Binax and Biotest Legionella Urinary Antigen Kits

The article of Robert F. Benson et al. entitled “Evaluation of the Binax and Biotest urinary antigen kits for detection of Legionnaires’ disease due to multiple serogroups and species of Legionella” (1) states the following in the abstract: “Eighteen were positive with the Binax kit, and 13 were positive with the Biotest.” This statement is misleading since data in both the article and Table 1 show that of 45 urine samples previously positive by the enzyme-linked immunosorbent assay of Tang and Toma (3), 45 were tested with the Binax enzyme immunoassay (EIA), and of these, 10 were positive and 35 were negative. Forty-two of the 45 were tested with the Biotest EIA; of these, 13 were positive and 29 were negative (3 were not tested). Obviously, there was a retest with the Binax radioimmunoassay: 26 of the 45 samples were retested. Of these, 13 were positive and 13 were negative (19 were not tested).

If one combines the results for the Binax radioimmunoassay (RIA) and the Biotest EIA shown in Table 1 in reference 1, it may be possible to find 18 positive samples, but the abstract should then state that 18 were positive with the Binax EIA and RIA kits combined, since the results of two test kits were being compared against those of one Biotest EIA. The abstract still would be short enough, even if the facts shown in the article were spelled out, i.e., 10 of 45 specimens positive by the Binax EIA, 13 of 42 positive by the Biotest EIA, and 13 of 26 positive by the Binax RIA.

In a report by Harrison et al. (2), the eight urine samples from culture-verified non-serogroup 1 patients were positive by the Danish in-house assay only. This is not stated in the article but was presented at the EWGLI Meeting, 1 to 3 June 1997, Lisbon, Portugal, prior to publication of the article (2). Harrison et al. also reported that the Biotest EIA was positive for 5 of 46 cases that were all negative by the Binax EIA or by in-house tests, all cases proven either by culture serology, direct fluorescent-antibody assay, or PCR results, so that the Biotest EIA provided an additional 11% positive results from urine samples negative by other tests but from patients proven positive.

With regards to the lower cutoff value, the Biotest assay does have two cutoffs: one is the mean of negative controls plus 0.200; the other is the mean of negative controls plus 0.100. In the latter case, the sample must test positive repeatedly (two times) to be considered positive. Many samples from non-serogroup 1 patients are weak positives: using the kit criteria, one usually finds twice as many non-serogroup 1 samples positive by the Biotest assay as with the Binax assay (as described by Dr. L. Helbig at the EWGLI Meeting, 27 to 29 June 1999, Dresden, Germany, and possibly by Benson et al. [1], who stated that 20 of the 42 [48%] samples would be positive by the Biotest EIA with a lower cutoff, although without stating what kind of lower cutoff).

This information about the cutoff value would be interesting to the reader of the abstract, certainly more so than the mention of 18 positive samples found by using the Binax kit. The lower ratio of >2.0, which increased the Binax test sensitivity, was not accompanied by a concurrent specificity study with 300 negative samples, 176 potentially cross-reactive samples from the manufacturer, and 123 potentially cross-reactive samples from a multicenter study (2), as was the case with the Biotest assay with the lower cutoff. Parallel specificity studies should always be performed when cutoff values are altered since in low-prevalence situations, high false-positive numbers may result.

REFERENCES

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Authors’ Reply
We appreciate Dr. Horn’s comments and offer the following response. In the abstract of our article (1), the number of samples listed as positive for the Binax kit was the total for both the EIA and RIA kits. This point was not stated directly in the abstract, but, as Dr. Horn acknowledges, this is described in detail in the text and in Table 1 of the article. We also stated that only the results of the Binax EIA were used for comparison to the Biotest EIA. In regards to the literature cited, we were not aware of the results presented at the EWGLI meeting in 1997 but only of the results presented in the article by Harrison et al. (2). We appreciate Dr. Horn’s clarification of the results published by Dr. Harrison. Our results tend to support Dr. Horn’s statement that the Biotest EIA is more sensitive than the Binax EIA in detecting 13 of 42 versus 10 of 45 urine samples. Dr. Horn states that the Biotest EIA has two cutoff values for positive results. This information is not stated in the product insert we received with the kit. If this is the case, the product insert should be changed to indicate that a lower cutoff can be used. Our observations of the positive samples compared to the negative samples is supported by Dr. Horn’s statement. The purpose of our study was to show that both tests, while not as sensitive as the broad-spectrum assay, are capable of detecting nonserogroup-1 Legionnaires’ disease.

REFERENCES

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