Changes in the glomerular macrophage index (GMI) between two consecutive biopsies and the association to renal transplant graft survival

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Introduction

Macrophages in kidney transplants were shown to be involved in inflammatory processes in transplants, and higher numbers are associated with worsened graft survival [1].

The aim of the study was to investigate if changes exist in the levels of glomerular macrophage index (GMI) between two consecutive kidney transplant biopsies, and if so to determine their potential impact on graft survival.

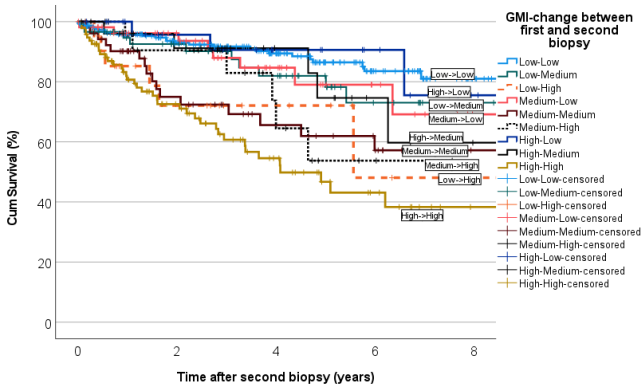
Methods

The study included 623 patients with two consecutive biopsies performed on the same renal graft. The median time between the first and second biopsies was 86 days. GMI was defined as the average number of macrophages in ten glomeruli and was categorized into three GMI classes: ≤1.8 Low, 1.9-4.5 Medium, and ≥4.6 High. This division yielded nine possible switches between the first and second biopsies (Low-Low, Low-Medium, etc.). Death censored graft survival was analyzed by a Cox-regressions adjusted for age and sex. Hazard ratios (HR) with 95% confidence interval (CI) are presented.

Results

The worst graft survival was observed in the High-High group, and the best graft survival was observed in the Low-Low and High-Low groups (Figure 1). Compared to the High-High group, a reduction of risk was observed in nearly all other decreasing groups (reductions between 65% and 80% of graft loss). The risk for graft-loss was lower in the Low-Low (HR=0.24, CI 0.13-0.46), Low-Medium (HR=0.25, CI 0.11-0.55), Medium-Low (HR=0.29, CI 0.11-0.77) and the High-Low GMI (HR=0.31, CI 0.10-0.98) groups compared to the High-High group as the reference adjusted for covariates.

***Figure 1**. Graft survival (Kaplan-Meier curve) according to GMI-change between the first and second biopsy.*



Discussion

Our findings suggest that high or increasing GMI levels are associated with shorter graft survival, whereas low or decreasing GMI levels are associated with longer graft survival. The present study indicates that the extent of macrophage involvement may change in some grafts and if reduced from High to Low levels could be associated with less graft loss. This indicates that clinicians should aim to lower the extent of macrophage involvement.

References

1. Mölne J et al, Clin Transplant, 36(12):e14816, 2022.

Acknowledgements

The authors are grateful to the patients and staff who performed the data collection for enabling this study. Further, the authors are grateful to the Research Fund (FoUUI) at Skaraborg Hospital, Skövde, Sweden, and the Healthcare Board, Region Västra Götaland, Sweden and Njurföreningen Norrland, Sweden.