29th ECCMID Amsterdam, Netherlands 13 – 16 April 2019

The congress of ESCMID

O1001 Novel screening ELISA for sensitive detection of Mayaro virus-infected patients

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Background: Mayaro virus (MAYV) is an emerging alphavirus circulating in the Caribbean and South America. It is transmitted to humans via mosquito bites, causing a febrile illness, often with prolonged arthralgia, which resembles other infections with co-circulating arboviruses, e.g. dengue virus (DENV), chikungunya virus (CHIKV) or Oropouche virus (OROV). Serological differentiation from other alphavirus infections is complicated in the presence of antibodies targeting homologous antigens from related viruses (Semliki Forest virus complex), primarily CHIKV. Here, serum samples of patients with MAYV or other arboviral infections were analysed with a novel Anti-Mayaro Virus ELISA at the Instituto Evandro Chagas (Ananindeua, Brazil).

Materials/methods: Serum samples originated from Brazilian patients with clinically and serologically characterised febrile infections, drawn between day 11 and 117 post symptom onset. Pre-characterisation included analyses for IgM and haemagglutination inhibition (HI) antibodies against MAYV, CHIKV, DENV, yellow fever virus (YFV), Zika virus (ZIKV), OROV, eastern and western equine encephalomyelitis virus (EEEV, WEEV) and flaviviruses in general using the respective in-house IgM antibody capture (MAC) ELISAs and indirect HI assays. The first panel encompassed 46 samples, including 21 positive and 25 negative for anti-MAYV IgM and HI antibodies. The second panel (n = 12) consisted of six anti-MAYV HI antibody-positive and six anti-MAYV HI antibody-negative samples. Samples were investigated using the Anti-Mayaro Virus ELISA (Euroimmun, Germany) for the detection of IgM (panel 1) and IgG (panel 2).

Results: In panel 1, the Anti-Mayaro Virus ELISA IgM was 100 % (21/21) sensitive and 76 % (19/25) specific. The six discrepant samples had been pre-characterised as positive for CHIKV (5/11) or general flavivirus (1/3) infection. Analysing panel 2, the Anti-Mayaro Virus ELISA IgG revealed a sensitivity of 100 % (6/6), at 50 % (3/6) specificity. Three samples with anti-CHIKV HI antibody-positive but anti-MAYV HI antibody-negative pre-characterisation were positive in the ELISA.

Conclusions: The novel Anti-Mayaro Virus ELISAs (IgM and IgG) showed a high sensitivity at moderate specificity. This specificity meets the expectations and, in the majority of cases, can be explained by cross-reactivity with antibodies against related viruses, primarily CHIKV. Thus, the ELISAs are suitable as screening assays, reliably detecting MAYV-infected patients.