CLINICAL NEUROLOGICAL CHARACTERISTIC OF PATIENTS WITH MULTIPLE SCLEROSIS IN VIEW OF THE SEVERITY CONDITION

Pazhigova Z.B., Karpova E.N., Karpov A.S., Gandilan K.S.

Stavropol State Medical University Ministry of Health of the Russian Federation, Stavropol, e-mail: karpov25@rambler.ru

79 patients were examined (57 women and 22 men) at the average age of 34,31 ± 4,7 years old with a diagnosis of multiple sclerosis (MS). The study enabled to record the patients with recurrent MS progression dominating in the group of interest. In that MS form, patients with the clinical score of mild disability dominated on the EDSS scale. The number of patients with medium severity prevailed in the secondary progressive MS course with a 3-fold increase, and increased by 5,5 times in the severe MS course. In all groups, coordination and movement disorders had the highest incidence of neurological symptoms with highest intensity in the severe group. More than 90% of patients with mild severity had only disorders in the reflex sphere. The incidence of pelvic disorders increased as the conditions deteriorated with maximum dysfunction in patients with severe MS. Basically, all patients with different MS forms had psychopathological disorders with different severity, which incidence was highest in Group 3 (86,4%). A similar trend was recorded in the intensity scale of cerebral function disorders, where cognitive impairments were recorded in more than 65% of cases with their increase as the demyelination processes of the nervous system impaired, being one of the most important clinical manifestations of chronic demyelinated process in MS.

Keywords: multiple sclerosis, demyelination, disability

We have to admit that multiple sclerosis (MS) is a problem that has not been solved so far [2, 3, 6, 7, 9, 10, 11]. On the other hand, the today's day brings us hope for a possible breakthrough in treatment and early diagnosis of the disease [5, 8, 9, 10]. The MS prevalence is large enough [1, 4, 7]. The MS clinical course may be caused by different diseases, resulting the patient's condition in different disability states in most cases. In this regard, understanding potential neurological disorders in different disease courses is supposed to enable to avoid MS fatal consequences in a lot of cases, where early detection of the disease will be especially important.

The research is aimed to: study the clinical and neurological characteristics in patients with multiple sclerosis taking into account the disease severity.

Materials and methods of research

The study included 79 patients (57 women and 22 men) at the average age of 34,31 ± 4,7 years old with a diagnosis of multiple sclerosis, which was previously confirmed in the clinics of Moscow, Rostov-on-Don, Stavropol. They were observed in the clinics of the Chechen Republic at the date of clinical examination. The following clinical forms of the disease have been identified in the total number of patients: recurrent (RMS) – 56,9%, secondary progressive (SPMS) – 18,9%, and primary progressive (PPMS) – 24,2%. The distribution by age and type of MS course is given in Table. The average duration of the disease, taking into account the clinical form was as follows: RMS – 3,3 ± 2,2 years, SPMS – 9,1 ± 4,2 years, PPMS – 2,7 ± 1,9 years. The assessment of functional system impairment was carried out according to the J.F. Kurtzke scale (1983). The assessment of the disability status in patients with MS was carried out using the Kurtzke Expanded Disability Status Scale (EDSS) (J.F. Kurtzke). The MS mild severity was between 1 and 3 (2,39 ± 0,1), medium severity – between 4 and 6 (5,3 ± 1,1), heavy severity – from 7 points and higher (7,6 ± 1,4). In this regard, all patients were divided into 2 groups according to the severity. All patients underwent the brain MRI in T1, T2 and FLA IR modes (MR Signa HD×3.0 Tc [GE]).

Most of the studied patients were in the condition of relative remission of the disease. The inclusion criterion was the patient's diagnosis of "multiple sclerosis" with available features of the disease course, such as incidence of clinically distinct acute conditions and rate of increased neurological deficit, lack of autoimmune diseases. The people with MS and progressive acute condition of the disease, history of craniocerebral injuries, and neuroinfections were excluded from the number of studied patients.

Distribution of patients by age and type of multiple sclerosis course

Age (s)	RMS	SPMS	PPMS	Total
18–29	32 (40,5%)	4 (5,1%)	3 (3,8%)	39 (49,4%)
30–39	9 (11,4%)	8 (10,1%)	6 (7,6%)	23 (29,1%)
40–50	4 (5,0%)	3 (3,8%)	10 (12,7%)	17 (21,5%)
total	45 (56,9%)	15 (18,9%)	19 (24,2%)	79 (100%)

The calculation of arithmetic means (M), their errors (m), and standard deviation (δ) were used for the evaluation of the results. The significance of mean differences was determined using the Student's t test (t).

Results of research and their discussion

As a result of clinical examination 29 (36,7 %) patients with MS had a mild severity (Group 1). In all cases, the patients in that group had RMS. In 15 (51,7 %) patients the severity of neurological disorders on the EDSS scale was 2,0 points, in 11 (37,9 %) patients – 2,5 points, 3 (10,4 %) patients – 3 points. In the neurological status, the pyramid insufficiency such as pararеflexia and available paresis with different severity prevailed in those patients, where the reduction in muscle strength varied between 1,5 and 3 points. In 26 (89,7 %) cases we recorded anisoreflexia along with loss of abdominal reflexes and pathological (feet, hand) reflexes. In 7 (24,1 %) cases the motor disturbances had different characteristics: monoparesis – in 2 (6,9 %) patients, paraparesis – in 5 (17,2 %) patients. The total clinical score reflecting the severity of motor impairments on the functional scale (FS 1) was 1,4 ± 0,8.

In 23 (79,3 %) patients, pathological cerebellar changes with mild coordination disorders like mild ataxy, intentional tremor, dysmetria were identified when performing coordination tests. The total clinical score reflecting the severity of coordination impairments on the functional scale (FS 2) was 1,41 ± 0,9.

17 (58,6 %) patients had a combination of pyramid cerebellar impairments associated with hypoesthesia, presence of paresthesia or feeling of numbness in one or both extremities. On objective examination, "mosaic" areas of superficial sensitivity infringements have been identified. The impaired proprioceptive sensitivity was recorded in 5 (17,2 %) patients. In this case, the total clinical score, reflecting the severity of sensory disorders on the functional scale (FS4) was 1,1 ± 0,8.

The impairments in the pelvic organ function according to the type of urgency combined with the difficulty in urinary bladder emptying (detrusor-sphincter dyssynergia) were identified in 6 (20,7 %) patients and were periodic. It corresponded to a total clinical score on the scale (FS 5) 0,41 ± 0,9.

In 13 (44,8 %) patients, the impairments in the stem structure were identified. Thus, in 2 (6,9 %) cases the impairments in the oculomotor nerve were recorded, in 5 (17,2 %) cases the failure of the facial nerve in the central type, and in 4 (13,8 %) patients the tongue deviation were recorded. The total clinical score on the scale (FS 3), reflecting the degree of stem dysfunction made 1,68 ± 1,5.

It should be noted that the manifestations associated with the impaired background mood were recorded in that group. Thus, in 16 (55,2 %) patients mild impairments of background mood were identified, which could not affect the EDSS scale score. In 12 (41,4 %) cases, patients reported rapid fatigability, defective memory, impaired concentration, attention, rigid thinking. The total clinical score (FS 7), which reflects the impairment degree of mnestic functions, made 1,11 ± 0,8.

In 28 (63,3 %) patients with MS, the medium severity was recorded (Group 2). The clinical manifestations of MS with medium severity were characterized by the present persistent focal neurologic deficit. In this group, 16 (57,1 %) patients had a recurrent clinical course, 8 (28,6 %) patients – secondary progressive, and 4 (14,3 %) patients – primary progressive clinical course. In all cases, the pyramid cerebellar syndrome with different severity was identified in Group 2 compared to Group 1, where disturbance of the pyramid and cerebellar system was recorded in 24,1 % and 79,3 %, accordingly.

The pyramid disturbances were identified in 19 (67,9 %) patients such as moderate or marked paresis. Monoparesis was identified in 4 (14,3 %) patients, paraparesis – in 6 (21,4 %) patients, hemiparesis – in 4 (14,3 %) patients, tetraparesis – in 5 (17,9 %) patients. The total clinical score reflecting the severity of motor impairment on the functional scale (FS 1) made 3,7 ± 0,5, which is 2,64 times more compared to Group 1. The intensity of stato-coordination disorders on the functional scale (FS 2) and the total clinical score was 1,99 ± 0,9, which is 1,38 times more than in Group 1. 15 (53,6 %) patients had sensory disorders such as reduction in deep sensibility, which were clinically manifested in the form of sensitive ataxia that is 36,4 % more than in Group 1.

The total clinical score reflecting the severity of sensory disorders in the functional scale (FS 4) was 2,4 ± 0,7, which exceeded twofold the total clinical score in Group 1.

The impaired function of pelvic organs was recorded in 12 (42,9 %) patients, which is 22.2 % more compared to Group 1. The total clinical score on the functional scale (FS 5) made 1,05 ± 1,3, which is 2,56 times more compared to Group 1.

In 8 (28,6 %) cases oculomotor apraxia was diagnosed. Nystagmus was detected in 15 (53,6 %) cases, which exceeded the manifestation data twofold compared to Group 1. The total clinical score on this scale (FS 3), impaired stem functions made 2,2 ± 0,8, which is 76 % more compared to Group 1.

The psychopathologic changes were detected in 18 (64,3 %) cases, and were manifested in the form of mood lability, while 8 patients (28,6 %) had a reduction in cognitive and mnestic processes, as well as reduced attention concentration. The total clinical score reflecting the impairment of cerebral functions (FS 7) was 1,41 ± 0,7, which is 1,41 times more compared to Group 1.

In 22 (27.8 %) cases we recorded severe MS (Group 3), including secondary progressive MS in 7 (31,8 %) patients and primary progressive clinical course in 15 (68,2 %) patients. The clinical presentation of severe MS included the presence of gross significant focal neurologic impairment. Motor disturbances dominated in the neurological status, which formed the basis of impaired pyramid and cerebellar connections and structures identified in each case (100 %). The impaired function of pyramid system included hypertonia, hyperreflexia, and pathological reflexes. Manifestation of tetraparesis, paraplegia or hemiplegia with different intensity was usually combined with foot or knee-cap clonus. The total clinical score reflecting the intensity of motor disturbances in the functional scale (FS 1) made 4,4 ± 0,8, which is 3,14 times more compared to Group 1, and 1,19 times more in Group 2.

6 (27,3 %) patients had a coordinatory symptomatology such as marked intentional tremor, significant discoordinated impairments that reduced the quality of patient's life a lot. 4 (18,2 %) patients reported head tremor when getting up out of bed. In seven (31,8 %) cases tremor was combined with postural tremor. The dysfunction in the cerebellar system was manifested in the form of hypermetria, adiadochocinesia, Homs symptom, scanning speech. The total clinical score on the functional scale (FS 2) made 2,4 ± 1,2, which is 1,7 times more compared to Group 1, and 1,21 times more compared to Group 2. It should be noted that the objective assessment of cerebellar dysfunction was very complicated due to the presence of extremity paresis with more than 3 points in a number of patients. This fact explains why patients in Group 3 did not have a significant increase in the clinical score of the cerebellar function assessment.

The total clinical score reflecting the intensity of stem functions (FS 3) made 2,4 ± 0,6 and was reliably similar to the value of Group 2. The sensorium was presented by prolapse of proprioceptive sense, which was recorded in 7 (31,8 %) patients without any significant differences in percentage compared to Group 2. The total clinical score reflecting the severity of sensory disorders on the scale (FS 4) made 2,4 ± 0,6 and did not have any significant differences compared to Group 2.

The impaired function of pelvic organs was identified in 17 (77.3 %) cases, which is 34.4 % more compared to Group 2. The total clinical score was (FS 5) 1,6 ± 0,7, which is 3,9 times more compared to Group 1, and 1,5 times more compared to Group 2. The psychopathological changes were recorded in 19 (86,4 %) patients, such as euphory, judgement decline to their condition, apathy or different depression. The total clinical score reflecting the degree of impaired higher cortical functions (FS 7) made 1,7 ± 0,9, which is 1,53 times more compared to Group 1, and 1,21 more compared to Group 2.

Conclusion

Thus, the study carried out in the Chechen Republic enabled to determine that the patients with the recurrent MS progress dominated in the group of interest. In that MS form, patients with the clinical score of mild disability dominated on the EDSS scale.

The number of patients with medium severity prevailed in the secondary progressive MS course with a 3-fold increase, and the severe MS course increased by 5,5 times. In all groups, coordination and movement

disorders had the highest incidence of neurological symptoms with highest intensity in the severe group. More than 90 % of patients with mild severity had only disorders in the reflex sphere. The predominance of sensory disorders was not found in any group. The incidence of pelvic disorders was increasing as the conditions deteriorated with maximum dysfunction in patients with severe MS.

Basically, all patients with different MS forms had psychopathological disorders with different severity, which incidence was highest in Group 3 (86,4 %). A similar trend was recorded in the severity scale of cerebral function disorders, where cognitive impairments were recorded in more than 65 % of cases with their increase as the nervous system demyelination processes impaired, being one of the most important clinical manifestations of chronic demyelinating process in MS.

References

1. Alifirova V.M., Titova M.A. Clinical characteristics of multiple sclerosis in the Tomsk region. Neurology, neuropsychiatry // Psychosomatics. – 2012. – № 2. – P. 50–51.

2. Burnusus N.I., Karpov S.M., Shevchenko P.P. Neurotransmitters in the pathogenesis of multiple sclerosis // International Journal of Applied and Basic Research. – 2012. – № 1. – P. 20–21.

3. Karpov S.M., Baturin V.A., Telbuh V.P., Frantseva A.P., Belyakov N.A., Ciechanowski L.V. Autoantibodies to myelin basic protein and its role in demyelinating processes // Clinical Neurology. – 2013. – № 3. – P. 16–19.

4. Karpov S.M., Pazhigova Z.B., Karpova E.N. Evoked visual potentials in the study of the visual analyzer in patients with multiple sclerosis. Neurology, neuropsychiatry // Psychosomatics. – 2014. – № 3. – P. 27–31.

5. Pazhigova Z.B., Karpov S.M., Shevchenko P.P., Burnusus N.I. The prevalence of multiple sclerosis in the world (review article) // International Journal of Experimental Education. – 2014. – № 1 (2). – P. 78–82.

6. Rasseyanny sclerosis: diagnosis, treatment, specialists. Ed. I.D. Carpenter, A.N. Boyko. – St. Petersburg: St. Petersburg-ELBI, 2008. – 320 p.

7. Shmidt T.E., Yahno N.N. Multiple sclerosis: a guide for physicians. – 3rd ed. – M.: MEDpress-inform, 2012. – 272 p.

8. O'Connor P., Confavreux C., Comi G., et al. Oral teriflunomide in patients with relapsing MS: baseline clinical features of patients in the TEMSO phase III trial // Multiple sclerosis. – 2008. – Suppl. 1. – P. 85.

9. Hamdard A.A., Mamedova A.E., Shevchenko P.P., Karpov S.M. Hyperthermia-syndrome as the debut of the development of multiple sclerosis // European Journal of Biomedical and Life Sciences. – 2015. – № 1. – P. 10–11.

10. Karpov S.M., Padgigova Z.B., Karpov A.S., Vishlova I.A. Invoked visual potentials in the study of the visual analyzer in patients with diffuse sclerosis // Medical Bulletin of the North Caucasus. – 2015. – T. 10. – № 2 (38). – P. 155–159.

11. Karpov S., Vyshlova I., Azoidis I., Karpov A. Visual evoked potentials in the study of the visual system in patients with multiple sclerosis // European Journal of Neurology. – 2016. – 23 (Suppl.). – P. 601–879. DOI:10.13140/RG.2.1.4743.3844.

16. Polman C.H., Reingold S.C., Edan G. et al. Diagnostic criteria for multiple sclerosis: 2005 revisions to the McDonald criteria // Ann Neurol. – 2005. – № 56(6). – P. 840–64.