P1451
Paper Poster Session
Lyme disease

Neuroborreliosis mimicking acute encephalopathy: the use of CXCL13 as biomarker in CNS manifestations of borreliosis

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Background: Acute neuroborreliosis (NB) is a severe complication of vector-borne Lyme borreliosis, caused by the spirochete *Borrelia burgdorferi sensu lato* (BB). Lymphocytic pleocytosis is an abnormal increase in the amount of lymphocytes in the cerebrospinal fluid (CSF) and mediated through BB-caused damage of the blood–brain barrier.

Material/Methods: Screening immunoassays were used for qualitative detection and quantitative determination of specific IgG/-IgM antibodies to Borrelia burgdorferi in serum and CSF. recomLine Borrelia was used for antibody detection in serum and CSF against the immunopathogenic genospecies (*B. burgdorferi* sensu stricto, *B. garinii*, *B. afzelii*, *B. spielmanii, B. bavariensis*) in order to confirm the enzyme immunoassays results. The chemokine CXCL13 was measured in CSF using an ELISA before and after antibiotic therapy. Detection of B. burgdorferi s.l. from CSF was done by culture and RT-PCR targeting *p41* and *ospA*. A PCR targeting the *hbb* with melting curve analysis and MLST (multi locus sequence typing) using 8 housekeeping genes was performed to establish the *B. burgdorferi sensu lato* species.

Results: Reiber nomograms showed B-cell mediated antigen-driven specific antibody responses. Lymphocytic pleocytosis was detected in CSF, different forms of lymphocytes (plasma cells, lymphocytes, atypical lymphocytes with shifted core-plasma-ratio, cytoplasmatic protrusions; Figure below) were visible. ELISA showed elevated Borrelia-IgG (480 U/ml) and -IgM (0.5 U/ml). CSF Borrelia-IgM was at 1.668 U/ml. OSPC and VlsE were detected in Borrelia-specific IgG serum blot and p41 was detected in Borrelia-IgM CSF blot. Both Borrelia-IgG (69.80) and -IgM (19.4) antibody index (AI) was highly elevated (normal range <1.5). TPPA test for syphilis, FSME IgG AI was negative. CSF showed highly elevated total protein, elevated total cell number (260 cells/µl) and lactate, severe blood-brain barrier dysfunction (albumin CSF/serum quotient of 47,2) and an intrathecal IgG- and IgM-synthesis. Both, ospA and p41 RT-PCR were positive, while borrelia genospecies identification using hbb and MLST failed. CXCL13 was 39.000 pg/ml at time of NB diagnosis.

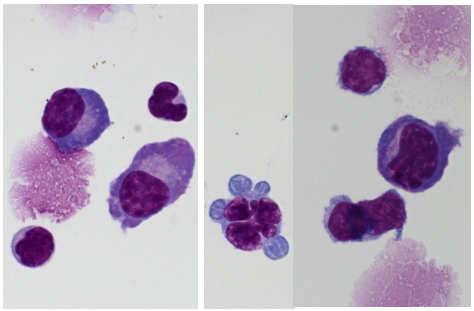

Fig.: CSF lymphocytic pleocytosis: different forms of lymphocytes, plasma cells, atypical lymphocytes (Zeiss Axio Vision microscope, 1000x magnification).

Conclusions: In our case report, severe neuroborreliosis was able to mimick acute encephalopathy with confusion in an elderly man. While many non-specific factors might lead to confusion in early stage of Alzheimer's disease, clinical course, microbiology results and response to antibiotic treatment suggested that a severe immunological reaction was a major trigger of these neuropsychiatric symptoms. The chemokine CXCL13 served as biomarker in conjunction with successful neuroborreliosis therapy. Although CXCL13 is not yet validated as a routine diagnostic tool, CSF CXCL13 may be another option to increase sensitivity and accuracy in diagnosing NB, next to CSF lymphocytic pleocytosis. Thus, both parameters might serve as potential biomarkers for NB treatment efficacy in the future.