Reminders for Redundant Tests: Results of a Randomized Controlled Trial

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ABSTRACT

We performed a randomized controlled trial (RCT) of the effect of giving providers reminders about apparently redundant clinical laboratory tests at the time of ordering. During the four-month study period, 939 apparently redundant lab tests were ordered. Tests were canceled in response to reminders 69% of the time. Of overrides, 41% were justified. In the intervention group, 27% of the redundant tests ordered were performed, compared to 51% in the control group ($p<0.001$).

INTRODUCTION

Use of clinical laboratory tests is known to be inefficient, and our preliminary data suggested that 11% of a defined group of tests appeared redundant. Computerized physician order entry (POE), in which all orders are written directly on-line by physicians, may improve care, because providers can be given feedback at the time they write orders. We recently implemented a POE application at Brigham and Women's Hospital. To evaluate the effect of giving reminders for apparently redundant clinical laboratory tests, we performed an RCT using POE.

METHODS

All patients on medical and surgical units were included. The unit of randomization was the patient; randomization was done using an internal identification number not available to providers.

Test-specific intervals within which a second test was considered redundant were developed from the literature and were evaluated by clinicians prior to beginning the intervention. In the intervention group, the physician received a reminder at the time of ordering that the test had been performed recently and was offered the opportunity to cancel it. Reminders were given for Profile 20s; urinalyses; urine, sputum and stool cultures; clostridium difficile toxin assays; fibrin split products; and digoxin, tobramycin, theophylline, vancomycin and gentamicin levels. Physicians could override a reminder but were required to enter a coded reason.

We conducted chart review and used explicit criteria to determine whether the overrides were justified. To determine whether cancellation of tests had adverse effects, we looked for evidence of a new abnormal result for the same test within 3 days.

RESULTS

During the four-month study period, 939 apparently redundant lab tests were ordered; orders for Profile 20s, urinalyses, and urine cultures accounted for 83% percent of them. Of the 437 (47%) orders in the intervention group, the test was canceled in response to the reminder 69% of the time. In the intervention group, 27% of the redundant tests ordered were performed, compared to 51% in the control group ($p<0.001$). The low percent of tests performed in the control group occurred because in many instances providers (physicians, nurses or the laboratory) noted that the test was redundant and canceled it. After tests were canceled, new abnormal results for that test were only found in 5 of 300 episodes.

Of overrides, 41% were justified. Problems with interval definition accounted for 39% of justified overrides; in particular, we considered chemistry profiles in the morning justified after a test was performed the night before. Changes in clinical condition accounted for 30% of justified overrides. After overrides, 9% of tests done following a prior normal result provided new clinical information.

DISCUSSION

We found that providing reminders for redundant tests was effective. The high percent of redundant tests ordered but not performed in the control group demonstrates the importance of a control group. Cancellation of redundant tests appeared to result in little or no loss of clinical information. An important percentage of overrides appeared justified. The percent of overrides could be decreased by refining the rules, but our data suggest overrides should be allowed when providing redundant test reminders.

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