The proportions of ABO subtypes among 3.4 million Korean blood donors were 0.05% (118 A subtypes, 237 B subtypes, and 1416 AB subtypes). The reason of large proportion of AB subtypes was due to combination of Korean cis-AB alleles in addition to A subtypes and B subtypes, yielding various phenotypes of ABO blood group. According to the recent introduction of automated blood typing systems, automation of ABO/D typing and antibody screening test is being implemented to reduce technical errors. In this study, we compared the ABO subtyping capacity of three current-using blood typing systems with manual tube method as reference method. The three blood typing systems were as follows; Qwalys-3 (DIAGAST, Loos Cedex, France), BioRad IH-1000 (Bio-Rad Laboratories, Hercules, CA, USA), Ortho AutoVue Innova (Ortho, Raritan, NJ, USA). Qwalys-3 uses Erythrocyte Magnetized Technology (EMT), which interprets result after mixing with plasma or serum of recipient on the magplate, following specific magnetization of donor RBCs by binding of iron bead-tagged anti-GPA Ab to GPA on the RBC surface. During shaking, only magnet force-driven magnetized RBCs reach to the base of magplate on which IgM and IgG are attached, through high density buffer, Nanolys. Inspector grades the results by patterns of RBC agglutination on the magplate with naked eyes. When it is negative, RBCs does not disperse by binding with IgG, IgM and agglutinate in the center of plate. BioRad IH-1000 uses gel card technology and Ortho AutoVue Innova uses glass beads card technology.

Assuming difference of 1 grade as same reaction intensity, the aggrements of 3 automated blood typing systems with manual reference method were as follows; 21.7% (5/23) of Qwalys-3, 21.7% (5/23) of BioRad IH-1000, and 43.5% (10/23) of Ortho AutoVue Innova. Qwalys-3 showed relatively high intensity with anti-B. The aggrements of mixed field reaction with manual reference method were 0.0% (0/17) of Qwalys-3, 41.2% (7/17) of BioRad IH-1000, 5.9% (1/17) of Ortho AutoVue Innova.

In this study, the researchers evaluated the aggrements of three automated blood typing systems with manual reference method. Ortho AutoVue Innova showed superior results but not enough to be used as a sole modality for typing ABO subgroup. In the inspection of mixed field reaction, BioRad IH-1000 showed highest agreeement. Among 23 suspected ABO subtypes, only 12 specimens could be genotyped. Seven were cis-AB combinations with O alleles, however, we could not catch any cis-AB sign from the Qwalys-3. Other five specimens were AB blood type and they showed either A or B weak expression. We conclude that it is not appropriate to depend largely on automatic blood typing system when typing ABO subtype.