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Clinimetric Evaluation of Functional Capacity and Quality of Life of Stroke Patients — Study Review

Klinimetryczna ocena wydolności funkcjonalnej i jakości życia pacjentów z udarem mózgu — przegląd badań

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Abstract

Stroke is the second most common cause of death in the world after ischemic heart disease and is often associated with various long-term physical and neuropsychological consequences. Because stroke is one of the most common causes of disability, interest from researchers around the world is focused on assessing the functional capacity and quality of life among these patients. Many assessment tools, covering various functional areas, are available to clinicians and researchers working with people who have had a stroke. The presented analysis of research results of various authors indicates that stroke significantly affects physical and mental performance. The change in functional abilities, mood disorders, cognitive impairment and reduced social interactions are often observed in these patients. In stroke patients, the simultaneous use of several different scales for assessing patients' conditions creates the possibility of correct qualification for rehabilitation, long-term forecasting, estimation of needs for possible care and an objective, more detailed analysis of the obtained results and changes occurring during the treatment process. (JNPN 2019;8(2):86–90)

Key Words: stroke, quality of life, functional capacity, clinimetric evaluation

Streszczenie

Udar mózgu jest drugą najczęstszą, zaraz po chorobach niedokrwiennych serca, przyczyną zgonów na świecie i często wiąże się z różnymi, długoterminowymi konsekwencjami fizycznymi i neuropsychologicznymi. W związku z tym, że udar mózgu stanowi jedną z najczęstszych przyczyn niepełnosprawności zainteresowanie badaczy z całego świata koncentruje się na ocenie wydolności funkcjonalnej i jakości życia wśród tych chorych. Wiele narzędzi oceny, obejmujących różne dziedziny funkcjonalne, jest dostępnych dla klinicystów i badaczy pracujących z osobami po udarze mózgu. Przedstawiona analiza wyników badań różnych autorów wskazuje, iż udar mózgu w znaczącym stopniu wpływa na wydolność fizyczną oraz psychiczną. Zmiana zdolności funkcjonalnych, zaburzenia nastroju, zaburzenia poznawcze i zmniejszone interakcje społeczne są często obserwowane u tych chorych. U pacjentów po udarze mózgu jednoczesne stosowanie kilku różnych skal oceny stanu chorych, stwarza możliwość prawidłowej kwalifikacji do rehabilitacji, prognozowania długoterminowego, oszacowania potrzeb dla ewentualnej opieki oraz obiektywnej, bardziej szczegółowej analizy uzyskanych wyników i zmian zachodzących w przebiegu procesu leczenia. (PNN 2019;8(2):86–90)

Słowa kluczowe: udar, jakość życia, ocena funkcjonalna, ocena klinimetryczna

Introduction

In the past decade, the definition of stroke has been updated and major advances have been made in treatment and prevention [1]. Stroke is not a disease

entity but a set of symptoms resulting from blood circulation disorders in the central nervous system. In connection with the significant progression of acute stroke treatment and the development of neuroimaging studies, American Heart Association (AHA)/American

Stroke Association (ASA) in 2013 proposed a new definition of ischemic stroke as an episode of sudden neurological disorders caused by focal ischemia of the brain, spinal cord or retina lasting more than 24 hours or corresponding to the morphological features of ischemia of the central nervous system (CNS). Thanks to this definition, ischemic stroke can also be diagnosed when clinical symptoms last less than 24 hours, but in neuroimaging studies, an ischemic focus has been demonstrated, as well as in patients after thrombolytic therapy, whose focal deficit symptoms have rapidly regressed. If the symptoms disappeared within 24 hours and the ischemic brain focus was not confirmed, the transient ischemic attack (TIA) is diagnosed [2]. The introduction of endovascular thrombectomy in large artery occlusions together with the administration of intravenous alteplase in acute ischemic strokes increases patient independence. The benefits of aspirin in preventing early recurrence of ischemic stroke are greater than previously thought. Other strategies for preventing stroke recurrence currently include direct oral anticoagulants [1].

Among the haemorrhage into the central nervous system are intracranial haemorrhage (intracerebral, subarachnoid and subdural), as well as bleeding into the spinal cord. Definitions and classifications of cerebral haemorrhage are not homogenous and differ from study to study. Mostly they are based on a radiological image divided into:

- haemorrhagic infarct — HI,
- parenchymal hematoma — PH [3].

The diagnosis of stroke includes, among others, clinical examination, clinimetric assessment, neuroimaging examination, Doppler examination of the carotid and vertebral arteries, etc. In order to improve the neurological assessment of a patient with stroke in clinical practice, clinimetric scales are used in everyday clinical practice, enabling rapid and standardized quantitative assessment of selected and the most important elements of the patient's neurological deficit. Stroke is the second most common cause of death in the world after ischemic heart disease and is often associated with various long-term physical and neuropsychological consequences. Due to the fact that stroke is one of the most common causes of disability, the interest of researchers from around the world is focused on assessing functional capacity and quality of life among these patients [4,5].

The aim of the study is to present the results of studies on the assessment of functional capacity and quality of life in patients after stroke.

Clinimetric Evaluation of Stroke Patients

As care for a stroke patient developed, there was a need for a reliable assessment of the effectiveness of interventions both at the level of a single patient who survived the stroke and in the context of clinical trials [5]. In the practice of neurological and neurosurgical nursing, the point scales are often used to measure the degree of damage (determining the neurological deficit), to perform the functional assessment of the patient (mainly to assess motor skills) and to perform the evaluation of the quality of life (psychosocial aspects of the disease). Current research in the field of neurological and neurosurgical nursing, assessing the patient's condition during the hospitalization period, tends to determine the patient's degree of self-care efficiency. This term is associated with functional capacity, identified with the ability to be independent and self-reliant in satisfying basic life needs [6]. Because stroke contributes to long-term disability, function measures are good for assessing results. Many assessment tools, covering various functional areas, are available to clinicians and researchers working with people who have had a stroke. The most commonly used tools unquestionably include: the National Institutes of Health Stroke Scale (NIHSS), the modified Rankin Scale (mRS), and the Barthel Index (BI), The Short Form 36 (SF-36) [5].

NIHSS is a 15-point scale that standardizes and quantifies basic neurological examination, paying particular attention to the aspects most relevant to stroke. The scale includes assessing consciousness, orientation, reaction to commands, associated gaze, field of view, paresis of the facial and limb muscles, sensation and language functions. The number of NIHSS scale points correlates with stroke severity and long-term prognosis. The NIHSS scale score ranges from 0 (normal) to 42 points [6,7].

BI is considered the “golden standard” for assessing patient disability. It assesses ten functional activities of daily life (activities of daily life — ADL), assessing the person depending on the self-reliance in each task. The assessment covers: feeding, bathing, grooming, dressing, toilet use, bowels and bladder control, transfers (bed to chair and back), mobility on level surfaces and stairs. Each activity has three possible answers: dependent, needs help, independent. In case of bowels and bladder control: incontinent, occasional accident, continent [7,8]. The results range from 0 to 100, and a higher result indicates greater independence. The scale is considered to be an important prognostic tool for stroke, in particular as a predictor of recovery, the level of care required and the duration of rehabilitation required after a stroke. BI results correlate with other stroke assessment scales, including other more detailed ADL scales [5].

Clinimetric assessment of the functional state of patients after stroke, including evaluation of distant effects of brain thrombolytic treatment is most often carried out using the modified Rankin Scale. The severity of the patients' functional deficit is directly proportional to the obtained score. Patients after stroke entirely (mRS 0 points) or to a large extent independent (mRS 1–2 points) after the acute phase of the disease (usually after 90 days) are considered to have achieved a beneficial therapeutic effect, while those requiring permanent supervision and care or deceased (mRS 5–6 points) are treated as those with adverse therapy results [9]. The modified Ranking scale has several main advantages, among others: it covers the entire range of functional results from the absence of symptoms to death, its categories are intuitive and easy to understand both by clinicians and patients. The importance of this scale was also confirmed by a strong correlation with stroke pathology measures (e.g. volume of cerebral infarction) and compatibility with other stroke scales, and its use has determined effective and ineffective acute stroke therapies in studies with appropriately selected sample size [10].

The SF-36 questionnaire is a general tool for measuring health-related quality of life. The questionnaire analyses the functional profile of health and well-being on an 8-point scale, as well as a psychometric assessment based on the respondent's physical and mental health. The quality of life based on physical health is measured by the following indicators: physical functioning, pain sensation, general health. Whereas the quality of life based on mental health is measured by: vitality of functioning in the society, emotional and mental state. SF-36 proved to be useful in studies of general and special populations, when comparing the relative weight of the disease and varied health services performed during various procedures [5,11].

Assessment of Functional Capacity

Diseases, often chronic ones, are one of the main causes of limited functional fitness and reduced quality of life. Every disease, especially one that causes a sudden or progressive limitation of self-service activities, is the reason for changes in the mental, social and spiritual sphere of a person. Stroke in most cases leads to a significant deterioration in physical fitness and quality of life. Stroke significantly affects physical and mental performance. Changes in functional abilities, mood disorders, cognitive impairment and reduced social interactions are often observed in these patients [5,11].

Due to the fact that stroke is one of the most common causes of disability, the interest of clinicians and researchers from around the world is focused on assessing

the functional capacity and quality of life among these patients. Studies carried out by Yeoh et al. [11] assessed quality of life (QoL) and functional capacity after 3 and 12 months after the onset of stroke. The majority of respondents were patients after the first episode (81.3%) of ischemic stroke (89.7%). The average NIHSS score after 3 months was 4.74 ($p=0.547$), in turn, after 12 months it was 4.57 ($p=0.626$). While on the mRS scale, the average score after 3 months was 2.65 ($p=0.151$), and after 12 months it was 2.61 ($p=0.792$). Moderately severe disability was observed in 130 (34.2%) respondents after 3 months and in 109 (33.8%) after 12 months. It was observed that among clinical measurements often performed in survivors of acute phase stroke, NIHSS and mRS were consistently independent QoL predictors after 3 and 12 months with comparable effect sizes. Consequently, this suggests their usefulness as an indicator of the quality of life of stroke patients. In studies carried out by Khalid et al. [12] the majority of patients were people with ischemic stroke (76.8%) with an age median of 59 (17) years. The time median since stroke was 13.83 months. According to the Modified Barthel Index for Functional Dependency, the minimum relationship was noted in 122 (34.8%) respondents, mild dependency in 76 (21.7%), moderate dependency in 70 (20%), severe dependency in 66 (18.8%), while total in 16 (4.5%). In turn, according to the Modified Rankin Score for Disability normal was noted in 3 (0.8%), no significant disability in 74 (21.1%), slight disability in 81 (23.1%), moderate disability in 66 (18.8%), moderately severe disability in 105 (30%), and severe disability in 21 (6%). The mean stroke severity score using the NIHSS scale was 3. Nearly 60% of respondents reported depression and 70% suffered from stroke complications. In research conducted by López Espuela et al. [13], long-term quality of life was assessed in 124 patients after stroke. The average age was 71.30 ± 11.99 years. Participants presented the most problems in the field of anxiety/depression (66.7%) and pain/discomfort (62.2%). Significant differences were found between gender and mobility and the performance of normal daily activities ($p=0.016$ and $p=0.005$, respectively). Women also achieved significantly worse QoL values than men ($p=0.013$). It was found that QoL is associated with a deficit in the performance of daily activities ($r=0.326$; $p=0.001$) and reduced mood ($r=-0.514$; $p<0.0001$). In turn, studies conducted by Chen et al. [14] evaluated the quality of life among 136 patients after a stroke and among 86 patients from the control group. All study participants completed the SF-36 questionnaire. In stroke patients, the SF-36 questionnaire was assessed repeatedly within 4 weeks after treatment. It was shown that patients after stroke had a lower assessment of their physical functionality, limitation of roles due to physical problems and general

health than people in the control group ($p < 0.001$). Also stroke patients defined their functioning in all mental dimensions much worse, including vitality, social functioning, role reduction caused by emotional problems ($p < 0.001$). After 4 weeks of treatment, it was found that in addition to pain, results in dimensions such as physical function, role reduction due to physical problems, and overall health increased significantly ($p < 0.001$). After treatment, the assessment of the physiological state of stroke patients increased, but the assessment of the mental state of the patients remained low. A multivariate logistic regression analysis was performed and the result showed that older age ($p = 0.04$) and loneliness ($p = 0.03$) significantly reduced the perceived quality of life. Seixas et al. [15] published interesting research results on the impact of short and long sleep on instrumental daily activities (IADL) of people after stroke. Nearly 87% of respondents rated their health from good to excellent, and 29.7% reported short sleep (≤ 6 hours). About 30% of people who survived a stroke reported IADL problems, and 34.4% who reported IADL problems were people sleeping for a short time. Among people who survived stroke, people sleeping for a long time more often than people with average sleep reported problems related to IADL (OR=1.97, 95% CI=1.71–2.26, $p < 0.001$). It was also shown that women who survived stroke, 57% more often suffer from IADL problems compared to their male counterparts. Studies conducted by Rutovic et al. [16] assessed the incidence of post-traumatic stress disorder (PTSD) and its correlation with stroke location, disability, age, gender and marital status. 85 patients after ischemic stroke were enrolled in the study, the age median was 64 years of age. The PTSD symptoms were assessed 3 months after stroke. A significant relationship was found between PTSD and the degree of disability ($p = 0.001$). The mRS median in patients with PTSD was noted at the level of 3 points, while in patients without PTSD it was 1 point. There was no significant relationship ($p = 0.78$) between stroke location and mRS. The incidence of depression, defined as HADS ≥ 11 , was 18.8%, while the incidence of anxiety in stroke patients was 10.6%. A significantly greater number of patients with PTSD had depression ($P < 0.001$) and anxiety ($P < 0.001$) compared to patients without PTSD. In turn, Lehnerer et al. [17] assessed their current offer of social support provided in long-term post-stroke care and the incidence of unmet social needs in the long term. They also determined whether these unmet needs were related to quality of life, caregiver burden, overall function and degree of disability, and stroke scale. It has been shown that respondents with a higher incidence of unmet social needs are characterized by a higher degree of disability — the mRS median 3 ($p = 0.018$). Further, these patients reported a more pronounced negative impact of stroke on their lives (Stroke Impact Scale, 21 vs. 34 median,

$p = 0.002$) and lower quality of life (EQ-5D-3 Lindex value, 0.70 vs. 0.89, $p = 0.02$).

Conclusions

Stroke in most cases leads to a significant deterioration in physical fitness and quality of life. The analysis of the condition of patients after stroke based on clinical observational methods is routinely used in clinical practice due to low costs, high availability and ease of use. The value of scales used in the assessment of patients' condition, including after a stroke, consists of such elements as simplicity of execution, construction transparency, reliability, homogeneity, repeatability, reliability, validity and sensitivity resulting from the possibility of translating the examined features into scoring, used further in the statistical significance analysis. In stroke patients, the simultaneous use of several different scales for assessing patients' condition creates the possibility of correct qualification for rehabilitation, long-term forecasting, estimation of needs for possible care and objective, more detailed analysis of obtained results and changes occurring during the treatment process.

Implications for Nursing Practice

Nursing care extended by the basic elements of rehabilitation from the first days after the onset of stroke contributes to the return of lost motor functions and prevents the occurrence of complications associated with long-term immobilization. In the practice of neurological and neurosurgical nursing, point scales are often used to measure the degree of damage (determining the neurological deficit), to assess the patient's functionality (mostly to assess motor skills) and to assess the quality of life (psychosocial aspects of the disease). The use of clinimetry in nursing practice is necessary to make the correct diagnosis and adjust the form of care.

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