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Infectious Disease Marker Profile of Potential Matched Unrelated Donors for Hematopoietic Stem Cell Transplantation in North India

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Donor evaluation is a vital aspect of hematopoietic stem cell transplantation (HSCT), ensuring both donor suitability and recipient safety. Along with confirmatory human leukocyte antigen (HLA) typing, infectious disease marker (IDM) testing remains crucial. It helps prevent transmissible infections and improves the outcomes of HSCT. In India, while the trend of haploidentical (half-match) donors is increasing, matched unrelated donor (MUD) HSCT is still clinically relevant. However, to the best of our knowledge, no published Indian data exist on IDM profiles specifically for HSCT MUDs.

We reviewed IDM testing results of 42 consecutive potential MUDs identified between May 2012 and December 2024 in Northern India. All donors provided written consent, and we collected anonymized data under ethical approval.

The evaluation included enhanced chemiluminescence immunoassay (Vitros 3600, Quidel Ortho, United States) for anti-HIV I/II, anti-HCV, HBsAg, anti-HBc (total IgG + IgM), anti-CMV IgG and IgM, and syphilis testing; a malaria rapid detection test; and individual donor nucleic acid testing (ID-NAT, Procleix Ultrio Plus, Grifols) for HIV RNA, HBV DNA, and HCV RNA.

All 42 potential MUDs tested negative for HIV, HBV, HCV, syphilis, and malaria, including NAT results. Importantly, all were positive for anti-CMV IgG while negative for IgM, as shown in ►**Table 1**. This finding suggests prior CMV exposure, which is common in adult populations since CMV seroprevalence increases with age.[1] The mean age of donors in this study was 35.69 years.

This universal CMV IgG seropositivity aligns with previous reports of high CMV seroprevalence in Indian adults (98.6%).[1] Given CMV's well-established role as a major infectious complication after HSCT, donor-recipient serological matching assumes clinical significance.[2] Among potential recipient (R)–donor (D) combinations, the R+/D– scenario carries the highest risk of reactivation and negative outcomes.[3] Our data suggest that D– donors are rare in our settings, indicating that D–/R+ mismatches are unusual, while D+/R– situations are more common. These findings can help transplant centers implement suitable preventive measures in these cases. Recipient CMV serostatus was not uniformly captured in the registry dataset, which limits the complete analysis of donor–recipient CMV pairing. Additionally, the absence of transmissible viral markers (HIV, HBV, and HCV) in our study is reassuring and aligns with trends reported in blood donor populations across India.[4]

To the best of our knowledge, this is the first Indian data on IDM profiles in potential MUDs. Although limited by sample size, the study establishes baseline data and highlights the unique context of donor evaluation in regions with uniformly

Table 1 Summary of the results of IDM of all the potential matched unrelated donors ($N = 42$)

Infectious disease marker	Nonreactive (*N*, %)	Reactive (*N*, %)
HIV (serology + NAT)	42 (100%)	0 (0%)
HBV (HBsAg, anti-HBc, NAT)	42 (100%)	0 (0%)
HCV (serology + NAT)	42 (100%)	0 (0%)
Syphilis	42 (100%)	0 (0%)
Malaria	42 (100%)	0 (0%)
CMV IgM	42 (100%)	0 (0%)
CMV IgG	0 (0%)	42 (100%)

Abbreviations: HIV, human immunodeficiency virus; HBV, hepatitis B virus; HCV, hepatitis C virus; HBsAg, hepatitis B surface antigen (hepatitis B core antigen); CMV, cytomegalovirus; NR, nonreactive; R, reactive.

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high CMV seroprevalence. From a policy perspective, considering these regional IDM trends in registry practices could enhance donor–recipient matching strategies and guide prophylaxis or preemptive antiviral therapy. In our North Indian cohort of potential MUDs, all donors were CMV IgG seropositive and negative for other IDMs. These findings emphasize the importance of CMV status in MUD selection and highlight the need for larger multicentric studies to refine transplant protocols in India.

Authors' Contributions

- V.C.M.: Investigation, writing—original draft, writing—review and editing.
- A.K.T.: Conceptualization, supervision, writing—review and editing.
- D.C.: Data collection
- V.R.: Conceptualization and supervision.
- All authors read and approved the submitted version.

Patient's Consent

Patient consent is not applicable. The study did not involve patients. Written informed consent was obtained from all stem cell donors, and anonymized data were analyzed. No identifiable patient information is included in the manuscript.

Conflict of Interest

None declared.

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