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Improved post-transplant mortality discrimination capability of the Gender-Equity Model for Liver Allocation(GEMA)

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Introduction: In Korea, the deceased donor liver transplantation(DDLT) is constrained by existing oran shortages. Because there had been no prior study that had compared post-transplant outcomes based on the Gender-Equity Model for Liver Allocation(GEMA) scores, we conducted this study using GEMA model to improve the current DDLT allocation system.

Methods: A single-center cohort of liver transplant recipients data was merged between June 2006 and December 2021. In the GEMA model, similar to previous studies, the Model for End-Stage Liver Disease(MELD) formula was re-fitted and re-weighted by substituting creatinine with the Royal Free Hospital glomerular filtration rate (RFH-GFR). Based on the patients GEMA points, they were stratified by four categories: 1-10, 11-20, 21-30, and 31-40. The discrimination of outcomes was compared to outcomes of MELD. The primary endpoint was focused on the discrimination of patient survival based on GEMA and GEMA-Na.

Results: The median age was 53 years. Among 1385 individuals, 427 (30.8%) patients were female. 432 (31.2%) underwent deceased donor liver transplantation (DDLT) and 655 patients (47.3%) underwent liver transplantation due to HCC. Between lower MELD scores, there were subtle differences of survival observed whereas the GEMA model exhibited significant survival disparities within its respective point groups. For the 1-year survival group, the Harrells concordance statistic was 0.709 for GEMA, surpassing the 0.697 for MELD ($p<0.001$). In the 5-year survival group, c-index was 0.642 for GEMA, compared to 0.631 for MELD ($p<0.001$). These findings suggest that the GEMA model showed improved mortality discrimination capability compared to MELD. Furthermore, GEMA-Na also showed enhanced discrimination in contrast to MELD-Na.

Conclusion: The GEMA scoring system demonstrates a better capacity for discriminating post-liver transplant patient outcomes than MELD.