Is Inappropriate Drug Prescribing Associated with Increased Mortality or Functional Decline in the Elderly?

Hanlon JT, Fillenbaum GG, Kuchibhatla M, et al. Impact of inappropriate drug use on mortality and functional status in representative community dwelling elders. Med Care 2002;40:166–76.

Study Overview

Objective. To determine if inappropriate drug use in elderly patients leads to increased mortality or functional decline.

Design. Prospective cohort study.

Setting and participants. Community-dwelling patients aged 65 years or older were recruited from a 5-county rural and urban area in North Carolina. 80% of contacted patients elected to participate. The population was oversampled for black patients, who comprised 54% of the study respondents. Between 1989 and 1990, patients underwent structured interviews to record their baseline drug regimen and functional status. Medications were classified as inappropriate using 2 sets of explicit criteria developed by expert national consensus panels. Criteria for drug selection, dose, duration, drug interactions, and duplicate therapy were derived from these expert opinions.

Main outcome measures. Primary outcome measures were mortality and functional decline measured yearly from 1989 to 1993. Death was identified through the National Death Index. Functional status was measured using 3 instruments: Katz Activities of Daily Living (ADL), Older Americans Resources and Services (OARS) Instrumental ADL, and the abbreviated Rosow-Breslau scales. The instrument questions were aggregated into 4 domains: basic self-care, intermediate self-care, complex self-management, and physical function.

Main results. Of 3234 participants, 21% were found to be taking inappropriate medications at baseline. Over 3 years, 560 members (17.3%) of the cohort died. Of the surviving sample, functional decline diminished in the following categories: basic self-care (12.3%), intermediate self-care (29.8%), complex self-management (17%), and physical function (33.4%). There was no association between inappropriate drug use and mortality. There was a significant association between inappropriate drug use and decline of basic self-care with an adjusted odds ratio (OR) of 1.36 (95% confidence interval [CI], 1.00 to 1.83). Use of drugs with known drug-drug or drug-disease interactions was more strongly associated with decline in basic self-care: adjusted OR, 2.04 (95% CI, 1.32 to 3.16).

Conclusion. Identifying the impact of inappropriate drug use can vary depending on the criteria applied. Further studies are needed that measure additional outcomes and use alternate measures of inappropriate drug use.

Commentary

Several cohort studies in the last decade have shown that elderly patients are frequently prescribed medications inappropriately. These studies generally have used administrative databases of drug prescribing and applied explicit criteria of inappropriateness developed by Beers et al [1] or other national consensus panels. Rates of inappropriate prescribing have ranged widely based on the criteria used and population studied. Studies of individual medications identified by these criteria have suggested an increased rate of falls, mental status change, and declining functional ability. However, there is little data to describe how systematically reviewing drug regimens for appropriateness could improve outcomes. Drug utilization review has been hindered by the uncertainty of whether such a practice makes a significant difference in the survival or quality of life of seniors.

Hanlon et al's study is an important attempt to link inappropriate prescribing with poor outcomes. The careful prospective data collection distinguishes this study from previous efforts. In addition, the outcomes in this study were objectively defined using explicit criteria that had been previously published. It is perhaps not surprising that the authors were unable to show a mortality impact. Few medications are regularly prescribed to outpatients that also frequently cause

death. The association of medications with functional decline is more plausible, and the finding that the ability to perform basic self-care declines with inappropriate prescribing is consistent with previous studies of individual medications, such as benzodiazepines.

However, the study design suffered from one major limitation that restricts interpretation of the results. 5 predictors were tested against 6 different outcomes, yielding 30 hypotheses. 2 of the 30 pairs were significantly associated. Because of the number of tests involved, there is a significant chance that at least one of them is a false positive.

Applications for Clinical Practice

Efforts need to be taken to remind physicians that tailoring drug regimens to a patient's age will likely lead to improved outcomes for elderly patients.

–Review by Josh F. Peterson, MD

References

1. Beers MH. Explicit criteria for determining potentially inappropriate medication use by the elderly. Arch Intern Med 1997;157:1531–6.