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Letter to the Editor ■

Computer Alerts for Potassium Testing: Resisting the Temptation of a Blanket Approach

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In the Nov/Dec, 2003 issue of *JAMIA*, Hoch et al[1] have reported the effectiveness of computer alerts to improve potassium testing in patients receiving diuretics. The underlying hypothesis of the study was that diuretics can cause hypokalemia, which can lead to adverse drug events (ADEs) including atrial and ventricular arrhythmias. The authors suggest that computer alerts to physicians would increase the rate of annual potassium testing for patients on diuretics, which would, in turn, prevent such ADEs. However, we wish to draw readers' attention to the following details.

First, it is conceivable that physicians deliberately decided not to test their patients annually based on their clinical judgment. The patients might have had stable serum potassium levels for many years or may have been asked to follow a high-potassium diet. Hence, the physicians may have changed behavior to avoid repeat alerts and not solely on clinical grounds. Such a trend toward increased testing would not have a long-lasting effect if physicians perceive them to be frequently irrelevant.[2,3] The authors could have made a much stronger argument by reporting the potassium values of patients for whom computer alerts were sent. If a substantial number of these patients had critically low serum potassium values, it would also have made physicians understand the benefit of routinely testing potassium rather than having them order tests that they did not think pertinent in the first place. We were surprised to see this valuable information on patient outcomes missing from the results of the study.

Second, computer alerts should not be considered simple and cheap interventions. In the current study, every computer alert required physicians to check their electronic messaging system, open patients records, order laboratory tests, follow-up on the laboratory tests, make changes to patients' medications (if required), and order a repeat laboratory test after medication change. Hence, there are many implicit costs and much time associated with computer alerts.[4] Before physician reminders are extended to include a variety of medications requiring laboratory investigation of medication level or side effects (as suggested by the authors), it is more important that users reach a consensus on appropriate guidelines than that they accept the computer as a way of delivering reminders.[5,6]

The primary outcome of the study was not a clinical outcome but annual potassium testing in patients receiving diuretics. This may not necessarily translate to better patient outcomes because treatment with hydrochlorothiazide by itself rarely causes marked hypokalemia or ventricular arrhythmias.[7,8] Also, there is no strong evidence that mild hypokalemia secondary to diuretics is associated with increased ventricular ectopy[9] or that its correction reduces the occurrence of ectopy.[10] The evidence quoted by the authors is from a study of 35 patients, who were monitored for arrhythmias after treadmill exercise.[11] The study found increased premature ventricular contractions under maximum stress conditions, but this can hardly be translated into clinical practice without other major studies showing direct effect on patient outcomes. This lack of discrete evidence is the main reason that, apart from the pharmaceutical industry, none of the prominent medical societies recommends routine annual potassium testing in all patients on diuretics.[12–14]

However, there may be a subset of patients for whom potassium testing studies are appropriate, such as those with moderate or severe hypokalemia.[7] The authors could have chosen to target such patients, along with other patients who are more likely to suffer from complications of diuretic use. These patients include those who have just begun diuretic therapy, those who have a previously low serum potassium level without a repeat level in the last 12 months, or those who are on concomitant digoxin.[15] This could reduce the number of overall alerts remarkably while targeting the right patient population, thus decreasing the burden of care and increasing overall efficiency. Such a decision support system has been reported in the literature.[16]

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Computer-based reminders to prompt physicians to implement preventive and other services have been available since the late 1970s and offer promise for improved patient care.[5,17] However, they are not complete solutions,[18] and we should resist the temptation of being too intrusive with clinic workflow without reaching a consensus. A targeted and tailored approach rather than a blanket approach to computer alerts may prove to be better and more effective in the long run.

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