Background

Detecting and preventing adverse medical events (AEs) is essential for improving medical quality. While electronic approaches for detecting and preventing adverse drug events have been developed, AEs, which include the entire range of events and are thus more diverse, have been harder to detect. Prior studies have detected AEs through structured chart reviews. While this approach is effective, it is costly and time consuming. Thus, we developed a computerized discharge abstract screening tool to detect AEs.

Methods

Our initial sample consisted of 424 randomly selected patients discharged from the medical services of the Brigham and Women’s Hospital between January 1 to June 30, 2000. We developed a set of alert signals based on screening criteria used in the Harvard Medical Practice Study that ultimately including 94 trigger words. Individual trigger words were then identified using text-based searches of the hospital course section of electronically stored discharge summaries. Discharge summaries generating an alert were classified as “screened positive discharge summaries” and were reviewed to determine the context in which the trigger word had been used and whether an AE appeared likely based on the discharge summary. All screened positive discharge summaries underwent chart review by two independent physician reviewers. The presence of an AE was assessed using structured implicit judgement. A random 25% of screened negative discharge summaries were also reviewed. The positive predictive values for the electronic tool was determined by dividing the number of admissions with discharge summary trigger words and an AE by the total number of screened positive discharge summaries. Time spent reviewing discharge abstracts was recorded.

Results

Nine hundred and fifty-three alerts were detected, and after adjusting for repeated signals within the same discharge summary, a total of 733 unique alerts were generated in 251/424 (59%) patients. In 131 screened positive discharge summaries the patient had experienced an AE based on chart review (kappa statistic = 0.77). Sixty AE occurred within the 173 patients without screened positive discharge summaries. The sensitivity and specificity of the screening tool were 69% and 48% respectively. The positive predictive value of the tool was 52%. The most common category of AE detected was adverse drug events representing 52% of the detected events. The time required to review the screened discharge abstracts was 18 hours.

Discussion

By using computerized screening of discharge abstracts we were able to identify AE’s in 31% of the patients sampled. The tool performed reasonable
well, however removing individual trigger words with low positive predictive values and other improvements could also improve sensitivity. Using an electronic screening tool, we were able to screen 424 charts in 18 hours. Using Harvard Medical Practice methodology this same initial sample would have required approximately 70 hours. Electronically screening discharge summaries for adverse events appears to be an efficient and feasible means of detecting AE within hospitalized medical patients.

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References