparison of auto-CAT titer values with the gold standard (CTT), in context of CACR (clinically acceptable concordant results) titer value

Conclusion

Auto-CAT is comparable with the CTT technique and is feasible for total (IgG and IgM) anti-A/B antibody titration in ABOi-LDKT.

Reference

1. Matsuura, Hideaki, et al. "Feasibility of the automated column agglutination technique for titration of anti-A/B antibodies in ABO-incompatible living kidney transplantation." Therapeutic Apheresis and Dialysis 26.4 (2022): 827-835.