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Background & Objectives :

ABO discrepancy is any deviation from the expected pattern of red-cell antigen grouping with serum-grouping or when the forward-grouping results do not correlate with reverse-grouping results. This study was done to determine the incidence and causes of ABO-discrepancies and to identify the correct blood group for safe blood transfusions.

Materials & Methods :

In this study, there were 57950 samples collected between year of [January 2020 to December 2023](#). All ABO typing was completed and records are maintained at the Surat Raktadan Kendra & Research Centre. ABO typing was done which included forward cell grouping and reverse serum grouping by 2 methods.

(a) Tube method : For forward grouping reagents used were as follows: Anti-A and Anti B - IgM monoclonal antibody (ABO grouping), For reverse grouping, reagents used were as follows: Pooled known A, B, O cells (Other reagents: AHG, Auto control (own cells and own serum), For A subgroup anti-A lectin was used which reacts directly with A₁ and A₂B but not A₂ or A₂B red cells.

(b) Automation method (E.M. Technology method) : It intended for ABO grouping, used with HEMALYS (or red blood cells magnetized according to the specifications of DIAGAST) for the realization of the reverse typing test (reverse group). This device is for use on the automated machines QWALYS® in the E.M. Technology method.

(c) Repeat the test with fresh sample and determine whether the discrepancy is in cell grouping or serum grouping (techniques such as cell washing, using reagent serum, incubation under varying conditions). The discrepancy was divided into four groups.

Group I discrepancies comprise the unexpected reactions in the reverse grouping due to weakly reacting or missing antibodies.

Group II discrepancies are those from unexpected reactions in forward grouping due to weakly reacting or missing antigen.

Group III discrepancies occur due to protein or plasma abnormalities, rouleaux formation and pseudo agglutination.

Group IV discrepancies are of a miscellaneous group and may be due to transfusion of out of group plasma containing component, presence of cold alloantibody, or autoantibody.

Results :

During the study period, 57950 blood grouping tests were performed. ABO discrepancies occurred in 68 (0.1%) of them. Majority Discrepancy in the Elder Age Patients (with history of Anaemia) was 32 (47%) and in AIHA Patients was 12 (18%). The most common blood group involved was B with 23 (34 %) frequency. 65 (88%) Patients were reverse discrepancy type (Group-I, Group-III, Group-IV discrepancies).

Table 1. Number of patients by Diagnosis		Table 2. Number of patients by Discrepancy		Table 4. Examples of Patient's Case Details												
Diagnosis	Numbers of Patients	Discrepancy	Numbers of Patient	Patient's Examples	Method used	Forward Grouping				Reverse Grouping			Problem Causes	Interpretation	For cross-match Select Blood group units	Solution
						ANTI-A	ANTI-B	ANTI-AB	ANTI-A ₂ LECTINE	Pooled cell A	Pooled cell B	Pooled cell O				
BONE MARROR TRANSPLANT /FAILURE	2 (3 %)	Group I discrepancy	20 (29 %)	1	Automation	4+	NEG.	4+	4+	NEG.	NEG.	NEG.	The absence of expected antibodies could indicate that the patient's serum is not producing these antibodies, which might be due to medical conditions like Chronic Infections, Malignancies, Vascular and Rheumatic Conditions	"A" GROUP WITHOUT ANTIBODIES	"A" GROUP	Repeat all pooled cell with Anti-human globulin at 4 C and 22 C and auto control and patient's antibody screening
AIHA	12 (18%)	Group II discrepancy	8 (12 %)		Tube	3+	NEG.	3+	2+	NEG.	NEG.	NEG.				
PREGNENCY	3 (4%)	Group III discrepancy	2 (3 %)		Repeat	4+	NEG.	4+	4+	NEG.	NEG.	NEG.				
MULTIPLE TRANSFUSION (EX. SICLE CELL ANEMIA,CKD)	7 (10%)	Group IV discrepancy	38 (56 %)	2	Automation	1+	4+	4+	NEG.	1+	NEG.	NEG.	Sub group of " A " with Cold or Warm agglutination in serum	"A,B" GROUP WITH "A," ANTIBODIES	"B" GROUP	Test patient's cell with anti-A1 lectin or anti-A1 adsorbed serum
		Total	68 (0.1%)		Tube	1+	3+	3+	NEG.	1+	NEG.	NEG.				
					Repeat	1+	3+	4+	NEG.	1+	NEG.	NEG.				
Table 3. Number of patients by Blood Group				3	Automation	NEG.	NEG.	NEG.	N.A.	NEG.	4+	NEG.	Plasma abnormality leading in rouleaux formation Low level of gamma globulin, patient of newborn ,elder, transplantation, certain diseases like leukemia (possible lose of antigen-A)	"O" POSIVE WITH "B" ANTIBODIES	"O" GROUP	Repeat Reverse grouping with all pooled cells at room temperature and at cold temperature with autocontrol
CANCER	5 (7%)	Blood Group	Numbers of Patient		Tube	NEG.	NEG.	NEG.	N.A.	NEG.	2+	NEG.				
ELDER AGE / ANEMIA	32 (47%)	"A" Group	19 (28%)		Repeat	NEG.	NEG.	NEG.	N.A.	NEG.	2+	NEG.				
Operation	2 (3%)	"B" Group	23 (34%)	4	Automation	4+	4+	4+	4+	NEG.	NEG.	2+	Errors in blood typing results caused by interference from auto antibodies, Tuberculosis, Pregnancy , sickle cell anemia with auto-immuno haemolytic anemia, auto-immuno haemolytic anemia	"AB" GROUP WITH AUTO ANTIBODIES	"AB" GROUP	Repeat all pooled "O" cell with Anti-human globulin at 4 C and 22 C and auto control
Dengue	1 (1%)	"O" Group	11 (16%)		Tube	3+	3+	3+	3+	NEG.	NEG.	1+				
		"AB" Group	7 (10%)		Repeat	3+	3+	3+	3+	NEG.	NEG.	1+				
ORGAN FAILURE	1 (1%)	"A,B" Group	5 (7%)													
OTHER	2 (3%)	"A ₂ " Group	3 (4%)													
Total	68 (0.1%)	Total	68 (0.1%)													

Conclusion: This study emphasizes the need of considering ABO discrepancies in blood banks for recipients (Patients) for safe blood transfusion to avoid any fatal complications.

This discrepancy ratio is 1:852. Repeat testing and investigating for ABO subgroups and auto/allo antibodies is important.