ASSESSING CAUSAL EFFECTS WITH TRUNCATION DUE TO DEATH AND MISSING MORTALITY STATUS

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The effect of Progesterone on recovery from traumatic brain injury is assessed by comparing functional status in treatment and control groups. However, this outcome is missing for patients in both groups who die before functional status can be assessed. Assigning death the value of the lowest functional status category is erroneous since death is not actually located on the functional status scale. Additionally, some patients were lost to follow-up before mortality status could be determined. Zhang and Rubin's principle stratification for estimating causal effect when outcomes are truncated by death was applied under all combinations of assumptions regarding structure of principle strata (monotonicity, ranked average score) and four extreme boundary options for the pattern of missing mortality status (all missing data ignored/omitted, all missing assumed dead, all missing assumed alive with minimum outcome, all missing assumed alive with maximum outcome). This method was also extended to include covariate and Bayesian analyses. Causal effect estimates appeared to be most sensitive to assumptions about principle strata structure rather than missingness patterns. A significant treatment effect was estimated in seven out of eight analyses under the monotonicity assumption, regardless of assumed missingness pattern. A null effect was estimated in four out of six analyses without the monotonicity assumption, regardless of missingness pattern. Covariate analyses provided mixed results, with stratification by age resulting in a significant treatment effect and stratification by initial severity resulting in an estimated null effect. Bayesian analysis also resulted in an estimated null effect.