

Optimization of blood safety through essential characterization of naturally occurring Lewis antibody

Dr. Ritam Chakrabarty, MD
Specialist, Transfusion Medicine, India

Introduction

- Lewis antibodies are usually naturally occurring IgM and are generally produced by Le (a-b-) individuals.
- Anti-Le^a is more commonly encountered than anti-Le^b
- However they may be clinically significant, IgG type and may cause haemolytic transfusion reactions.
- The present study depicts the clinical significance and detailed characterization of Lewis antibodies in blood donors and patient populations and their implication in safe blood transfusion.

Materials and Methods

- **The 4 year prospective study included 7 individuals who were detected with Lewis antibodies.**
- **Further investigations were performed for detailed characterization of these antibodies with regards to**
 - **antibody type**
 - **thermal amplitude**
 - **Titre**
 - **enzyme study (papain)**
 - **secretor status of the individuals.**

Results

- 50854 donors and patients were subjected to antibody screening
- Anti-Le^a was detected in 7
- None had anti-Le^b
- All showed the Le(a-b-) phenotype with 4 presenting with IgG anti-Le^a optimally reacting at 37°C with a highest titre of 32 .
- Where all 7 were ABH secretors however none revealed any Lewis substances.
- For patients requiring transfusion compatible Le^a - antigen negative red cell units were issued without any adverse events.

Characterization of Lewis antibodies in donors (N =3)

S.N	Age / Sex	Hb (g/dl)	Transfusion / pregnancy	DAT	Lewis phenotype	Antibody Characterization	
						Antibody Type	Titre & thermal amplitude 4°C - 22°C - 37°C
1	37/ M	14.8	None	0	Le (a-b-)	Anti-Le ^a , IgM	2 – 2 - 0
2	25/ F	12.9	None	0	Le (a-b-)	Anti-Le ^a , IgM, IgG	8 – 4 - 4
3	32/ M	15.2	None	0	Le (a-b-)	Anti-Le ^a , IgM, IgG	4 – 4 - 2

Characterization of Lewis antibodies in patients (N = 4)

S.N	Diagnosis	Age / Sex	Transf usion Histor y	Hb (g/dl)	DAT	Lewis phenotyp e	Antibody Characterization	
							Antibody Type	Titre & thermal amplitude 4°C - 22°C - 37°C
1	Anemia under evaluation	33/ F	None	6.2	2+	Le (a-b-)	Anti-Le ^a , IgM	16 – 4 - 0
2	Cholelithiasis	45/ M	None	11.6	0	Le (a-b-)	Anti-Le ^a , IgM, IgG	8 – 2 - 2
3	Coronary artery disease	57/ M	None	10.2	0	Le (a-b-)	Anti-Le ^a , IgM	8 – 2 - 0
4	Iron deficiency anemia	29 /F	Yes	5.7	0	Le (a-b-)	Anti-Le ^a , IgM, IgG	8 – 8 - 32

- Naturally occurring low titre Anti-Le^a of IgG type was detected in 2 of the 3 donors who revealed the antibody even after 6 months follow-up.
- Anti-Le^a was detected in all donors and this may be attributed to the high frequency of Le(a-b-) phenotype in Indian blood donor population.

Discussion

- **As naturally occurring Lewis antibodies may be clinically significant and cause haemolytic transfusion reaction therefore identification and detailed characterization of antibody in blood donor or recipient is very crucial to blood safety.**