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*Depressive symptoms in acute phase of tick-borne encephalitis*

Tick-borne encephalitis (TBE) is a neuroinfectious disease caused by TBE virus (TBEV). There are two subtypes of the virus: eastern and western. The latter is transmitted through bites by *Ixodes ricinus* and appears endemic in the large parts of Northern, Central and Eastern Europe (e.g. Baltic Sea area, Germany, Switzerland, Austria, Poland, Slovakia, Czech Republic, Hungary and countries of former Yugoslavia (Fig. 1). The European type of TBE is also known as Central European Encephalitis (CEE) (3, 4, 7, 8, 12). In recent years a sharp increase of TBE cases in Poland was noted. North-east of the country is an endemic area of the disease. This is a region of many forests with considerable numbers of ticks (6).



Fig. 1. Endemic areas of TBE in Europe. Source: International Scientific Working Group on TBE (2001) – internet site: <http://www.tbe-info.com/epidemiology/endemic.html>



Fig. 2. A magnified image of a tick

The disease typically takes a biphasic course. After an incubation period, the first phase of TBE takes the form of an influenza-like infection (fever, headache, malaise, myalgia, sometimes abdominal pain). The second phase usually begins suddenly, after a few days' of asymptomatic period, with *meningoencephalitis*. At this stage often appear neurological symptoms and non-specific psychiatric disorders. They may assume a variety of forms (1, 2, 13). Many authors notice that most frequent psychiatric disorder in TBE – especially in the severe course – is impairment of consciousness or delusional and catatonic disorders. Other symptoms, like: cognitive dysfunctions, memory and attention disorders, depressive symptoms are common in the mild course of TBE. Cognitive dysfunctions as well as depressive symptoms may be present even after acute phase of TBE. Those symptoms impair patients' functioning and decrease their quality of life. Patients in acute phase of TBE are seldom examined and treated by psychiatrists (6, 10, 11).

A research project was undertaken to better understand the psychiatric disorders in the course of TBE. The objective of the current presentation is evaluating the frequency of depressive symptoms in an acute phase of tick-borne encephalitis and possible correlation with the clinical course of the disease and demographic data.

#### MATERIAL AND METHODS

We examined TBE patients hospitalised in 1999 and 2000 at Infectious Clinic of Medical University in Białystok and infectious wards in Hajnówka and Bielsk Podlaski (North-Eastern Poland). There were 51 subjects – 31 men and 20 women (Table 1); ages: 21 to 74 (average 44.8) – (Table 2). TBEV infections were confirmed by detection of TBEV-specific IgM antibodies in serum and cerebro-spinal fluid, by routine serological screening tests in all the examined. The subjects did not receive any psychiatric care before the neuroinfection. Thirty-one control healthy subjects – matched for age, gender and education – were also included in the study.

Table 1. Gender of subjects

		Severe course (S)	Mild course (M)	Total (S+M)	Control group (C)
Men	N	21	10	31	13
	%	65.6%	52.6%	60.8%	41.9%
Women	N	11	9	20	18
	%	34.4%	47.4%	39.2%	58.1%

Table 2. Age of the examined patients

	Severe course (S)	Mild course (M)	Total (S+M)	Control group (C)
Average age	45.2	44.1	44.8	51.0
Stand. Dev.	13.7	16.2	14.5	14.0
Min.	21.0	23.0	21.0	30.0
Max.	71.0	74.0	74.0	72.0

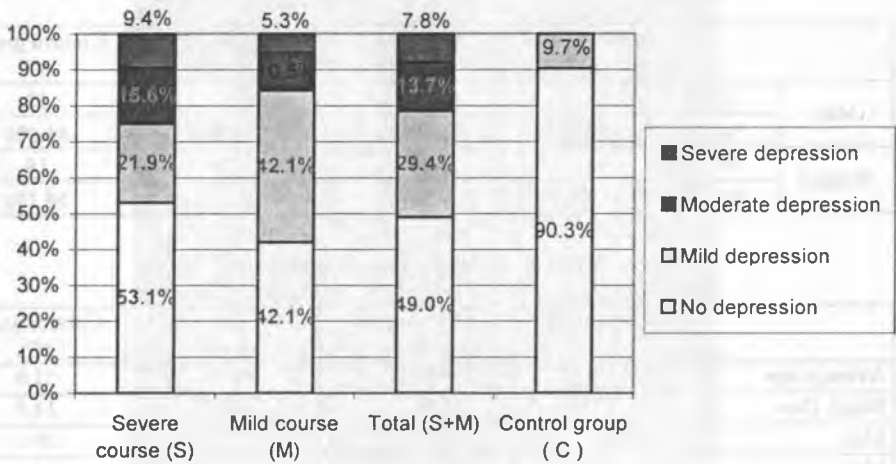
Patients were divided into two subgroups, depending on the clinical course of TBE. There were 32 with the severe course (*encephalomeningitis* and *encephalitis*) – S – group and 19 – mild (*meningitis*) – M group (Table 3). The subjects were examined during the first week of hospitalization. They were evaluated according to the Hamilton Depression Rating Scale (HDRS). The examined sample consisted primarily of men (60.8%). In the group of severe course there were 65.6% men. Control group contained slightly more women (58.1%). However, all the differences in respect of the sex between groups were statistically insignificant (Table 1).

Table 3. Clinical course of TBE – number of cases examined in the study

	<i>Encephalitis</i>	<i>Encephalomeningitis</i>	<i>Meningitis</i>
Number	5	27	19
%	9.8%	52.9%	37.3%

## RESULTS

There were significantly more people suffering from depression among TBE patients (and significantly less of those not receiving this diagnosis) (Fig. 3). In the group of TBE patients (Total S+M) there was also a significant positive correlation ( $p < 0.05$ ) between age and general results obtained in the Hamilton Depression Rating Scale. For example among the patients above 40 years of age there were significantly more cases of depression (moderate and severe) than in younger age groups. However, a similar, but weaker interdependence existed in the control group. There were no significant correlations between depression and other demographic data.



\* Numbers marked red indicate statistically significant difference with the control group

Fig. 3. Results in the Hamilton Depression Rating Scale

There were also no significant correlations between depression and severity of the clinical course of TBE. Among the most frequent depressive symptoms in HDRS were: • depressed mood – 22 (43.1%) • insomnia initial – 30 (58.8%) • insomnia middle – 29 (56.9%) • insomnia late – 28 (54.9%) • difficulties at work and loss of interest – 35 (68.6%) • anxiety – psychic symptoms 16 (31.4%) • anxiety – somatic symptoms 17 (33.3%) • loss of weight – 17 (33.3%).

In relation with the diagnosed psychic disorders some patients received psychotropic therapy (Table 4). Antidepressants were used most frequently. Over 21% of patients received this kind of medication, while anxiolytics were administered to 19.6% subjects (Table 4).

Table 4. Psychotropic medication used with examined TBE patients

		Severe course (S) N=32	Mild course (M) N=19	Total (S+M) N=51
Antidepressants	N	8	3	11
	%	25.0%	15.8%	21.6%
Nootropic drugs	N	4	7	11
	%	12.5%	36.8%	21.6%
Anxiolytics	N	6	4	10
	%	18.8%	21.0%	19.6%
Sleeping drugs	N	4	3	7
	%	12.5%	15.8%	13.7%

## DISCUSSION

Among the examined sample of the patients 60.8% were diagnosed with psychiatric disorders. The percentage of such diagnoses was slightly higher (62.5%) in the severe course of TBE group. In the acute phase of TBE, the most frequent diagnosis were mild cognitive disorders – 35.3%.

Patients included in the study – before the onset of TBE – had not displayed any signs of psychiatric disorders nor received any psychiatric treatment. Their depressive disorders were linked directly to an organic factor. Accordingly we have numbered them to an organic mood disorders – 21.6% patients received this diagnosis. Most of them were from the acute clinical course group (25.0%). Dementia was found in 3.9% subjects. As those patients had not been psychiatrically examined before, it is difficult to estimate if (and how much) their cognitive functions had been impaired before getting infected with TBE.

It is worth to note diagnostic difficulties in cases of coexistence of depression and cognitive impairment. In depression we can often observe a decrease of intellectual ability having functional character that is secondary in relation to mood disorders. It is sometimes called pseudodementia. Depression not only can imitate dementia, but also often co-appears with cognitive disorders. In such situations it makes them appear more escalated. Some authors note that depression often precedes onset of dementia. Special diagnostic difficulties can arise in cases with organic reason of mood disorders when organic factor can simultaneously contribute to appearance of cognitive impairment (5, 6, 9).

### CONCLUSIONS

The obtained results demonstrate that depressive symptoms are important elements in the clinical picture of the acute phase of tick-borne encephalitis. Because nobody of the examined group had psychiatric diagnosis before TBE, we treated all observed psychiatric disorders in TBE patients as organic disorders. Organic damage caused by TBE virus, in the central nervous system seems to be responsible for these disorders. Every patient should receive professional psychiatric care in acute phase of TBE. Early use of psychotropic treatment (specially antidepressants) could essentially improve patients' psychic state and their quality of life. Further investigations are suggested, aiming to identify risk factors for the onset of depression in TBE as well as their relationship with the clinical course and with neuroinfection's biological elements.

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#### SUMMARY

Tick-borne encephalitis (TBE) is a neuroinfectious disease caused by TBE virus (TBEV). North-east of Poland is an endemic area of the disease. There are psychic disorders in the course of TBE. Patients in acute phase of TBE are seldom examined and treated by psychiatrists. The objective of the current presentation is evaluating the frequency of depressive symptoms in an acute phase of tick-borne encephalitis and possible correlation with the clinical course of the disease and demographic data. Subjects were examined during the first week of hospitalization in infectious ward. There were 51 subjects – 31 men and 20 women; ages: 21 to 74 (average 44.8). Thirty-one control healthy subjects were also included in the study. They were evaluated according to the Hamilton Depression Rating Scale (HDRS). Results showed significantly more people suffering from depression among TBE patients than in the control group. In the group of TBE patients and in the controlled there was a significant positive correlation ( $p < 0.05$ ) between age and general results obtained in the Hamilton Depression Rating Scale. There were also no significant correlations between depression and severity of the clinical course of TBE. Depressive symptoms are very common among TBE patients. Every patient should receive professional psychiatric care in acute phase of TBE. Early use of psychotropic treatment (specially antidepressants) could essentially improve patients' psychic state and their quality of life.

#### Objawy depresyjne w ostrym okresie kleszczowego zapalenia mózgu

Kleszczowe zapalenie mózgu jest neuroinfekcją wywoływaną przez wirusa kleszczowego zapalenia mózgu. Region północno-wschodni Polski jest obszarem endemicznym choroby. W przebiegu kzm występują zaburzenia psychiczne. Pacjenci w ostrym okresie kzm są rzadko badani i leczeni przez psychiatrów. Celem badania była ocena częstości występowania objawów depresyjnych w ostrym okresie kleszczowego zapalenia mózgu (kzm) i ocena ich zależności od ciężkości przebiegu klinicznego choroby i cech demograficznych. Badaniem objęto pacjentów z kzm w pierwszym tygodniu hospitalizacji w oddziale zakaźnym. Zbadano 51 osób: 31 mężczyzn i 20 kobiet w wieku od 21 do 74 lat (średnio 44.8). Grupę kontrolną stanowiło 31 zdrowych osób. Do oceny stanu psychicznego badanych zastosowano Skalę Depresji wg Hamiltona (HDRS). Wyniki wskazują, że u pacjentów z kzm istotnie częściej niż w grupie kontrolnej występowały objawy depresyjne. W grupie pacjentów z kzm jak i w grupie kontrolnej stwierdzono dodatnią korelację między wynikami uzyskanymi w Skali Depresji wg Hamiltona a wiekiem badanych osób. Nie stwierdzono istotnych statystycznie związków między występowaniem depresji a ciężkością przebiegu klinicznego kzm. Każdy pacjent w ostrej fazie kzm powinien uzyskać opiekę psychiatryczną. Wczesne zastosowanie leczenia psychotropowego (szczególnie leków przeciwdepresyjnych) mogłoby wpłynąć na poprawę stanu psychicznego pacjentów i poprawę jakości ich życia.