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# **Burnout, bipolar or borreliosis? A diagnostic dilemma behind prolonged disability**

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## **Abstract**

The key elements of psychiatric assessment of ability to work are an objective evaluation of function, accurate differential diagnostics, and finding out the clinical and non-clinical reasons behind disability. Here, we present a case with prolonged disability due to disseminated borreliosis that first mimicked burnout, then unipolar depression, and finally, bipolar mood disorder. The important clues of organic neuropsychiatric syndrome were severe cognitive deficits which were disproportionate regarding previous psychiatric diagnoses and a significant and enduring decline of function in the clinical picture. An atypical clinical picture with treatment-refractory psychiatric symptoms should prompt further consultations. Although very rare, the possibility of disseminated borreliosis is worth keeping mind, because the prognosis of late neuropsychiatric, untreated symptoms and prolonged disability is poor.

## **Introduction**

Referral to psychiatric assessment of ability to work with objective evaluation of function and re-evaluation of diagnostics often leads to new treatment and rehabilitation strategies with positive outcomes among patients with a complicated disability. The return to work rate of psychiatric patients, however, is decreased after half a year of absence from work, and remarkably decreased after year of absence, independent of the reason for absence (1). The delay in vocational rehabilitation is common among psychiatric patients (2). This case report presents the

difficulties in differential diagnosis and adequate treatment of disseminated borreliosis due to overlapping, multiple symptoms and challenges in laboratory diagnostics. The diagnosis of disseminated borreliosis is very rare, with a prevalence of less than 0.01% (3), compared to more common burnout 2.5% (4), unipolar depression 6.5% (5) and bipolar mood disorder 0.24% to 0.72% (6, 7).

Contemporary working life sets high demands for cognitive functions and ability to cope with stress. Work can be rewarding in many ways, but symptoms of stress and burnout can appear if work demands outweigh the means of recovery. Typical symptoms are fatigue, sleep disturbances, difficulties with memory and concentration and depression. If prolonged, these symptoms can decrease the ability to work and lead to absence from work. The psychological triad of occupational burnout has become a focus of interest in media and business, as well as a popular explanation for problems at work. It is less stigmatizing than psychiatric diagnosis and thus often more welcomed by the patients. When correct, the diagnosis of burnout is useful in leading to reassessment of work load and employee coping skills with subsequent interventions (8). But when not correct, it may confuse the identification of medical and psychiatric syndromes and delay their treatment. Unclear somatic complaints are very common in the working age population. Underlying psychological stress or even mild psychiatric syndromes can be found, instead of severe somatic illness. This case again makes an exception, with a distinctive warning sign of objectively deteriorated function and non-response to psychological or psychiatric approaches.

Lyme borreliosis is an infection caused by spirochetes *Borrelia burgdorferi*, transmitted by *Ixodes* ticks. It is the most common tick-borne infectious disease in countries with a moderate climate (9). By the infectious character of the disease, it can be classified as local or disseminated borreliosis. Based on anatomical damage of the disseminated form, it can be divided into neuroborreliosis or borreliosis arthritis. The disseminated form can also be divided as early and late dissemination (10, 11). In Finland, it has been estimated that there are approximately 4000 borrelia infections yearly and the majority of these are local, early-stage infections restricted to skin. The number of patients with disseminated borreliosis has been estimated to be at least 400 yearly (3). In disseminated borreliosis, a central nervous system infection can be diagnosed (3, 9). Headache, facial paresis, memory disorders, tiredness and attention problems are common symptoms (12). Psychiatric symptoms such as depression, mania and panic disorder have also been recognized as manifestations of disseminated borreliosis (13, 14), but their existence has been questioned (15). The challenge in diagnosing central nervous system involvement in disseminated borreliosis is that the serum levels of borrelia antibodies can be normal and only cerebrospinal fluid (CSF) antibodies reveal the underlying disease (16).

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## Case report

We report a case of a 46-year-old man who was referred to the Helsinki University Central Hospital's (HUCH) Psychiatric Outpatient unit for assessment of ability to work because of treatment-refractory depression and prolonged disability.

The patient did not have a family history for neurologic or psychiatric disorders. Despite a successful career as an information technology designer, his performance at work had gradually deteriorated during the last decade. He had noticed tickbites in years 2001 and 2002 while sailing in the Finnish archipelago. Over the following two years he had visited occupational health care due to insomnia, a lowered ability to cope with stress, and subjective complaints regarding memory and concentration. These symptoms were attributed to occupational burnout. He also suffered from increasing musculoskeletal and chest pains. Due to facial paresis, the blood serology for borrelia antibodies was controlled, but it was negative. Comprehensive clinical evaluation was done and he was diagnosed with fibromyalgia and Prinzmetal angina in 2005.

Two years after the second tickbite, the patient had his first long sickleave of several months due to pain symptoms, exhaustion and sleep disturbance. When he returned to work his mood was elevated and irritable, his need for sleep was reduced, his self-esteem was inflated. He was abnormally talkative, restless, distractible and overactive. The hypomanic episode in 2004 remained undiagnosed and lasted almost a year. Although the patient recognized some harmfulness of his distractibility and agitation, he still welcomed the overactive state wishing to get back his characteristic premorbid energetic and vigorous state. After the hypomanic episode, the patient had his first depressive episode and he also suffered from mixed anxiety symptoms. His mood was low, but his exhaustion was even more remarkable. He did not respond to antidepressants and psychosocial support. A neuropsychological examination discovered problems in attention and concentration leading to disturbances in short-term memory. Brain magnetic resonance image (MRI) was normal.

In 2009 the patient's working rate had slowed down considerably, and he could no longer concentrate in meetings or make calculations. He forgot names and discussions. His work was modified, but he could not even manage his reduced tasks, or part-time working. Laboratory tests and brain MRI were repeated and the findings were normal. A

polysomnography indicated a moderate to severe sleep apnea with some clues of central apnea and Cheyne-Stokes respiration. Obesity, unhealthy habits and addictions were excluded as aetiological factors. Continuous positive airway pressure (CPAP) treatment showed no response, but in the next polysomnography a month later the sleep apnea was only mild. Subsequently the initial abnormalities were attributed to nocturnal panic attacks.

Because of poor treatment response and problems with memory and concentration he was sent to neuropsychological assessment in 2011. A broad neuropsychological examination showed fatigue, a mild disturbance in attention control and a moderate disturbance of working memory. The results did not meet the criteria for early dementia. The patient was referred to a psychiatric open care unit for intensified treatment of moderate depression and anxiety. There was again no treatment response to pharmacological and psychosocial interventions. However, the patient was motivated to try to go back to work. A gradual return to work with part-time sickleave was designed after 1.5 years of absence from work, but the patient's cognitive performance was insufficient for the work and his depressive symptoms increased during the 4 months of working.

From spring 2012 he was on sickleave again. He was depressed and afraid of dying due to frequent chest pain attacks. Thus he avoided all stress until the next mood shift and his second hypomania, when his inactivity turned into overactivity. On a sudden impulsive decision, he travelled alone by bike around Europe and across the Alps, which was considered as exceptional and risk-taking behaviour by his family. Next autumn, in depressive phase again, the patient was referred by his psychiatrist to HUCH in 2012 for re-evaluation of function, ability to work and differential diagnosis. The then present diagnosis of moderate depression and panic disorder were not enough to explain the severe difficulties of function in daily life and the failure to return to work. The psychiatric assessment of ability to work consisted of lifehistory and daily life interview, structured diagnostic interviews and symptom screens, laboratory screen, family and workplace interviews, collecting all previous medical records, and in this case, clinical psychological examination and neurological consultation.

The patient was depressive and exhausted. He was co-operative and logical, but his psychomotor function was remarkably slow. The psychomotor retardation could have been typical of severe depressive episode, but unlike that he did not express typical depressive ideas and cognitive distortions. Despite history of burnout, he expressed no professional cynicism, nor did he blame his work. He had been devoted to his work, but before the initial pain and cognitive symptoms, he had always been good at coping

with work stress and he had loved challenges at work. The patient himself did not consider his exhaustion to be caused by work. The history of burnout symptoms was not typical, because the exhaustion was not preceded by an experience of adverse occupational stress nor an altered workload. The patient recognized his mood symptoms, but he could not find the psychological logic for them, except for being devastated by losing his function and ability to work.

The observations of the patient's lowered function in daily life and at work were in line with patient's subjective report and the clinical observations during assessment. His performance had slowed down remarkably compared to premorbid level. He was unable to concentrate on longer discussions or to keep his papers in order. He had difficulties finishing a sentence or remembering what he was going to say. He described difficulties in writing SMS text messages with his cell phone or tapping billcodes on a computer keyboard. He still suffered from joint stiffness and pain, besides he still had a mild left-sided residual facial paresis. Laboratory screens were normal. History of addictions was ruled out.

In psychological examination, the main findings were problems with concentration, especially when the level of demand increased, and his impulse control was reduced. The problem-solving skills were considerably lower than expected from a previously high functioning individual. The ability to retrieve newly learned verbal information had further deteriorated since his previous neuropsychological examination. The retrieval of stored information, like words, was also deteriorated. The slowing of mental processing was obvious. The cognitive deficits, in comparison to his primary level, were disproportionate in relation to his psychiatric diagnosis and state.

In disseminated borreliosis, the patients typically have deficits in attention and executive functions, in verbal and visual memory and response or processing speed (17-20), like in this case. Although the borrelia serology in the blood had been repeatedly negative, a CSF sample was taken. In the CSF, increased borrelia IgG antibodies (5.9 wME) were found, and the IgM was normal. There was also an increase in CSF total protein (518 mg/l). After this, the blood serology was carried out with a different method, revealing elevated levels of borrelia IgG antibodies (15VE/ml). The patient was referred to HUCH Unit of Infectious Diseases and he was then diagnosed by two separate infectious disease specialists as having a late stage of disseminated borreliosis. Based on a Finnish multicentre study with a relatively large number of patients concerning the antimicrobial treatment of disseminated borreliosis (11), our patient was due to be treated with 3 weeks of intravenous ceftriaxone. However, after 10 days this treatment was discontinued because of elevated liver enzymes. Thereafter his treatment was followed with doxycycline 100 mg twice a day for 3 months.

The late onset antimicrobial therapy had no remarkable effect on cognitive deficits, but during prolonged doxycycline treatment, his joint symptoms improved. By then, the mood was stabilized, but some depressive symptoms still persisted, such as tiredness, low initiative, psychomotor retardation and poor concentration, which could be attributed to the organic neuropsychiatric syndrome of disseminated borreliosis. The organic bipolar mood disorder had not responded to mood stabilizers that were the first symptom-based treatment trial before antibiotics were introduced. Small dose quetiapine alleviated insomnia and was better tolerated than lamotrigine and the previous antidepressive medications. The patient was granted disability pension after receiving a diagnosis of organic bipolar disorder and cognitive deficits due to disseminated borreliosis that explained his fluctuating and variable, treatment-refractory symptoms and lowered function.

## Discussion

This case report has described an unfortunate patient with late stage disseminated borreliosis. Besides musculoskeletal pain, the exhaustion and cognitive symptoms first imitated work stress and burnout symptoms. Cognitive deficits were worsened with the onset of bipolar symptoms. Disseminated borreliosis has previously been associated with depression, but a recent case history describes a manic psychosis caused by borrelia encephalitis (21). After series of unsuccessful treatments for unipolar depression, the patient was diagnosed with an organic bipolar mood disorder. However, the present marked cognitive dysfunction was associated more with disseminated borreliosis than mood disorder. The prognosis of organic neuropsychiatric symptoms due to late disseminated borreliosis is worse than the prognosis of bipolar mood disorder, which is often treatable by adequate psychiatric care.

Our patient had several opportunities for tick bites, because his hobby was to sail in the Finnish archipelago during summer, which is known as a high-risk area for borreliosis (3). His symptoms started after the first tick bites about 10 years ago. His initial symptoms were musculoskeletal pains, later neurocognitive abnormalities were found. Regarding the patient's severe clinical picture, there might have been more tick bites than those two that he clearly identified after having removed the bothering ticks from the sensitive skin area. The diagnosis of disseminated borreliosis was based on identified tick bites, clinical picture examined by two separate infectious disease specialists supported with spinal fluid findings and by elevated blood borrelia IgG antibodies. The microbiological definite diagnosis of disseminated borreliosis, however, can be difficult as shown by a previous Finnish study (22).

Our patient was due to be treated with 3 weeks of intravenous ceftriaxone. However, after 10 days the treatment was discontinued because of elevated liver enzymes. During this period his joint symptoms had not improved. Matrix metalloproteinases (MMPs) and especially MMP-8 mediated inflammatory response have been shown to play a significant role in disseminated borreliosis (23-27), and particularly among those patients who have persistent joint symptoms after treatment with beta-lactam antibiotics like ceftriaxone (25-27). While our patient, after a beta-lactam antibiotic, still suffered from joint stiffness and pain, his treatment was followed with prolonged doxycycline, 100 mg twice a day, as used in reactive arthritis (27-29), because long-lasting joint symptoms in disseminated borreliosis have been considered as reactive arthritis (25, 30-34). Doxycycline treatment was also chosen because there are several European studies showing that doxycycline is an efficient drug in disseminated borreliosis (35-38). The important role of MMP-8 in infection-induced systemic inflammatory response, also regarding central nervous system involvement, suggests its role as a therapeutic target (39). Tetracycline antibiotics, such as doxycycline, have been shown to inhibit MMP-8 by several mechanisms (31-34). As the prognosis of late stage disseminated borreliosis is poor, an early diagnosis is vital. In endemic areas the differential diagnostics of disseminated borreliosis should be considered in atypical and treatment-refractory psychiatric illness (12, 40).

Occupational burnout is considered to be a negative consequence of chronic work stress and defined as a three-dimensional psychological syndrome of emotional exhaustion, professional cynicism and lack of professional efficacy (41, 42). Burnout predicts health deterioration, future sick leaves and disability pensions due to somatic and psychiatric disorders (42). Severe burnout is often accompanied by somatic and psychiatric comorbidity, such as musculoskeletal disorders 46.7%, cardiovascular diseases 27.6%, depressive disorders 45.3% and anxiety disorders 21.0% (41), which were all diagnosed with our patient. Unlike most burnout cases, our patient himself never really agreed with the clinical judgement of burnout, but he was compliant.

In this case, the exhaustion was primarily due to organic neuropsychiatric symptoms, and secondarily, due to the patient's efforts to keep up with previous productivity despite lowered cognitive capacity. Insomnia, and later, the depressive episodes also explained some part of the exhaustion. Despite a feeling of diminished professional efficacy and accomplishment, there is no clinically remarkable deterioration of function in burnout. The objective findings of cognitive functions are contradictory: a population sample with burnout symptoms may perform even better than average people (43), but clinical burnout cases seem to underperform compared to

their healthy controls (44). Burnout seems to be associated with slight and reversible cognitive impairment (45). The subjective experience of cognitive problems is more severe than the objective cognitive deficits among burnout patients (44). In depression, the experience of diminished performance and failure is broader and more painful, it is not limited to work and besides, there is a more obvious objective decrease of function and ability to work than in burnout.

This case shows how important it is to integrate all the symptoms and signs in the clinical picture across medical specialties. The presentation of burnout syndrome is always a warning sign of unhealthy occupational stress and of an elevated risk for morbidity and future disability. Besides occupational health care professionals, employers and managers should also react if the symptoms of burnout are present. Emphasis should be in early intervention and co-operation with employee, manager and occupational health care. The prognosis is usually good, but without an evident aetiological connection to workload and working conditions, the hypothesis of burnout should be discarded. Even with a justified diagnosis of burnout, the possibility of comorbid somatic and psychiatric illness should be considered. When exhaustion at work is preceded by mood disorder or inflammatory disease, it is rather a symptom of illness or a consequence of lowered performance due to illness. Re-evaluation of diagnosis should be considered if the work ability and work-related symptoms do not improve with support, correct treatment and work modifications.

## Conflict of interest

None declared. The patient has given his consent to this case report.

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