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**Simultaneous Detection of Mononucleosis Syndrome Serology Markers Using an EIA Dipstick System**

B. Kiehl¹, E. Lennette², ¹GenBio, San Diego, CA, USA, ²Viralab, Berkeley, CA, USA

**Objective and Methods:** Dipsticks detecting IgG to Epstein-Barr virus viral capsid antigen (VCA), Epstein-Barr virus recombinant nuclear antigen type-1 (EBNA-I), cytomegalovirus (CMV) and toxoplasma and IgM to heterophile, EBV-VCA, and CMV are evaluated and compared to latex (heterophile), indirect immunofluorescence (IFA) and enzyme immunoassay (ELA) results.

**Results:** Six (1.8%) out of four hundred twenty-five samples submitted from patients with suspect mononucleosis syndrome were heterophile negative and the dipstick product classified all as positives. The corresponding EBV profiles supported EBV mononucleosis for all eleven samples. One (0.3%) additional sample is identified as a current or recent EBV infection based on VCA-IgG reactivity. An additional 25 (7.6%) samples are CMV IgG reactive. Twenty samples (6.0%) that are neither EBV nor CMV reactive and toxoplasma IgG were detected.

**Conclusions:** Agreement between individual assay methods are all greater than 90%. Simultaneous detection of all EBV mononucleosis syndrome markers is feasible. Additionally, detection of a significant number of primary and/or recurrent CMV infections that presumably may cause the mononucleosis episode is illustrated.

**Comparison of Immunofluorescence with Enzyme Immunoassay for Detection of Serum Immunoglobulin G Response to Human Herpesvirus 6**

F. Mesa, P. Campo, A. Guerra-Neira, R. Martinez-Zapico. Dpt. of Microbiology, La Paz Hospital, Madrid, Spain

**Objectives:** To evaluate indirect immunofluorescence assay (IFA) and enzyme immunoassay (ELA) for the detection of immunoglobulin G antibodies to human herpesvirus 6 (HHV-6).

**Methods:** We tested 250 serum samples by IFA (HHV-6 IgG IF1 (1/160) and enzyme immunoassay (HHV-6 IgG EIA, Biotrin International, Dublin, Ireland) and EIA (HHV-6 IgG EIA, GenBio, San Diego, CA, USA).

**Results:** The frequency of distribution of the samples according to IFA test titers and results obtained by ELA were:

<table>
<thead>
<tr>
<th>IFA test titer</th>
<th>No. of serum samples</th>
<th>Positive by IFA (%)</th>
<th>No. negative by IFA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/160</td>
<td>65</td>
<td>16 (24.6)</td>
<td>49 (75.4)</td>
</tr>
<tr>
<td>1/20</td>
<td>62</td>
<td>29 (46.8)</td>
<td>33 (53.2)</td>
</tr>
<tr>
<td>1/40</td>
<td>22</td>
<td>12 (54.5)</td>
<td>10 (45.5)</td>
</tr>
<tr>
<td>1/80</td>
<td>48</td>
<td>42 (87.5)</td>
<td>6 (12.5)</td>
</tr>
<tr>
<td>1/160</td>
<td>14</td>
<td>13 (92.3)</td>
<td>1 (7.7)</td>
</tr>
<tr>
<td>1/320</td>
<td>13</td>
<td>12 (92.3)</td>
<td>0</td>
</tr>
<tr>
<td>1/640</td>
<td>9</td>
<td>9 (100)</td>
<td>0</td>
</tr>
<tr>
<td>1/1280</td>
<td>5</td>
<td>5 (100)</td>
<td>0</td>
</tr>
<tr>
<td>Inconspic.</td>
<td>12</td>
<td>12 (100)</td>
<td>0</td>
</tr>
</tbody>
</table>

**Conclusions:** We have found discrepancies in the results obtained by IFA and ELA, mainly when low titer results by IFA analysis.

**Viral hemorragic fevers**

**Coagulation Disorders in Children with Viral Hemorrhagic Fever**

E.C.M. van Gorp¹, C. Subarti², T.E. Setiari³, M.S. Tassotoenojo¹, H. ten Cate¹, M. Keuter⁴, W. Dolmans⁴, A. van der Ende⁴, D.P.M. Brandjes¹

¹Department of Internal Medicine Slotervaart hospital Amsterdam, Netherlands, ²Department of Internal medicine University of Diponegoro Semarang, Indonesia, ³Pediatric department University of Diponegoro Semarang, Indonesia, ⁴Department of Internal medicine Catholic University Nijmegen, Netherlands, ⁵Center for hemostasis, thrombosis, atherosclerosis and inflammation, AMC, Amsterdam, Netherlands

**Objectives:** Viral hemorrhagic fever e.g. Dengue hemorrhagic fever (DHF), is an acute febrile disease complicated by bleeding and/or shock. Activation of the coagulation cascade and fibrinolysis is studied in a group of children with severe hemorrhagic fever.

**Methods:** During the period July/October 1996 all children (28) admitted to the intensive care unit with the clinical diagnosis of Dengue hemorrhagic fever enrolled the study. Patients were clinically classified as DHF III and IV, according to WHO criteria. Markers of coagulation and fibrinolysis were sampled on three successive days, starting at the day of admittance and one sample on the day of discharge.

**Results:** Eight patients died. Mean age of all patients 6.5 years.

Early in the disease there was an evident increase in markers of thrombin generation. (values at day of admittance, survivors vs. deaths). F1 + 2 fragments (median 2.4 vs. 5.9; p < 0.05; normal <1.1 min/ml), TAT complexes (median 22 vs. 81 mg/l; p < 0.05; normal <4.1 mg/l), fibrinogen was decreased (mean + sd 1.6 vs. 1.4 + 0.3 g/l; ns; normal 1.7-4.0 g/l), Fibrinolysis increased during hospital stay, most obvious in the non survivors, measured as D dimers (third day after admittance, median 457 vs. 649 ng/ml; p < 0.05; normal <59 ng/ml).

**Conclusions:** Hemorrhagic fever in children is characterized by disseminated intravascular coagulation (DIC), probably one of the contributive factors to the often dramatic outcome.

**Disorders of Hemostasis and Fibrinolysis in the Hemorrhagic Fever**


In 57 patients suffering from hemorrhagic fever /Hantaan = Pummalla virus/ hemostasis and fibrinolysis were followed. The analysis showed the frequent acceleration of trombocitopenia and fibrinolysis. The most frequent was trombocitopenia at 32 patients, primary trombocitopenia 19, and secondary 13. Fibrinolysis was acceleration in 25 out of 57 observed patients, DIC was detected at two patients.

Primary fibrinolysis is more frequently/15/, secondary at 10 patients. It was more frequently verified at the onset of the disease, when the greatest acceleration was noticed 98/min with the approximate one of 116. In the later course of the disease, fibrinolysis was present together which the developed azotemia gave the grave course of disease. It was noticed that early fibrinolysis had more benign course. Also, trombocitopenia and fibrinolysis in this stage were shorter in duration and endid without the therapy, while the secondary with azotemia can provoke malignant bleeding, because of which it was necessary to apple antiplasmin in fibrinolysis, or heparin in DIC.
Viral hemorrhagic fevers

**P1441** Viral Hemorrhagic Fever in Pregnancy

S. Baljović, C. Vujčić, N. Mitić. Clinic of Infectious Diseases, Clinical-Hospital Centre, Prilica, Yugoslavia

Evolution of pregnancy and development of embryo during existence of infectious diseases has been the subject of many investigations due to pathological changes in pregnancy with numerous complications for a mother.

Within 1986-1995 we have treated 300 patients suffering from Hemorrhagic Fever, type Hantaan (with kidney syndrome) and Congo-Crimean Fever (CCHF). The latter had severe course with evident consumbable coagulopathy manifested by hemorrhagic shock and abundant skin and mucous membrane bleeding and also bleeding from gastro-intestinal organs.

Only four pregnant women suffering from CCHF (table 1) were registered.

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Duration of illness (days)</th>
<th>Pregnant Outcome</th>
<th>Grav. Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>6</td>
<td>VII</td>
<td>Ex</td>
</tr>
<tr>
<td>30</td>
<td>8</td>
<td>VI</td>
<td>Ex Ex</td>
</tr>
<tr>
<td>39</td>
<td>7</td>
<td>IV</td>
<td>Ex Ab</td>
</tr>
<tr>
<td>24</td>
<td>4</td>
<td>III</td>
<td>Ab</td>
</tr>
</tbody>
</table>

In the eighth month of pregnancy we have premature baby dies immediately after being born: mother dies 8 days later. In the sixth month a baby is born dead: mother dies 10 days later. In the fourth month embryo is dead: mother dies 8 days later. The forth pregnant woman in third month of pregnancy, had abortion at home followed by rich bleeding at the beginning of hess and after being treated at our clinic she survived and has been cured without negative results.

We conclude that CCHF is very severe acute infectious disease for mother and her foetus, too. There is also danger for medical staff and family members due to high risk of transmitting virus by blood.

**P1442** Serological Evidence of the Presence of Hantavirus Serotypes in Montenegro

N. Vulić, B. Andrić, a. Jusufmraci. Clinical Hospital Centre-Montenegro, Podgorica, Montenegro

The aim of this study was to assess the circulation of different Hantavirus serotypes in Montenegro in 1995.

Hantavirus infection has been explored for 30 years. These viruses are maintained in nature every five to ten years. In 1995, we treated 128 patients (Clinical Hospital Centre, Ward of Infectious Disease). Clinical picture varied from mild to severe. Sera from 128 patients were examined by IFA using different hantavirus antigens (Institute of Virology, Belgrade, S. Tomamovic).

The serological investigation showed the following results: diagnosis was serologically confirmed in 82% cases. The seropositivity was found in a high percentage: both serotypes Hantaan (HTN) and Puununla (PUU) in 14%, HTN in 58%, and PUU in 20% cases.

In conclusion we can say that HTN serotype infection ranked first. The findings for both serotypes (HTN, PUU) corresponded to the severity of illness. PUU infection caused mild form of disease.

**P1443** Cellular Immune Defence in the Pathogenesis of Hemorrhagic Fever with Renal Syndrome (HFRS)

A. Marković, A. Gago, S. Rahatić, A. Sabioncello, G. Dalić, I. Kuman, D. Dekaris. Institute of Immunology, Zagreb, Croatia

**Objectives:** The aim of our study was to measure proinflammatory cytokines that may have a role in the pathogenesis of HFRS.

**Methods:** We used EIA-test (Quantaikine, R&D Systems Inc., UK) for the detection of IL-2, IL-2Ra, IL-6 and IL-6Ra in sera of 41 HFRS patients. Samples were collected among the Croatan soldiers during the greatest HFRS outbreak in Croatia in 1995. During the outbreak, we were looking for immunophenotypic changes in the main lymphocyte populations and activation markers in 22 HFRS patients.

**Results:** We found elevated levels of IL-2Ra, IL-6 and IL-6Ra in patients with HFRS in comparison to healthy controls IL-2Ra and IL-6 showed negative correlation with the day after the onset of HFRS. In 14 patients 2Ra positively correlated with the CD25, an early activation marker (detected during the study in 1995). In the same patients we also found positive correlation among the IL-6 and CD20-CD21 double-positive B-lymphocytes, CD23, B-cell activation marker and CD4- and CD8-lymphocytes simultaneously expressing both CD45RA and CD45RO markers.

**Conclusions:** We found an increase of tested proinflammatory cytokines in the early phase of HFRS. Also we could consider that measured cytokines act as an autocrine and paracrine factors, driving the expansion of antigen-specific lymphocytes and influencing the activity of the other cells within the immune system. Our next aim would be to correlate clinical and biochemical data with the immune response, and to look for their role in the prognosis of HFRS.

**P1444** Evaluation of Two Commercial Dengue Fever Assays versus an IgM Specific Neutralization

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**Objective:** To assess the specificity and sensitivity of two commercial DFV assays in comparison to IgM specific viral neutralization.

**Methods:** A panel of 30 selected low IgM positive samples provided by the CDC, San Juan, PR. and 5 normal sera from a non-endemic region were tested. Prior to performing the neutralization assay, IgG was removed by treating the samples with goat anti-human IgG. The commercial assays compared included the MRL Diagnostics, capture ELISA and Genelabs Diagnostics IgM Blot. Samples were tested per kit manufacturer’s instructions.

**Results:** The thirty IgM low positive samples all had specific IgM neutralizing antibodies. Two samples had only type 1 DFV neutralizing antibodies, 11 had only type 2, 1 had only type 4. There were no samples with type 3 DFV neutralizing antibodies.

The remaining 16 samples had antibodies specific to more than one DFV. All five normal sera were negative. Viral neutralization was detected using IFA. The MRL Diagnostics μ capture ELISA detected IgM in 29 of the 30 samples for sensitivity of 96.7%. The Genelabs Diagnostics Blot detected IgM in 20 of 30 for a sensitivity of 66.7%; seven samples were indeterminate. Both the MRL and the Genelabs assays had 100% specificity.

**Conclusion:** The MRL μ capture ELISA showed significantly better correlation with IgM viral neutralization than the Genelabs Blot.
Dengue Shock Syndrome (DSS): Liver Involvement in Fatal versus Non Fatal Cases

C. Suharti 1, T.E. Setiati 1, M.S. Trasronetoeno 1, H. Setiawan 1, Djokomoejanto 1, G. Rahmania 1, J. Setiabudi 1, E.C.M. van Gorp 1, W.M.V. Dolmans 1. 1 School of Medicine, Diponegoro University, Dr. Kariadi Hospital Semarang, Indonesia, 2 Department of Internal Medicine St Antonius Hospital Amsterdam, The Netherlands, 3 Department of Internal Medicine, Katholic University of Nijmejen, The Netherlands

Objectives: To get clinical pictures and laboratory findings concerning liver involvement in DSS.

Methods: Cross sectional study. Fifty children DSS patients admitted to Dr. Kariadi Hospital from June 24, 1996 to December 10, 1996, were evaluated for physical examination, laboratory tests: SGOT, SGPT, Total protein, Albumine, Alkaline phosphatase, Gamma-GT and Prothrombin time. We also measured TNF level in 13 out of 50 DSS cases.

Results: Hepatomegaly was found in 88% of cases. Laboratory findings fatal vs non fatal cases were: the median of SGOT was (143 vs 76) u/l, SGPT (41.50 vs 26) u/l, Alk. Phosphatase (115 vs 138) u/l, Gamma-GT (31 vs 17) u/l, Total protein (4.50 vs 4.65) g/dl, Albumine (3.30 vs 3.50) g/dl, Prothrombin time (18 vs 14.6) seconds. The TNF data from 13 cases showed, that there seems to be very high level in fatal cases.

Conclusions: 1. Hepatomegaly was found in 88% cases of DSS. 2. High level of SGOT, SGPT, low level of total protein and albumine, and prolonged of prothrombin time were found in DSS, but more remarkable in fatal cases. 3. The level of alkaline phosphatase and Gamma-GT were relatively normal. 4. There seems to be very high level TNF in fatal cases. 5. The correlation between the prolonged of prothrombin time and high level of TNF needs further investigation.

C1Q Induces Conformational Changes into the NP of Lassa Virus Antigen

A. Vladyko, T. Shkolina, V. Zaytseva. Research Institute of Epidemiology and Microbiology, Minsk, Belarus

It was shown that a guinea pig complement, being added to antigen in Lassa virus ELISA-test, intensified sensitivity and specificity of the assay. The analysis of mice antibodies spectrum, involved in this phenomenon, demonstrated that the intensification of method's sensitivity as much as 8-16 times took place in poliester plate sensitization with antibodies of IgG2a and IgG2b subclasses and when the complement was added to antigen.

On the basis of footprinting data it was proved, that after binding to antigen-antibody immune complex, the complement induced conformational changes in antigen.

Footprinting and ELISA data permitted us to assume, that the C1q component of the complement and MAbs of various isootypes, specific to NP protein of Lassa virus, induced changes in antigens in different ways, affecting various antigen-active sites.

False Positive Results in the Serologic Diagnostic of the Human Parvovirus B19 Infection

M. Rivera, A. Menasalvas, P. Gijón, F. Catalán, C. Sánchez-Carrillo, E. Bouza. Hospital General Gregorio Marañón, Madrid, Spain

Parvovirus B19 (PVB) is a DNA virus recently implicated in a wide spectrum of human diseases. IgM antibody detection constitutes the easiest and most available diagnostic procedure for recent infections. From January 1993 to December 1995, our laboratory received the request to determine IgM-PVB (Parvo-B19 EIA IgM test, Madx Diagnostics) in 584 clinical samples. Of these, 95 samples from 65 patients were positive. We were able to find adequate clinical information in 46 cases. Twelve cases (26%) were considered "false positive". Ten adults with liver transplantation with acute CMV infection (positive viral culture), a child with measles infection (clinical presentation and seroconversion) and one case with EBV infectious mononucleosis (IgM). The remaining 34 cases had clinical manifestations well described in relation to PVB. Seven were pediatric patients, the most of them with erythema infectiosum, 7 healthy young women presented arthralgias or erythematous rash, 16 were HIV-positive patients with persistent anemia and 4 other patients had hematological disorders. Most frequent signs were: anemia (58%), skin lesions (47%), fever (38%) and arthralgias (20%).

The high rate of "false positive" in our study warns against over-interpretation of the results.

Persistence of Human Parvovirus B19 DNA in Bone Marrow of Healthy Donors

P. Casiinotti 1, G. Burtonboy 2, G. Siegl 3. 1 Institute for Clinical Microbiology and Immunology, St. Gallen, Switzerland, 2 Université Catholique de Louvain, Bruxelles, Belgium

Objectives: To investigate the presence of human parvovirus B19 (B19V) in bone marrow of healthy bone marrow donors.

Methods: Presence of B19V DNA was tested in blood and/or bone marrow samples obtained from a total of 45 healthy bone marrow donors using a nested polymerase chain reaction assay (nPCR). The serological status of the donors was determined by enzyme immunoassay (EIA).

Results: B19V DNA was detected in the bone marrow of 4 out of 45 donors (9%). Among serum samples available from 39 donors none tested positive for B19V DNA, 28 (72%) contained anti-B19 IgG antibody only as a sign of past infection, and none contained anti-B19 IgM antibody. Anti-B19 IgG antibody was detected in each serum sample available for 3 of the 4 individuals with B19-DNA in bone marrow.

Conclusions: These results indicate that B19V may persist in the bone marrow of 11% (3/28) of donors with serologically documented past B19V infection.

The Polyomyelitis in Kosovo and Metohia in 1996 Year

N. Cvetkovic, S. Baljolevic, C. Vujjici, R. Kataacic, N. Popovic, S. Stojanovit. The Clinic of Infective Diseases, Pristina, Yugoslavia

In places where antiepidemic measures were not applied properly and hygienic conditions of life are bad, epidemic form of disease are possible. The aim of this work is to point on differency of clinical picture and epidemiological characteristics epidemic of polymyeli-