Letter to the Editor

Experience With a Rapid Diagnostic Test for Influenza

To the Editor:

During an explosive nursing home outbreak, brief delays in the application of prophylaxis could expose many residents to a potentially fatal illness. Unfortunately, the identification of influenza on clinical grounds is complicated by overlapping viral respiratory pathogens such as respiratory syncytial or parainfluenza virus.[1] Rapid diagnostic tests performed on site could quickly confirm the presence of influenza.

The Wisconsin Veterans Home used the BD Directigen Flu A+B test (Becton Dickinson, Cockeysville, MD) during the period of influenza activity (2001–2002). The standard clinical case definition for influenza lacks proven sensitivity in vaccinated residents of long-term–care facilities.[2] Therefore, we had a low "clinical" threshold for collecting specimens from residents. No temperature threshold was required. Clinical cases had at least two symptoms or signs, including cough, nasal congestion or discharge, sore throat, malaise, myalgia, or aural temperature of 99.5°C or greater, and were sampled within 3 days of illness onset. The BD Directigen Flu A+B test was performed in the Wisconsin Veterans Home laboratory within 1 hour of specimen collection. All specimens were inoculated into cell cultures within 36 hours of collection.

A total of 72 samples were collected by swab from the nasopharynx by experienced research nurses to track the spread of influenza within our four-building facility. Forty-nine specimens were collected with or after the first culture-positive case. Only seven rapid diagnostic tests had positive results for influenza A, and in all seven cases the organism grew on tissue culture, with a positive predictive value of 100%. Of interest, all seven cases had recorded aural temperatures of more than 100°F at the time of collection. False-positive results have been reported with rapid diagnostic tests. Initial cases in the community identified by rapid diagnostic tests should be confirmed by culture.

An additional five specimens were negative on the rapid diagnostic test, but subsequently grew influenza A on tissue culture, resulting in a sensitivity of 58% (95% confidence interval, 28% to 85%) compared with cell culture. Only one of these five cases had a temperature of 100°F or greater. Positive results were reported in 3 to 7 days. Finally, 60 specimens were negative for influenza by both rapid test and cell culture. A pooled analysis of zanamivir treatment studies that included culture, polymerase chain reaction, and serology with 791 symptomatic cases (laboratory confirmation by at least one method; mean patient age, 36 years) found that only 73% of the cases had a positive culture.[3] If this percentage is valid, our estimated sensitivity would drop to 43%.

In contrast, Leonardi et al. reported that the BD Directigen Flu A test (versus A and B in our study) had a sensitivity of 85% for 46 institutionalized geriatric patients with positive cultures during a season with a poor vaccine match (versus a good match in our study).[4] Approximately 92% of the total group sampled (N = 160) had documented temperatures of 100°F or greater, versus only 25% of our total group sampled (N = 72) at the time of collection. We infer that the sensitivity of the rapid test may be better compared with culture in febrile cases. In addition to nasopharyngeal swabs, Leonardi et al. also obtained throat swabs.

Although the sensitivity of the rapid diagnostic test in our hands was only 58%, we found that a group of rapid tests performed on symptomatic individuals were helpful in the early identification of influenza and the application of antiviral prophylaxis. We initiated prophylaxis in a single building on the day influenza was confirmed by rapid test. This involved a single test with positive results. Prophylaxis would have been delayed 3 days if we had waited for the culture report. On the day influenza was first identified by rapid test, influenza had been confirmed by culture in the surrounding community. Four rapid tests were performed in the "outbreak unit." One case had a positive result on the test and on culture, and a second case had a negative result on the test with a subsequent positive culture. In two cases, both the result on the rapid test and the culture were negative. In our experience, rapid diagnostic tests may be useful for quickly identifying influenza within a building using grouped data, but should not be relied on for the treatment of individual residents. Because of imperfections in the sensitivity of these tests, individual treatment should probably not be withheld for a frail, elderly individual with a compatible syndrome during the influenza season on the basis of a negative result. We encourage other clinicians to report clinical comparisons of rapid diagnostic tests for influenza and viral culture in nursing home residents.

REFERENCES

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