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Performance of assays used in the U.S. to diagnose Lyme borreliosis acquired in Europe

The most common tick-borne infection reported in the United States is Lyme disease, which can be acquired in the United States or while traveling in Europe. Evaluation of Lyme disease acquired in Europe, by doctors in the United States, is challenging because assays used in the United States use lysates of the original Borrelia burgdorferi sensu stricto isolate (B31 strain). This strain has common immunodominant antigens found among the various other North American strains. However, using the B31 strain to test for Lyme disease acquired in Europe is problematic as several heterogenous species compose the European Lyme disease pool. The authors systematically compared the performance of assays from the United States and Europe using sera from U.S. patients with Lyme disease acquired in Europe. First-tier, second-tier, and conventional two-tier testing was compared statistically. In addition, the authors tested the performance of newer assays with antigenic targets useful in identifying European Lyme disease. The results showed that the sensitivity and specificity of first-tier assays using C6 peptide enzyme-linked immunosorbent assays (ELISAs) as a stand-alone test or in the second tier of a two-tiered algorithm performed similarly to European assays. However, second-tier tests using immunoblots were significantly dissimilar in terms of sensitivity and specificity for the early identification of infection and overall infection determination. Overall disease positivity was 81 percent versus 58 percent using the European and U.S. immunoblots, respectively. Furthermore, comparison of conventional two-tiered testing showed that U.S. assays were less sensitive than analogous European assays (52 percent versus 81 percent, respectively). Alternative testing, which incorporated the detection of anti-IR6 or anti-V1sE antibodies, did not result in increased detection of Lyme disease acquired in Europe. However, changing the alternative assay to either a C6 peptide ELISA or a two-enzyme immunoassay (EIA) resulted in higher sensitivity for early and late-stage disease identification (81 percent for European assay versus 88 percent for C6 and 84 percent for two-EIA approach). The C6 peptide ELISA and the two-EIA assays are FDA approved. The authors favored the two-EIA method to the C6 peptide as the latter had higher false-positive rates. However, there were several limitations to this study, namely the individualized algorithms and scoring criteria employed in Europe and the stringent interpretive criteria for immunoblots used by the Centers for Disease Control and Prevention, which make statistical comparisons difficult. Despite these limitations, the authors concluded that a C6 ELISA as a stand-alone test or a two-EIA approach, which used a U.S. Whole Cell Sonicate polyvalent ELISA followed by a C6 ELISA, performed similarly to a conventional European two-tiered testing method. Furthermore, this testing approach could be used to evaluate Lyme disease acquired in the United States and Europe.

Branda JA, Strle F, Strle K, et al. Performance of United States serologic assays in the diagnosis of Lyme borreliosis acquired in Europe. *Clin Infect Dis.* 2013;57(3):333–340.

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Direct-to-consumer genomic testing: impact at long-term followup

Direct-to-consumer genomic-wide testing is controversial, generating concerns related to lack of clinical utility as well as a lack of appropriate involvement by health care providers or regulatory oversight, or both of the latter. Additional concerns are related to the psychological or other harms that may result, including inappropriate burdening of the health care system. Impacting this debate was a longitudinal cohort study by the Scripps Genomic Health Initiative designed to assess the psychological, behavioral, and clinical impact of direct-to-consumer genomic risk testing for common diseases. The study involved participants who purchased a commercially available genomic test between 2008 and 2009 and were administered a series of Web-based health assessments to assess anxiety, diet, exercise, test-related distress, and health screening behaviors. Results showed no measurable impacts on any outcomes after a followup of six months. A subsequent study, detailed below, reported a longer term followup assessment of one year after the participants received their genomic test results. The authors administered baseline, short- (three-month), and long-term (one-year) followup Web-based assessments to adults who purchased the commercially available Navigenics Health Compass genomic test. Results from 2,240 study participants, including 1,325 who completed long-term followup, showed no significant differences in anxiety, fat intake, or exercise at participants' long-term followup. Furthermore, 96.8 percent of the population had no test-related distress. Completion of screening tests was associated with sharing genomic test results with a physician at a rate of 36 percent and the perceived utility of the test at 61.5 percent, but neither was associated with the genomic risk estimate values. The authors concluded that genomic testing was not associated with long-term psychological risks, and most participants reported the test to be of high utility. Of interest, the sharing of genomic results with a physician was one of the only factors associated with a behavior change after genomic testing that resulted in a higher rate of health screening tests being completed. The authors emphasized that direct access to genetic testing, with physician availability and support as desired, may be an optimal approach.

Bloss CS, Wineinger NE, Darst BF, et al. Impact of direct-to-consumer genomic testing at long term follow-up. *J Med Genet.* 2013; 50:393–400.

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