The key to Immunologic compatibility in the highly sensitized -The combined role of understanding Anti HLA antibody and HLA allelic prevalences.

E poster ID eP174

Sam Arul Doss R, Divya M, Gayathiri KC, Dolly D

Department of Transfusion Medicine and Immunohematology, Christian Medical College, Vellore

BACKGROUND

- Finding suitable donors for highly sensitized transplant patients is challenging, even with advanced HLA typing and anti-HLA antibody detection methods.
- **Highly sensitized patients develop antibodies** against certain HLA antigens, which limits their donor options.
- While current tests can precisely identify these antibodies and HLA types, a clearer **understanding of which HLA antibodies and antigens are most common could improve compatibility predictions.**
- By recognizing these patterns, we may **unlock ways to expand donor availability**, allowing for more successful transplants for those who are highly sensitized.

AIM & OBJECTIVE

To evaluate the **frequency of allele-specific anti-HLA antibodies and the prevalence of the corresponding HLA alleles** to assess the clinical probability of finding an antigen negative donor.

MATERIALS & METHODS

Study participants and recruitment:

- This retrospective study analysed the **frequency of antibody specificities** present in **15 highly sensitized patients**.
- A total of **3050 samples of High resolution HLA typing** were analyzed to determine HLA allele frequency.

Anti HLA Antibody detecting platform:

- **Antibody testing** was performed using the **Luminex Single Bead Antigen Assay (SAB)**, with an MFI (Mean Fluorescence Intensity) **> 1500 considered positive.**

HLA typing platform:

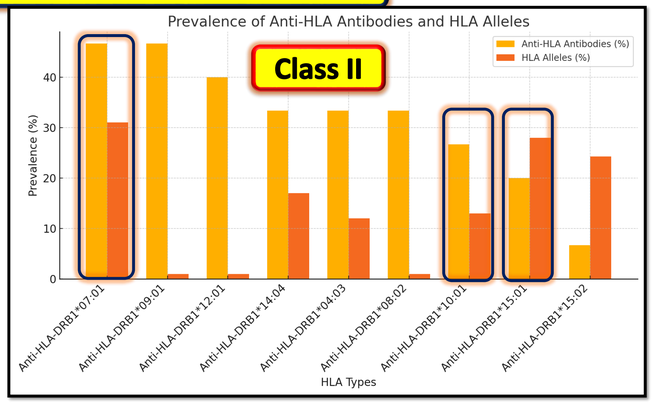
- **High-resolution HLA typing** was done with MIA FORA kits on the **Illumina MiniSeq platform.**
- HLA-A*, HLA-B*, HLA-C*, HLA-DRB1*, HLA-DQB1* and HLA-DPB1* genes were analyzed.

Statistical tools –

- An in-house built software **(Database-Driven HLA Matching Algorithm with Transaction-Safe CRUD Operations)** designed by **institutional IT team** was used to determine the HLA allele frequency and the results were collated.

RESULTS

Prevalence of Anti HLA antibodies and HLA alleles



DISCUSSION & CONCLUSION

- Our results highlight the various combinations of **antibody frequency and allelic prevalence In Class I, HLA-A*24:02 which shows high prevalence (29%)** and , suggesting strong immune engagement.
- Conversely, **HLA-B*15:12, despite its high frequency (66.67%),** has limited clinical relevance due to its very low prevalence (0.29%).
- **In Class II, HLA-DRB1*07:01** plays a significant role in immune recognition with both **high frequency (46.67%) and prevalence (31%)**. On the other hand, **HLA-DRB1*09:01 and HLA-DRB1*12:01, despite their high frequencies, have low prevalence (1%), indicating minimal immune significance.**
- Understanding these various combinations in our population is essential for predicting the chances of finding a suitable donor in highly sensitized individuals.

REFERENCES

1. **Class I antibodies on organ allocation Melissa Y. Yeung et.al Am) Incidence and impact of allele-specific anti-HLA antibodies and high-resolution HLA genotyping on assessing immunologic compatibility Daria Zavyalova et.alHuman ImmunologyVolume 82, Issue 3, March 2021, Pages 147-154.**
2. **Impact of allele-specific anti–human leukocyte antigen American Journal of Transplantation Volume 23, Issue 9, September 2023, Pages 1388-1400.**