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## ORIGINAL ARTICLE

# POSTSTROKE FATIGUE AND MOTOR RECOVERY AFTER ISCHEMIC STROKE

DOI: 10.36740/WLek202205218

**Oleksandr Pulyk, Myroslava Hyryavets, Taras Studeniak**

UZHGOROD NATIONAL UNIVERSITY, UZHGOROD, UKRAINE

## ABSTRACT

**The aim:** To determine the effect of post-stroke fatigue on the motor recovery after ischemic stroke.

**Materials and methods:** The study was conducted on the basis of the department of vascular neurology of the Uzhhorod Central City Clinical Hospital during the six months of 2020. We examined 92 patients who suffered a hemispheric ischemic stroke in the early recovery period.

**Results:** At the end of therapy, improvement of motor function was observed in patients in both groups. We received a significant improvement ( $p < 0,05$ ) in the patients of the main group on the SSS and 6-point scale of muscle strength. We found that a high score on the FAS showed a significant correlation with the worst dynamics of recovery on the NIHSS, Scandinavian scale of stroke and 6-point scale of muscle strength ( $p < 0,05$ ).

**Conclusions:** According to the results of the study, it was found that the presence of post-stroke fatigue significantly impairs the improvement of motor functions in patients with hemispheric ischemic stroke, patients who had more severe fatigue had worse recovery rates after stroke.

**KEY WORDS:** ischemic stroke, paresis, post-stroke fatigue

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## INTRODUCTION

Poststroke fatigue is a common symptom in patients. A systematic review and meta-analysis found marked variabilities in estimates of poststroke-fatigue prevalence, ranging from 25% to 85%[1]. Poststroke fatigue is generally qualitatively different from fatigue experienced before stroke, as the former can be exacerbated by stress and physical exercise, and generally responds well to rest and adequate sleep[2,3]. Prospective study has reported that, at 6 months after stroke, approximately half (51%) of all patients complained of fatigue[4]. Regarding the duration of fatigue after stroke, acute fatigue can last up to 6 months, whereas the chronic type can persist in 40% of patients after 2 years[2]. Several studies have reported poststroke fatigue to be an independent predictor of shorter survival, institutionalization, poorer functional outcome, and greater dependency for activities of daily living along with instrumental activities of daily living[2]. Moreover, in young patients, poststroke fatigue has been reported to be a determinant to resuming work, independent of physical disability or cognitive deficit[5]. In addition, in patients aged 18 to 50 years, poststroke fatigue has been associated with a poor functional outcome, as assessed by the modified Rankin Scale (odds ratio, 4.0; 95% CI, 1.6–9.6)[6].

## THE AIM

The aim was to determine the effect of post-stroke fatigue on the motor recovery after ischemic stroke.

## MATERIALS AND METHODS

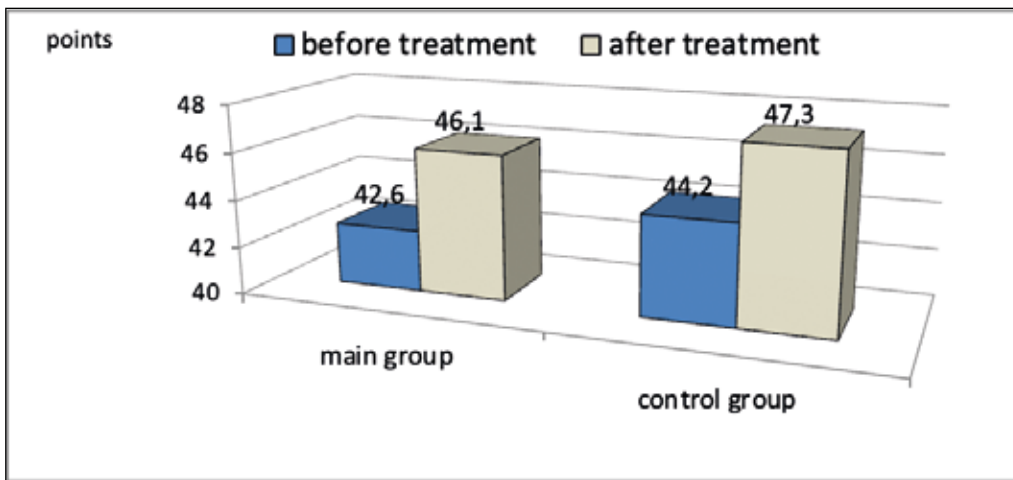
The study was conducted on the basis of the department of vascular neurology of the Uzhhorod Central City Clinical Hospital during the six months of 2020. We examined 92 patients who suffered a hemispheric ischemic stroke in the early recovery period. The criteria for inclusion in the study were: age from 40 to 74 years, verified diagnosis of ischemic stroke of hemisphere localization, absence of severe somatic diseases, poststroke fatigue (the average score on the FAS more than 22 points). General clinical examination, neuroimaging examination (computed tomography, magnetic resonance imaging of the brain), neuropsychological examination using a battery of tests: the Scandinavian scale of stroke (SSS), NIHSS, Scale for assessing muscle strength (Peak L. M. And Braddom R, 1996), the Ashworth scale for assessing the tone of muscles and the Fatigue Assessment Scale (FAS) were used.

Rehabilitation was carried out according to the protocol in the early recovery period during the month with the use of physical therapy, occupational therapy, constraint-induced movement therapy, physiotherapy treatments.

Statistical calculations are performed using the standard statistical package "Microsoft Excel 2010". Differences at  $p < 0,05$  (95% significance level) and at  $p < 0,01$  (99% significance level) were considered statistically significant.

## RESULTS

We examined 92 patients who suffered a hemispheric ischemic stroke in the early recovery period (the first 3



**Fig. 1.** Dynamics of the functional state of patients in Scandinavian scale stroke

**Table I.** The effect of poststroke fatigue on motor recovery after ischemic stroke

Scales	FAS	
	the main group	the control group
Scandinavian scale of stroke	r=0,51, p=0,0018	r=0,48, p=0,0016
NIHSS	r=0,38, p=0,0095	r=0,43, p=0,0018
6-point scale of muscle strength, hand	r=-0,43, p=0,0017	r=0,39, p=0,0014
6-point scale of muscle strength, leg	r=0,34, p=0,005	r=0,38, p=0,004
Ashworth's scale, hand	r=0,13, p=0,22	r=0,22, p=0,13
Ashworth's scale, leg	r=-0,10, p=0,49	r=0,21, p=0,14

months). The average age of patients was  $59,1 \pm 1,1$  years. Analyzing the location of brain damage, it was found that 49 patients (54%) had an ischemic stroke of the left hemisphere, and 43 patients (46%) - right hemisphere. The patients were randomly divided into two groups of 46 patients. In the main group physical therapy, occupational therapy, constraint-induced movement therapy, physiotherapy treatments were used, in the control group we used the same methods, except constraint-induced movement therapy.

Before the start of rehabilitation therapy, the mean NIHSS score in patients of the first group was  $13,3 \pm 2,8$  points, in patients of the control group -  $12,5 \pm 3,7$  points. The Scandinavian scale of stroke in patients in the main group had an average score of  $42,6 \pm 0,8$  at baseline and  $44,2 \pm 0,7$  points in the control group( fig. 1 ).

According to the 6-point scale of muscle strength, for the hand the average score for patients in the first group was  $2,9 \pm 0,7$  points, for patients in the control group  $3,0 \pm 0,8$  points. According to Ashworth's scale, the muscle tone in the paretic limb of the patients in the main group before the study was  $2,4 \pm 0,8$  points, and in the control group patients -  $2,2 \pm 0,6$  points. According to the the Fatigue Assessment Scale average score for patients in the first

group was  $29,1 \pm 3,7$  points, in the control group -  $28,2 \pm 2,9$  points.

At the end of therapy, improvement of motor function was observed in patients in both groups. We received a significant improvement( $p < 0,05$ ) in the patients of the main group on the SSS and 6-point scale of muscle strength.

We found that a high score on the FAS showed a significant correlation with the worst dynamics of recovery on the NIHSS, Scandinavian scale of stroke and 6-point scale of muscle strength ( $p < 0,05$ )( Table I)

## DISCUSSION

The current study was aimed to determine the effect of post-stroke fatigue on the motor recovery after ischemic stroke. Poststroke fatigue is a common symptom that can have debilitating effects. Fatigue is defined as a feeling of lack of energy, weariness, and aversion to effort [1]. Fatigue is common after stroke with a prevalence ranging from 16% to 72% [1-2] depending on the population studied and whether patients with mood disorders are included or excluded. Moreover, up to 40% of stroke survivors report it as their worst or one of their worst symptoms[1-2]. The

chronic type can persist in 40% of patients after 2 years [2]. Our study was conducted in patients who suffered a hemispheric ischemic stroke in the early recovery period during the six months of 2020. To detect fatigue in patients we used the FAS – a scale to assess post-stroke fatigue. This scale is the most frequently used scale in patient with stroke[3]. Approximately half (51%) of all patients complained of fatigue at 6 months after stroke[4]. Poststroke fatigue to be an independent predictor of poorer functional outcome and greater dependency for activities of daily living. In our study according to the the Fatigue Assessment Scale average score for patients in the first group was  $29,1 \pm 3.7$  points, in the control group -  $28,2 \pm 2.9$  points. To detect disorders of the nervous system we used the Scandinavian scale of stroke(SSS), NIHSS, Scale for assessing muscle strength (Peak L. M. And Braddom R, 1996), the Ashworth scale. Before the start of rehabilitation therapy, the mean NIHSS score in patients of the first group was  $13.3 \pm 2.8$  points, in patients of the control group -  $12.5 \pm 3.7$  points. According to the 6-point scale of muscle strength, for the hand the average score for patients in the first group was  $2.9 \pm 0.7$  points, for patients in the control group  $3.0 \pm 0.8$  points. Rehabilitation was carried out according to the protocol in the early recovery period during the month with the use of physical therapy, occupational therapy, constraint-induced movement therapy, physiotherapy treatments. At the end of therapy, improvement of motor function was observed in patients in both groups. We received a significant improvement( $p < 0,05$ ) in the patients of the main group on the SSS and 6-point scale of muscle strength. A number of studies suggest that in patients poststroke fatigue to be a determinant to resuming work, independent of physical disability or cognitive deficit [2-7]. Our study also showed that the patients who had more severe fatigue had worse recovery rates after stroke.

## CONCLUSIONS

According to the results of the study, it was found that the presence of post-stroke fatigue significantly impairs the improvement of motor functions in patients with hemispheric ischemic stroke, patients who had more severe fatigue had worse recovery rates after stroke.

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## ORCID and contributionship:

Oleksandr Pulyk: 0000-0002-8717-047X<sup>A-F</sup>

Myroslava Hyryavets: 0000-0001-8419-0590<sup>A-F</sup>

Taras Studeniak: 0000-0001-6564-1552<sup>A-F</sup>

## Conflict of interest:

*The Authors declare no conflict of interest.*

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## CORRESPONDING AUTHOR

**Oleksandr Pulyk**

Uzhhorod National University

3 Narodna Square, 88000 Uzhhorod, Ukraine

tel: +380506113041

e-mail: apulyk@gmail.com

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