Usefulness of quantitative IgG assays Borrelia VLSE LIAISON® and the new VIDAS® Lyme for serological follow-up of patients with Lyme borreliosis

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INTRODUCTION

Diagnosis of Lyme borreliosis relies on serology by screening for IgG and IgM to Borrelia burgdorferi sensu lato, confirmed by immunoblots if results are positive or equivocal. In Europe epidemiological situation is complicated by IgG seroprevalence varying from 10 to 20%. Seroprevalence increases with age and depends on risks of contact with ticks during leisure or professional activity. Positive predictive value is below 50% without anamnesis of tick bite and good clinical examination. VlSE discovered in the 2000’s was thought to be the answer as a marker of disease activity. Unfortunately seroprevalence was also detected and tempered enthusiasm for this specific antigen. We used quantitative values of Borrelia IgG LIAISON assay for follow-up of patients. Using the new VIDAS® Lyme IgG in routine, we observed similar variations. Our goal was to compare these 2 assays (VIDAS Lyme IgG and LIAISON Borrelia IgG) for serological follow-up of patients at different stages of Lyme borreliosis. A retrospective analysis was initiated with collection of precise clinical data from all included patients.

MATERIALS AND METHODS

The Lyme IgG VIDAS assay was not designed by manufacturer as a quantitative assay. VLSE antigen is the main constituent of this new assay. Linearity range was determined for the VIDAS Lyme IgG assay, as well as reproducibility. The Borrelia IgG LIAISON assay is only constituted of VlSE antigen. This assay was performed according to manufacturer instructions but dilutions 1/10 were performed starting with value >200 AU/ml. Linearity for the VIDAS assay was established between the 2 assays.

RESULTS

A total of 296 sera from 97 patients with early, disseminated and late symptoms of Lyme borreliosis were evaluated. Clinical data were collected for all the patients. A control group composed of 2 samples, 3 to 12 months apart from seropositive and seronegative blood donors (N=38 and N=52 respectively) was included. Concordance of both methods was calculated based on both groups, blood donors and patients. Patients were evaluated according to clinical stages. Concordance of tendencies was established between the 2 assays.

Blood donors (N=90) Discrimination positive-negative between both assays was 97.6%. Correlation of tendencies was 95.6 % : stable values (N=62) or significant increase (N=3) or decrease (N=1). In addition 4 discrepant results were observed with LIAISON : 1 significant increasing value (above 30%) and 2 decreasing value. These 4 cases showed stable values with VIDAS. No significant variations was observed for 91% of blood donors.

Patients (N=97) Linearity for the VIDAS assay was established between 0.4 and 4.0 TV (Test Value). For the LIAISON assay linearity was found between 5 and 200 AU/mL. Concordance between both assays was good. We observe increasing values with duration of symptoms. Usually patients with EM have LIAISON values <200 AU/mL and VIDAS values <20.0, except in case of a second EM. Patients with ACA or arthritis have values >500 AU/mL (LIAISON) or >50.0 (VIDAS). Patients with neuroborreliosis have a wide range of values going from <10 to 6’934 AU/mL (LIAISON) or <0.2 to 236 (VIDAS) depending on duration of disease.

Follow-up sera (N=296) Concordance between LIAISON and VIDAS assays is rather good if we think that the 2 assays are basically different : technology (CLIA-ELFA), antigens (VlSE – VlE, OspC, DdpA) , scales... Concordance of tendencies is 82.7% with EM patients (seroconversion appears in few cases later with VIDAS) and 96.7% with neuro , ACA and Lyme arthritis patients. Patients with early infections (EM or neuroborreliosis) demonstrate a clear increase in test values and a quick decrease after initiation of treatment. For patients experiencing late infections (ACA or Lyme Arthritis), test values are high and decline is marked but slower than decline observed with early Lyme borreliosis.

CONCLUSION

Using this methodology for the follow-up of patients for several years we are convinced that quantification of IgG to B. burgdorferi sensu lato makes sense and gives useful laboratory results to the clinicians regarding activity of infection and effectiveness of treatment. The fact that both assays show similar variations bring some strength to predict either a current infection or seroprevalence or cure. Variations with these 2 assays were rapid, within a few weeks depending on clinical stages. Observed variations seem to reflect disease activity as previously described in initial papers.[1,2] These results need to be confirmed by a prospective multicentre study.