Why do patients with a low MELD score die?

Jung Woo Shin

Department of Internal Medicine, University of Ulsan College of Medicine, Ulsan University Hospital, Ulsan, Korea

Background/Aims

The model for end-stage liver disease (MELD) is widely accepted as a predictor of short-term mortality in patients with end stage liver disease (ESLD). Patients with a low (<15) MELD score are at a low risk of mortality; however, 13% of all waitlist deaths occur in those patients. Our aims were (1) to identify the cause of death in ESLD patients with a low MELD score and (2) to determine whether taking into account serum sodium (i.e., MELDNa) could improve mortality prediction.

Methods

Data on all patients who were registered to the liver waitlist of the Organ Procurement and Transplantation Network (OPTN) from our institution, including their vital status at the time of removal from the list, were obtained from the OPTN. In those who died before transplantation, all available medical records were reviewed to extract laboratory data for the MELD score as well as the cause(s) of death. The analysis included decedents waitlisted with ESLD between 1996 and 2010, exclusive of those with acute fulminant or malignant liver disease. They were divided into liver-related and non-liver-related deaths, with the latter restricted to cases in which liver disease clearly played no role in the death.

Results

A total of 255 decedents met the inclusion criteria, out of whom the cause of death could be confidently adjudicated from medical records in 143(56%). The majority of deaths (n=119, 83%) were liver-related, including multi-organ failure (35%) and infection (33%). Common non-liver-related causes included cardiovascular disease (25%), extra-hepatic malignancies (25%) and accidents (17%). In the comparison between liver-related and -unrelated deaths, there was no difference in age, sex, liver disease diagnosis, history of ESLD complications at listing. History of hypertension was more common among decedents with non-liver-related causes (19% versus 46%, p<0.01). The mean (+standard deviation) MELD and MELDNa

scores available within 14 days of death were higher in liver-related than -unrelated deaths (MELD: 27.3+8.4 versus 17.2+7.2, $p<0.01$; MELDNa: 29.1+7.4 versus 20.4+6.7, $p<0.01$). Approximately one half of low (<15) MELD (10/19) and low MELDNa (3/6) deaths were liver-related. Among liver-related decedents, variceal bleeding tended to be more common in those with low MELD(Na).

Conclusion

While the cause of death is not reliably reported to the OPTN, this study utilizes medical records and death certificates to show that the majority of waitlist deaths are liver-related. A substantial proportion of waitlist deaths with low MELD is liver-related, underscoring that the MELD score may underestimate the risk of death in some ESLD patients.