FRIDAY-09 / FRIDAY-09 - ZIKA VIRUS ANTIBODY DETECTION: EVALUATION OF THREE DIFFERENT SEROLOGIC METHODOLOGIES

May 20, 2016, 4:30 - 6:00 PM | Ocean Center - Exhibit Hall

Authors

D. Granger[1], L. J. Gómez[2], M. Schimek[1], M. Dubbels[1], J. A. Mosquera[3], E. S. Theel[1]; [1]Mayo Clinic, Rochester, MN, [2]Dinámica IPS, Medellín, Colombia, [3]Mayo Med. Lab., Rochester, MN

Disclosures

D. Granger: None. **L.J. Gómez:** None. **M. Schimek:** None. **M. Dubbels:** None. **J.A. Mosquera:** None. **E.S. Theel:** None.

Abstract

Background: The Zika virus (ZV) epidemic in South America was declared an international public health emergency by the World Health Organization in early 2016 due to association with fetal microcephaly and post-infectious neurologic manifestations. Among acutely symptomatic individuals, fever, arthralgia, conjunctivitis and maculopapular rash are common, and overlap with those of other arbovirus infections, including with dengue (DV) and Chikungunya (CHIKV). Notably, ZV, DV and CHIKV are all endemic in South America and are transmitted by ***Aedes*** species mosquitos. Co-infections are therefore possible. Diagnostic testing for ZV, including RT-PCR and serology, is currently available only through public health departments and the Centers for Disease Control and Prevention. Here, we evaluate the Euroimmun (Lübeck, Germany) ZV EIA and IFA and the Viramed (Planegg, Germany) line immunoassay (LIA) for detection of anti-ZV IgM and IgG antibodies. **Methods:** The Euroimmun and Viramed assays were evaluated per manufacturer instructions using prospectively collected specimens from patients in Colombia (n=30; serum) and Brazil (n=3; plasma; ZV RT-PCR positive by Brazil assay) presenting with symptoms suspicious for ZV. Reference range serum studies were performed using 30 normal donor Minnesota residents and specificity was evaluated using two panels: A) 26 sera positive for IgM-class antibodies to West Nile virus (WNV; n=10), DV (n=10), CHIKV (n=4) and St. Louis Encephalitis virus (SLEV; n=2) and B) 31 sera positive for IgG-class antibodies to WNV (n=10), DV (n=10), CHIKV (n=5) and SLEV (n=6). **Results:** Clinical data was available for the 30 patient Colombian cohort. Patient age range was 6 to 79 years (median 34 years), with a male to female ratio of 2:3 (four prenatal). Four patients presented with all four symptoms commonly associated with ZV, while half (n=15) presented with fever and rash. Due to pending serologic results from the CDC and Colombia, the reference standard for IgM or IgG positivity was defined as a consensus result in which at least 2 of the 3 assays were in agreement. Using this criteria, the ZV IgM EIA, IFA and LIA had a positive agreement of 100% (3/3), 100% (3/3) and 66.7% (2/3; 1 indeterminate) and negative agreement of 90% (27/30), 96.7% (29/30) and 83.3% (25/30; 5 indeterminate), respectively. 2 of the 3 ZV IgM positive samples were negative for IgM antibodies to DV and CHIKV; all 3 samples were negative for DV NS1 antigen. The ZV IgG EIA, IFA and LIA had a positive agreement of 90.9% (10/11), 90.9% (10/11) and 100% (11/11) and negative agreement of 100% (22/22), 70.8% (17/22) and 100% (22/22), respectively. All assays were negative in the three ZV RT-PCR positive samples, except for the IgM LIA assay which was indeterminate in one specimen. All assays showed 100% specificity among normal donors except the IgG EIA (96.7%; 29/30) and the IgG IFA (93.3%; 28/30). The ZV IgM EIA and LIA showed 100% (26/26) specificity in sera from panel A, compared to 88.5% (23/26) for the IgM IFA. Comparatively, the ZV IgG EIA, IFA and LIA showed 69.4% (25/31), 58.1% (18/31) and 83.9% (26/31) specificity, respectively. The majority (80.9%) of cross-reactivity occurred in dengue positive samples. **Conclusions:** Our preliminary data indicate that the

Euroimmun and ViraMed ZV IgM assays have a high specificity for ZV, and may be used in tandem (EIA screen followed by IFA or LIA confirmation) for detection of anti-ZV IgM antibodies. Conclusive sensitivity studies are pending on results from the CDC. As expected, the ZV IgG serologic assays are fraught with cross-reactivity to other flaviviruses and should not be used for diagnostic purposes.