

TRANSMEDCON 2016, BHOPAL

Retrospective analysis of ABO discrepancies among patients and blood donors in a tertiary care hospital

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Introduction

- ✓ ABO blood group typing – simplest test performed to determine an individual's blood group.
- ✓ Accurate ABO typing - ensure patient safety and good transfusion practices.
- ✓ Risk of AHTR due to transfusion of ABO incompatible blood is 100 to 1000 times higher than the risk of TTI.

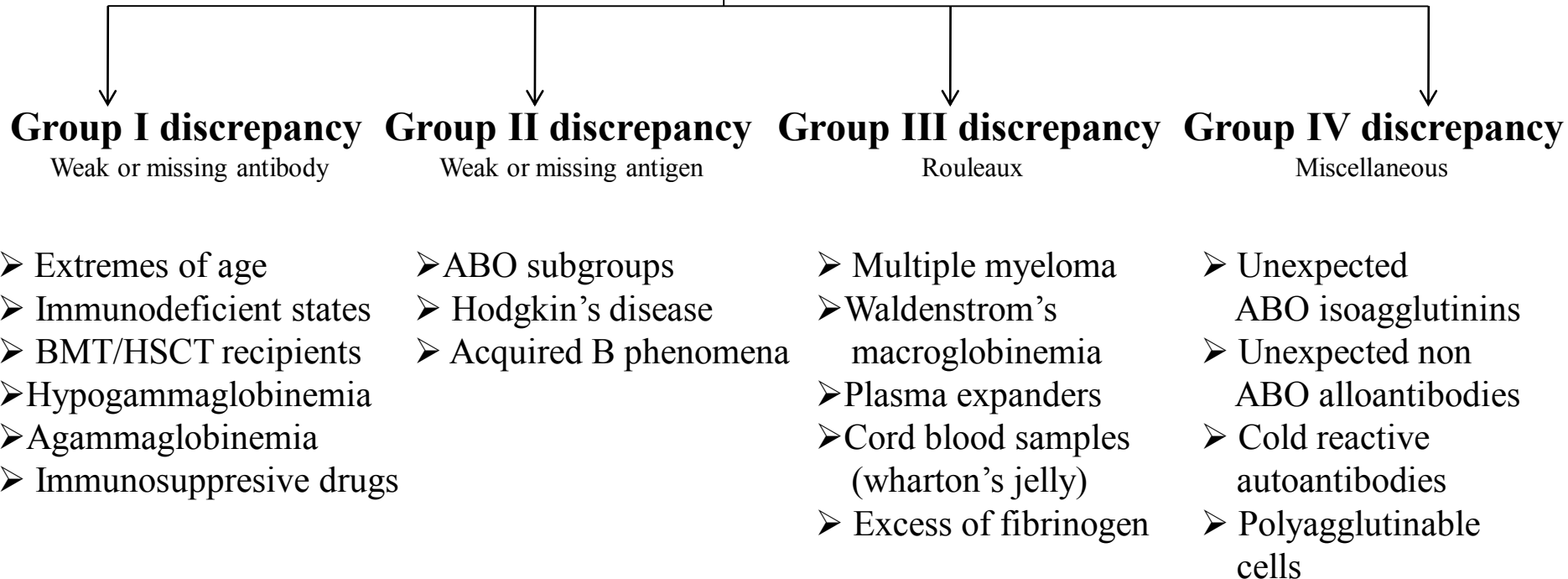
Introduction

- ✓ ABO discrepancy - *mismatch* between the forward (cell) grouping and reverse (serum) grouping
- ✓ Most common cause – 
- ✓ Other causes – problems related to red cells or serum and procedure/technique related problems



ABO discrepancy

Mismatch between forward and reverse grouping



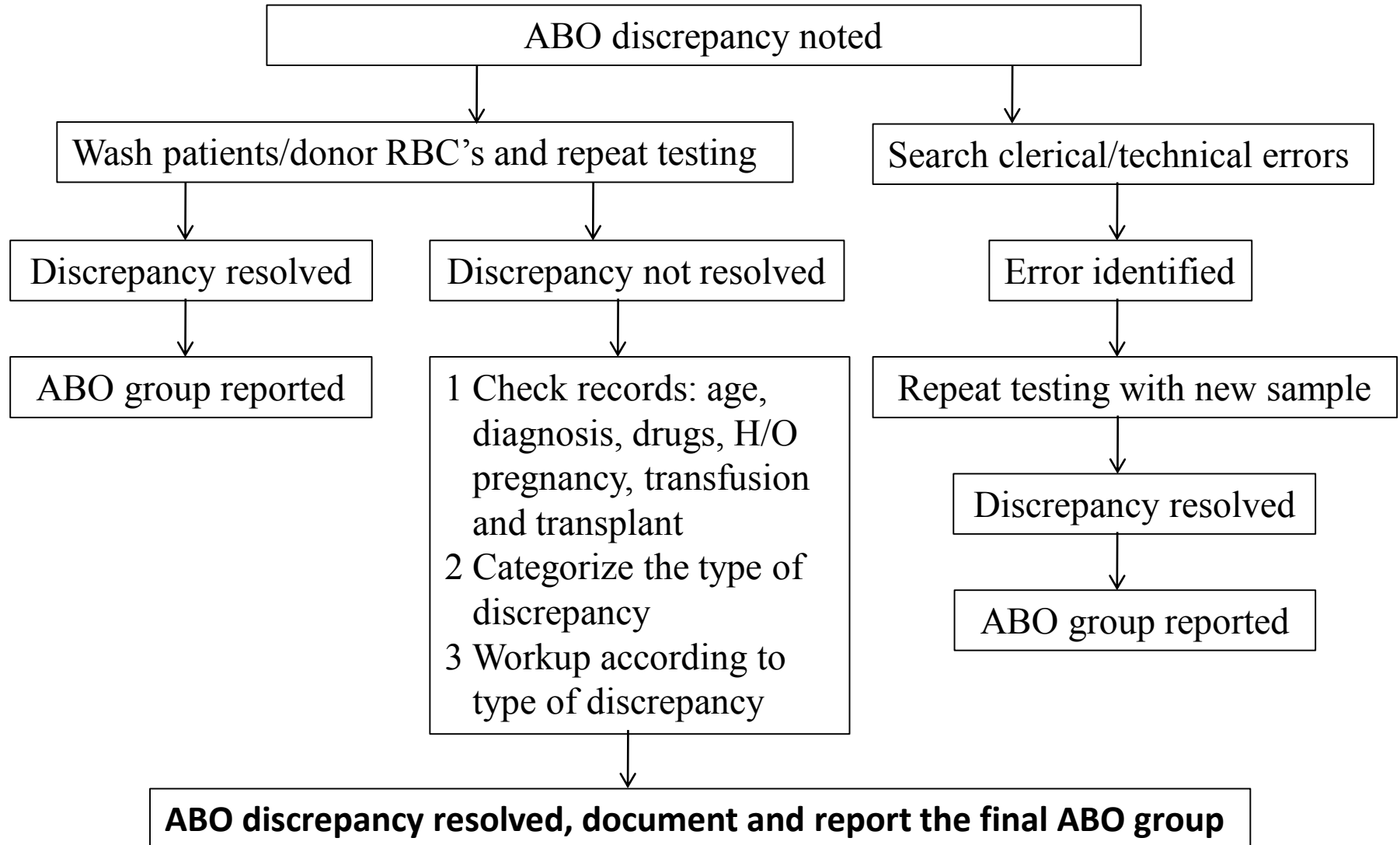
Aims and objectives

- ✓ To determine the incidence and the cause of ABO discrepancies among patients and blood donors in our centre

Materials and Methods

- ✓ **Study design** – retrospective observational
- ✓ **Study participants** – patients and blood donors
- ✓ **Study period** - March 2013 to December 2015
- ✓ All blood samples received during the study period were analysed for ABO discrepancies
- ✓ **Exclusion criteria** - deferred/rejected donors and haemolysed samples.
- ✓ Initial ABO typing – Neo/Galielo, Immucor Inc., Norcross, GA, USA
- ✓ Further workup for discrepancy was performed by conventional tube technique which included lectin study, DAT, testing at different temperatures (4°C, room temperature and 37°C), antibody screening/identification, adsorption/elution, etc wherever applicable

Algorithm for resolving ABO discrepancy



Results

Blood donors

- ✓ 62,080 donor samples analyzed
- ✓ Incidence – 0.02% (14/62,080)
 - » All were male donors
 - » Age range – 19 to 39 years

Type of discrepancy	Cause of discrepancy	Number of donors
Type I	Weak antibody	1 (7%)
Type II	Weak antigen (subgroup A)	4 (29%)
Type III	Rouleaux	0 (0%)
Type IV	Alloantibody (Anti-M) Cold autoantibodies	1 (7%) 8 (57%)

Results

Patients

- ✓ 1,35,853 patient samples analyzed
- ✓ Incidence – 0.1% (143/1,35,853)
 - » Age range – 1 month to 87 years
 - » 83 males (58%) and 60 females (42%)

Type of discrepancy	Cause of discrepancy	Number of donors
Type I	Weak antibody*	22 (15.4%)
Type II	Weak antigen (subgroup A, B, AB)	25 (17.5%)
Type III	Rouleaux	2 (1.4%)
Type IV	Alloantibody (Anti-M, -N, -E, -c, -Lea)	11 (7.7%)
	Cold autoantibodies	69 (48.2%)
	Warm autoantibodies	14 (9.8%)

*Interesting case

Initial grouping revealed

Forward grouping			Reverse grouping		
Anti – A	Anti – B	Anti – AB	A cell	B cell	O cell
0	0	0	0	4+	0

↓
O group



↓
A group

Resolution

History revealed 33 year old male
historical blood group – A positive

Post stem cell transplant recipient (blood group of the donor – O positive)

Conclusion

Blood group **chimerism** resulting in ABO discrepancy

Discussion

Blood donors

Published literature	Number of samples	ABO discrepancy	
		Incidence	Most common cause
Alireza Moafi (2006)	75,066	0.054%	Weak or missing antibody
Kaur et al (2013)	44,425	0.06%	ABO subgroups
Sharma et al (2014)	1,04,010	0.04%	Weak or missing antibody
Esmatie et al (2016)	30,254	1.4%	Misidentification (slide technique)
Present study	62,080	0.02%	Cold autoantibodies

Discussion



Patients

Published literature	Number of samples	ABO discrepancy	
		Incidence	Most common cause
Chaironi et al (2004)	4,07,769	1 in 3400	Phlebotomy errors
Esmaili et al (2014)	100	-	Weak or missing antibody
Present study	1,35,853	0.1%	Cold autoantibodies

Conclusion

- ✓ Irrespective of the type of ABO discrepancy seen, correct typing of blood group is essential to ensure patient safety and minimize the chance of transfusion of incompatible blood as such a transfusion is associated with serious consequences.

Acknowledgements

- ❖ *Dr (Prof.) RN Makroo*
- ❖ *Dr Soma Agrawal*
- ❖ *Dr Mohit Chowdhry*

