Dropping the ball on critical value POC glucose results?

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December 2013—Prompt reporting of critical laboratory results is considered an important patient safety goal. But for one of the most commonly performed tests, point-of-care glucose, there has been limited information about how critical results are handled. A new CAP Q-Probes study finds there is a great deal of variability. In addition to having widely differing critical result cutoff values, many laboratories are not repeating critical POC glucose test results for verification despite the relative high rate of erroneous results on first measurement.

Using data from 50 participating laboratories, the study, "Point-of-Care Glucose Critical Values," evaluates the reliability of POC glucose results in the critical range as well as practices associated with notification. The study reports that while 92 percent of participants had a policy for repeat testing of critical POC glucose results, the median rate of critical values retested within 10 minutes was only 56 percent. Failing to repeat POC glucose tests with results in the critical range is not advisable, the study authors say. "Good laboratory practices should include repeating all critical POCG test results with verification criteria provided to test operators," they write in their analysis of the data.

The study was undertaken, in part, because it's been a Joint Commission patient safety goal for some time that critical results should be reported to the primary responsible provider, says study coauthor Ron B. Schifman, MD, chief of diagnostics for the Southern Arizona VA Healthcare System and vice chair of the CAP Quality Practices Committee.

"Laboratory medical technologists have plenty of experience handling critical values as a daily practice. Critical value policies and procedures for notification and turnaround time are well established in this setting," he says. "But in most hospitals and health care settings, more glucose testing occurs outside the clinical laboratory at the point of care," where much less is known about critical value practices.
CAP Q-Tracks studies have found that laboratories are very good at notifying providers of critical values when tests are performed in the core laboratory. Rates of almost 100 percent are common. "The question raised in this recent Q-Probes study deals with whether the same level of quality performance is seen with point-of-care testing," Dr. Schifman says. The findings suggest not.

There are key differences between the testing sites, of course, because at the point of care, the patient's direct caregivers can immediately evaluate the results in the context of the patient's current clinical condition. "In the clinical laboratory, we don't have the advantage of checking the patient to see if there are signs and symptoms of hyperglycemia or hypoglycemia that fit the test result. So the setting is different, but the principle is the same. If a patient has a critical value, the patient safety goals do not differentiate between places where the test is done."

Dr. Schifman

In the past, Dr. Schifman says, most core laboratories repeated a critical value to confirm the result. But now, because of the accuracy and precision of chemistry analyzers, "many laboratories have demonstrated that the likelihood of false critical values or analytical error is so low that repeating the test is probably not necessary.

Maybe the juice isn't worth the squeeze. Plus the delay you have with notifying the provider of a critical value outweighs the rare, remote possibility that you might have an inaccurate result. Whether that same practice applies to point-of-care testing has never been carefully looked at."

For this Q-Probes study, the 50 participants were asked to track their critical high or low POC glucose tests, whether they were repeated or not, and if a test was repeated, whether it was verified. There are no guidelines or standards for verifying a repeat POC glucose test, Dr. Schifman says. "In this study we used the ISO 15197 standard, which defines accuracy as a low glucose value that is within 15 mg/dL of the critical result, or within 20 percent if it's a high value." But that standard was not developed for critical value POC glucose testing. "The ISO standard was designed for comparing a patient doing a test at home with a reference standard test. We used it because there are no standards that have been developed that can be applied for verifying critical POC gluose test results."

The study authors found that the median laboratory retested 56 percent of critical POC glucose results within 10 minutes. Of those that were repeated, 81.7 percent of results were verified by the median laboratory. "That means that for that laboratory, four out of five times, the critical value report was verified using these standards. And that's a much lower accuracy rate than you would expect to see in a core laboratory," Dr. Schifman notes.

"So at least with this sample of participants, that would indicate that with a critical value point-of-care glucose, you might have to be very cautious about taking the result at face value. It probably does need to be repeated and confirmed using some laboratory-based criteria, since there's no real standard."

In addition to that conclusion, Dr. Schifman says, the study found variation in verification frequency. In the poorest performing laboratories, the critical value was verified only half the time, but in the best laboratories, it was verified 100 percent of the time. The verification rate was significantly higher among laboratories that had higher test volumes and when testing was performed by technicians or health aides. Another area of significant variation was in critical value cutoffs. "The cutoff values are up to the laboratory director and medical staff as to what they define as a critical value," he points out. "And it's important to note that the cutoff value might influence the outcome of the verification."

The level of experience of POC glucose operators affects these outcomes too. "Laboratorians are very used to dealing with critical values, but in a point-of-care environment, you've got literally hundreds of nurses or other personnel, primarily nurses, doing testing. We found that the average number of point-of-care glucose tests performed per operator is 119 per year. A critical value might occur only once in a thousand tests. It's not very common. So the likelihood of having an operator encounter a critical POC glucose even once a year is fairly remote." That relative rarity means operators are not likely to acquire much experience with critical values, he says. Most experience would have to come from training rather than practice.

With regard to notification, the handling of critical values in POC glucose testing again falls short compared with handling in core laboratories. The median figure is 85.7 percent notification. "So that's another area that doesn't meet the quality result we see with core laboratories," Dr. Schifman says.

Despite the prevalence of tight glycemic control and the growth in POC glucose testing, "The POC glucose critical value issue has not been on people's radar," he says. "But a critical value can be life-threatening. The patient could have severe hypoglycemia or hyperglycemia and so there is some concern about whether that result is, No. 1, accurate, and No. 2, communicated the same way that core laboratories do it in their normal daily practice."

More rigorous standards and criteria for when to repeat a POC glucose critical value and how to define accuracy on a duplicate test need to be developed, in his view. "Whereas other Q-Tracks studies in the field have shown that laboratories are doing an exceptionally good job, approaching 100 percent for critical value notifications, we don't see this in point-of-care-testing, perhaps because people haven't really thought very much about this aspect of quality practice. There's been much more focus on POC glucose for critical care patients and tight glycemic control,

and critical values in point-of-care glucose testing are really pretty uncommon."

The only way to know if a critical value result is a true and accurate result is to retest, either using another fingerstick or a venipuncture, Dr. Schifman says. In this Q-Probes study, "Almost everybody had a policy for repeat testing, and the policies varied, but repeat testing was only done in the median laboratories 50 percent of the time. That was a little surprising, because the policy in most facilities is to repeat, but practice appears not to follow policy. Between what happens in the core laboratory and what happens at the point of care, in terms of testing, accuracy, and notification—there really is a gap in practice."

He doesn't regard this Q-Probes study's findings as an "SOS" message so much as a call for greater awareness of the need for better standards in verification and notification, mitigating the risk of error by appropriate training of testing personnel, and continuous monitoring. "Point-of-care glucose testing on capillary specimens has the advantage of speed and convenience, but critical point-of-care glucose values are prone to inaccuracy, and should always be repeated for verification, then reported promptly to responsible caregivers."
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