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Renal Graft Rejection: MFI Threshold of Post-Transplant DSA as a Predictive Factor

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Abstract | **Original Research Article**

Chronic humoral rejection is one of the main causes of kidney graft loss. The proposed consists of a retrospective study, based on the study of a sample of kidney transplant recipients observed be in 10 years, who presented de novo DSA. The group of cases studied is 102 kidney transplant recipients. The MFI threshold beyond which the detection of anti HLA antibodies responsible for rejection is 9000.

Keywords: Renal graft rejection, MFI, DSA, kidney graft loss, graft survival , antibody.

INTRODUCTION

Chronic humoral rejection is one of the main causes of kidney graft loss. The diagnosis of rejection is based on the detection of specific anti-HLA antibodies against the donor (DSA). Although anti-HLA antibodies specific against the donor have been developed, some recipients do not systematically show rejection. This is because DSAs do not have the same pathogenicity. The characteristics of the latter known to be associated with graft loss are the titer of the antibody assessed by MFI.

Objective:

Our study aims to retain the MFI threshold as a predictive criterion for graft survival.

MATERIALS AND METHODS

The proposed approach consists of a retrospective study, based on the study of a sample of kidney transplant recipients observed between January 2013 and December 2023, who presented de novo DSA. The cases studied were hospitalized in the nephrology department of the IBN ROCHD University Hospital in Casablanca. The data analyzed consists of several quantitative and qualitative variables providing information on the clinical and biological state, the MFI score, as well as graft survival after the presence of DSA.

DISCUSSION

De novo donor-specific antibodies (dnDSA) are now recognized as a major determinant of chronic antibody-mediated rejection and long-term graft loss [1,2]. However, not all DSAs have the same pathogenic potential, which explains the heterogeneity in clinical outcomes observed among kidney transplant recipients. In this context, the mean fluorescence intensity (MFI) has been widely used as a semi-quantitative marker to estimate antibody strength and potential pathogenicity.

In our study, an MFI threshold of 9000 was associated with graft dysfunction, suggesting a high immunological risk beyond this level. This finding is consistent with previous studies reporting that high MFI values, generally above 8000–10,000, are strongly associated with antibody-mediated rejection and poorer graft survival [3,4]. Loupy *et al.,* demonstrated that both the presence and intensity of DSA are independently associated with graft loss, highlighting the prognostic value of antibody strength [5].

The average delay of dnDSA appearance in our cohort (3 years post-transplant) aligns with the literature, where dnDSA typically develops within the first few years after transplantation and is often linked to under-immunosuppression or poor adherence [6]. Moreover, the variability in graft outcomes despite the presence of DSA supports the concept that additional factors—such as complement-binding capacity (C1q, C3d), IgG subclasses, and inflammatory context—play a critical role in determining antibody pathogenicity [7].

Although MFI remains a useful and accessible tool in routine practice, it has several limitations. It is not

a strictly quantitative measure, can be influenced by technical factors, and does not fully reflect the biological activity of antibodies [8]. Therefore, relying solely on MFI thresholds may be insufficient, and integrating functional assays and clinical parameters would improve risk stratification.

Our results reinforce the clinical relevance of monitoring dnDSA and suggest that an MFI threshold around 9000 could serve as a warning signal for closer surveillance and therapeutic adjustment. Nevertheless, prospective studies are needed to validate this cutoff and to better define its role in guiding individualized management strategies.

RESULTS

The group of cases studied is 102 kidney transplant recipients, 74.3% of whom are male. The average ofAge at the time of kidney transplantation was 35.6 years, with extremes ranging from 7 years to 64 years. Regarding nadir creatinine, it varies between 6mg/l and 18mg/l. The average duration of appearance of DSA post-transplant is 3 years. The MFI threshold beyond which the detection of anti HLA antibodies responsible for rejection is 9000.

CONCLUSION

This work responds to a pressing clinical need in kidney transplantation, that of predicting graft survival, based on the MFI threshold of new post-transplant DSA.

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