Discontinuation of Screening Mammography After Serious Health Events

The benefits associated with breast cancer screening and screening in general depend critically on patients’ life expectancy and the risk of death from competing causes. However, it is unclear if health care providers and patients take life expectancy into account when deciding whether to screen. A number of studies have examined the impact of age and health status on receipt of mammography.1-9 All find that mammography rates decline with age but report mixed results regarding the impact of comorbidities. These studies do not control for previous screening behavior.

The present study used a new approach to evaluating the relationship between life expectancy and receipt of mammography that does not treat each mammogram as an isolated event. We identified a cohort of women who received screening mammograms in 2 consecutive years. Then, we determined how the occurrence of serious health events (eg, myocardial infarctions, strokes) affects receipt of a third screen. We view these events as serious health events that should lead patients and clinicians to revise downward their estimates of remaining life expectancy. This method better reflects the decision problem facing patients and clinicians.

Methods. The data consist of Medicare claims and enrollment records for a random 5% sample of beneficiaries residing in Surveillance, Epidemiology, and End Results (SEER) catchment areas. Our study population consists of women 67 years and older who (1) received a mammogram in 2000 (hereafter, “the index mammogram”), (2) received a mammogram within 15 months, but not within 6 months, prior to the index mammogram, (3) were continuously enrolled in the fee-for-service Medicare program, and (4) were not previously diagnosed as having breast cancer. Criteria 1 and 2 were designed to identify women who are in the habit of receiving annual mammograms. We measured receipt of screening mammograms using Medicare physician office and outpatient claims.

We identified women hospitalized for serious conditions in the 11-month window following the index screen. We identified health events using International Classification of Diseases, Ninth Revision (ICD-9) codes on Medicare inpatient claims forms and SEER cancer tumor registry records. We excluded women who were diagnosed as having breast cancer (n=56), died (n=235), or received a mammogram (n=562) during the 11-month window. We used a Cox proportional hazards model to estimate the impact of serious health events on the receipt of a third mammogram, controlling for demographics and local area characteristics.

Results. The final sample includes 25,884 women, of whom 17,196 (66%) received a third mammogram and 7,673 were still alive and free of breast cancer at the end of the follow-up period. The Table displays the number of women in the sample who experienced each event, mortality rates, the proportion of women receiving a third mammogram, and hazard ratios from the Cox proportional hazards model. The hazard ratios are less than 1, indicating that women who experienced the health events were less likely to receive a third mammogram.

| Table. Impact of Serious Health Events on Receipt of a Third Mammogram |
|-----------------------------|------------------|------------------|-----------------|------------------|
| Group                       | Patients, No.    | Alive After 2 Years, % | Unadjusted Proportion, No. (%) | Cox Proportional Hazard Model, a |
|                             |                  |                  |                               | HR (95% CI) | P Value |
| No event                    | 24,605           | 94               | 16,620 (68)                  | Reference group |
| Stroke                      | 323              | 78               | 148 (46)                     | 0.59 (0.50-0.70) | .001 |
| Myocardial infarction       | 112              | 78               | 49 (44)                      | 0.66 (0.49-0.87) | .004 |
| COPD                        | 469              | 69               | 219 (47)                     | 0.64 (0.56-0.74) | <.001 |
| Pneumonia                   | 243              | 68               | 109 (45)                     | 0.67 (0.55-0.81) | <.001 |
| Late-stage cancer           | 92               | 52               | 51 (55)                      | 0.74 (0.56-0.98) | .03 |

Abbreviations: COPD, chronic obstructive pulmonary disease; HR, hazard ratio.

a Controls include age group, race, urban vs rural residence, and census tract education and income levels.
Comment. Our results are consistent with the hypothesis that some women and their health care providers, recognizing that the expected benefit of early detection declines with remaining life expectancy, consciously decide to discontinue screening following a serious health event. Though most women discontinue screening following serious health events, many do not. Our results suggest that there is a high degree of persistence in screening behavior. Surveys indicate that many women intend to continue screening throughout their lifetimes and apparently do not understand how life expectancy affects the value of early detection.10-12 Women and the health system at-large may benefit from shared decision-making tools and enhanced physician-patient communication on the subject of life expectancy and cancer screening targeted at previously screened women.

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COMMENTS AND OPINIONS

It Is Time to Get More Accurate Times to Defibrillation

The recent article by Chan et al1 finds wide variations in the incidence of delayed defibrillation among hospitals that are not adequately explained by hospital-level factors. The authors assume that these variations represent real differences in hospital performance and call for efforts to identify the approaches of top-performing hospitals so that other facilities may adopt them.

Though the authors’ attention to this problem is welcome, using the reported data to identify and emulate hospitals achieving “best practices” is likely to be a waste of time and effort. The problem is that the study was based on the time-interval data from the National Registry of Cardiopulmonary Resuscitation (NRCPR). The NRCPR’s time-interval data come from handwritten code records and are rounded to the nearest minute, resulting in clearly invalid aggregate statistics: median times to first defibrillation of 0 minutes1 or 1 minute1 and first quartiles of 0 minutes.1,2 These figures are clearly impossible, representing not only inaccuracy but gross underestimation of the problem of delayed defibrillation. Though the analysis of survival by quartiles indicates that the NRCPR data are not completely random, I believe that more accurate data are both desirable and achievable.

My sporadic personal observations indicate that an unexpected cardiac arrest in an intensive care unit can be defibrillated (barely) in less than 2 minutes. On telemetry and unmonitored units, the delays are usually much longer.

Artificially short times result mainly from the common tendency to record the start of the code as the time the recorder reaches the scene and begins writing. If a hospital trains recorders to look at their watches and note the time a code is paged before going to the scene, the result will be a huge increase in “delayed” defibrillation. Even better to the-second data can be acquired fairly easily, with the same result.3 Perhaps some of the “worst-performing” hospitals are merely more conscientious in capturing time data.

More accurate time-interval data are necessary to show the seriousness of the problem of delayed defibrillation in hospitals. The NRCPR’s leadership in this area would be welcome, but hospitals can begin on their own initiative with a minimal investment of resources.3 With good time data, the real work of shortening times to defibrillation and increasing survival can begin.

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