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Psychiatric disorders in borreliosis

Borreliosis named Lyme disease is a tick-borne disease caused by the spirochete, *Borrelia burgdorferi*. Since 1982, when this bacteria was isolated by W. Burgdorfer, this disease has been more and more often recognized in Poland and other countries, due both to availability of specific serologic methods and to a growing body of knowledge (1, 11). As a multisystem infection borreliosis has different clinical manifestations: dermatological, rheumatological, neurological, cardiac, ophthalmological, endocrinological. Lyme disease may cause general lymphadenopathy, hepatitis, dyspeptic symptoms, pyelonephritis, cystitis. The manifestations of borreliosis include secondary neuropsychiatric disorders.

The aim of the paper was presentation of psychiatric disorders in borreliosis on the basis of the literature review.

PSYCHIATRIC DISORDERS IN BORRELIOSIS

Psychiatric disorders were observed among patients both in early and late stage of disease. The most common are: chronic mild confusional stage, Lyme encephalopathy, which is manifested as impulsiveness, personality changes with irritability and mood swings, hypersomnia, short-term memory loss. The encephalopathy may develop many years after the acute stage of disease (10, 11). Patients may also experience depression, panic attacks, unrelenting anxiety, paranoia, obsessive compulsive disorder, manic episodes, psychotic states (6, 11). Depressive stages among patients with Lyme disease are ranging across studies from 26% to 66% (5). Kohler described 3 stages of borreliosis with connection to neurologic and psychiatric symptoms: stage I – fibromyalgia and mild depression, stage II – aseptic meningitis, infectious polyneuritis and organic psychiatric disorders, stage III – chronic encephalitis and/ or myelitis linked with dementia, organic psychosis and anorexia nervosa (11).

Reviewing the literature there is but little report on psychiatric manifestations in Lyme disease. There are a few reports of cases. Hess and colleagues presented the case of a 42-year-old woman who was diagnosed with schizophrenic disorder. She suffered from paranoid delusions, acoustic and visual hallucinations, thinking decelerations with thought withdrawals. Neurological examination showed no focal or meningitic signs. CSF investigation revealed a lymphocytic pleocytosis, higher level of protein and a B-cell immunoresponse. Antibody-specific indices to *Borrelia burgdorferi* were positive. Cranial MRI discovered contrast medium enhancing lesions in thalamus on both

sides and left pallidum. Based on MRI and CSF findings an atypical course of Lyme disease was diagnosed. Authors noted that the patient did not receive any chronic antipsychotic treatment after acute intermittent treatment with antibiotic and antipsychotic drugs (12).

Some evidence for linkage between borreliosis and psychiatric symptoms is a report of three patients who had developed a psychiatric disorder for the first time after infection with *Borrelia burgdorferi*. These manifestations include depression, panic disorder and mania. Similar to the case described above these disorders remitted after adequate antibiotic treatment (4).

Bar et al. described a case of a 61-year-old woman who developed a severe pain syndrome following tick bites. She was diagnosed with neuroborreliosis. She received various courses of antibiotics over several years, but without any clinical improvement in her conditions. She was admitted to a psychiatric ward because of mental symptoms. Neuroleptic treatment led to a dramatic improvement of her pain symptoms. Although this patient might have suffered from late onset schizophrenia with painful hallucinations right at the start of her disease, an idea is emerging that psychiatric complications might be associated with neuroborreliosis (2). In one of the cases psychiatric disorder occurred as an acute exogenous psychosis, concomitant with polysymptomatic autoimmune disorder. The psychotic symptoms disappeared after typical treatment (with antibiotics) (3).

Some patients develop a chronic fatigue syndrome with predominant symptoms: fatigue, headaches, emotional lability, memory impairment, neurasthenia, difficulty in concentration. Often there are the flulike symptoms of fever, sore throat, unrefreshing sleep, muscle stiffness, tender lymph nodes (1, 7, 11).

The suggestion that there is liaison between borreliosis and psychiatric disorders is based on observations upon the frequency of psychiatric disorders among patients with Lyme disease which is greater than among those with other medical conditions, antibiotic treatment may improve psychiatric symptoms and many patients who developed neuropsychiatric conditions reported being psychiatrically healthy prior to the onset of Lyme disease.

DIFFERENTIATING PRIMARY AND SECONDARY DISORDERS

Differentiating neuropsychiatric Lyme disease from primary psychiatric disorders can be complicated. In the task of differentiating Lyme disease from primary psychiatric disorders clinical presentation, laboratory testing, neuropsychological testing and functional brain imaging. It is important if patient has markers of a nonpsychiatric disease, such as an erythema migrans rash, arthralgias or arthritis, myalgias, increased light or sound sensitivity, severe headaches, paresthesias, diffuse fasciculations, cardiac conduction delay, cranial neuropathies, radicular pains (6). But diagnosis is made difficult by lack of history or finding of a tick bite and by the fact that the pathognomonic finding, the rash of erythema chronicum migrans, is seen in only a minority of causes (1). We should pay attention to any atypical course of disorders. In the case of depression, it is characterized by marked mood lability, in which the patient bursts into tears for no apparent reason or in which moods fluctuate from normal to extreme irritability over short periods. In the case of panic disorder, the acute anxiety last longer than the usual 10-minute interval characteristic of most primary panic attacks. A poor response to medications that typically would be helpful or that previously had helped the same patient should alarm the doctor if a diagnosis is apt. And as a general rule, whenever a patient older than the age of 40 years develops a psychiatric disorder for the first time without apparent cause, an organic etiology must be suspected (6).

The essential method in the laboratory diagnostics of borreliosis is serologic tests indicating the presence of antibodies for *Borrelia burgdorferi*. As each methods as this has some limitations, to use

any laboratory test it is essential to understand its positive and negative predictive values – i.e. in a given patient, what is the likelihood that a positive result predicts disease or a negative result predicts its absence. Test ELISA, the Western-blot technique and in some cases auxiliary the PCR test are used (6, 13).

Neurological tests show that 50–60% of patients with chronic neurological Lyme disease have evidence of objective impairment. These symptoms include impairment of memory, attention and concentration, verbal fluency, perceptual motor functioning, conceptual ability. Often, objective cognitive deficits on neuropsychological testing can be demonstrated despite normal findings from a neurological examination and of EEG, CFS and MRI studies. And what is important, a routine clinical examination may not show memory problems. In cases of memory loss accompanied by mild depression, neuropsychological testing can be extremely valuable. Typically, mildly depressed patients will show few if any objective memory deficits on neurological testing, while patients with Lyme disease encephalopathy will show mild to severe levels of impairment, particularly in verbal fluency and verbal short-term memory (6, 7).

MRI scans of patients with neurological Lyme disease may demonstrate punctate white matter lesions on T2-weighted images, similar to SM. This is most often the case among patients with evidence of meningitis or encephalitis. The white matter lesions may resolve after antibiotic treatment. In late-stage neurological Lyme disease, however, brain MRI scans are generally normal even though the patient may continue to have neuropsychiatric problems. In patients with Lyme disease, SPECT scans typically show multifocal areas of decreased perfusion in both the cortex and the subcortical white matter (6).

However, some investigators claimed that there are no reasons to link borreliosis to psychiatric disorders (9, 10), Hajek et al. had psychiatric patients tested to look antibodies to *Borrelia burgdorferi*. Prevalence of antibodies to *Borrelia burgdorferi* among psychiatric patients was higher than healthy subjects. One-third of the psychiatric patients had serological signs of past *Borrelia burgdorferi* infection. They speculate that circulating immune complex IgM, with a high rate of psychiatric patients, might be involved in the pathogenesis of psychiatric symptoms associated with borreliosis. As far as a relationship between borreliosis and psychiatric disorders is concerned there are taken two possibilities into account. Patients vulnerable to psychiatric disease may be also more susceptible to *Borrelia burgdorferi* infection or perhaps to its neurotoxic effects because of genetic or intrauterine factors. Or *Borrelia burgdorferi* infections may cause psychiatric symptoms. Future research should elucidate this issue (8).

CONCLUSIONS

There are data that nearly one-fifth of a sample of psychiatric outpatients had a medical conditions as the cause of their psychiatric disorder and that this physical conditions had been missed by the referring physician in about one-third of the causes (6). It is crucial to diagnose Lyme disease in its earliest phases, as treatment with antibiotics usually results in a complete cure. Failure to make an early and certain genetic factors contribute to a pattern of chronic disease in some patients (1). An early diagnosis affects a selection of treatment, which in case of borreliosis and concomitant psychiatric disorders should be combined.

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SUMMARY

Borreliosis is a multisystem disease in which manifestations may include psychiatric disorders. In case of borreliosis and concomitant psychiatric disorders treatment should be combined. Despite clinical presentations in diagnostics are helpful laboratory testing, neuropsychiatric testing and functional brain imaging.

Zaburzenia psychiczne w przebiegu boreliozy

Borelioza jest chorobą wieloukładową, mogącą przejawiać się w postaci zaburzeń psychicznych. W przypadku współistnienia zaburzeń psychicznych i boreliozy leczenie powinno być skojarzone. W postawieniu właściwej diagnozy oprócz obrazu klinicznego pomocne są testy laboratoryjne, testy neuropsychologiczne oraz badania obrazowe mózgu.