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Mini Review

Current Situation of the Fugl-Meyer Scale for Evaluation of Upper Extremity Motor Function in Stroke Patients: A Short Review

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Abstract

The incidence of stroke is increasing yearly, and the remaining upper limb motor dysfunction after stroke is still problematic for rehabilitation treatment. Proper assessment tools help gain additional feedback on rehabilitation effectiveness. Although many methods exist for assessing upper extremity motor function after stroke in a clinical setting, the Fugl-Meyer Upper Extremity Motor Scale is the most valid and reliable. It has been translated into several languages for rehabilitation assessment in different countries. The Fugl-Meyer Upper Extremity Motor Scale is clinically used as the gold standard for evaluating upper limb motor function in post-stroke patients due to its high operability and low cost.

Keywords: Stroke; Fugl-Meyer scale; Upper extremity

Abbreviations: FMA-UE: Fugl-Meyer Assessment of the Upper Extremity Motor Function; MRS: Modified Rankin Scale; ARAT: Arm Movement Survey Test; WMFT: Wolf Motor Function Test; NIHSS: National Institutes of Health Stroke Scale; CAT-FM: Computer Adaptive Testing System; R-STREAM: Revised Stroke Rehabilitation Mobility Tool Assessment; A-FMAS: Automatic Fugl-Meyer Assessment System.

Introduction

Stroke is a common and frequently occurring disease of the nervous system, with the characteristics of high morbidity, high disability rate, high mortality rate, and high recurrence rate. Globally, more than 60% of stroke patients suffer from reduced or lost activities of daily living and quality of life due to upper limb motor dysfunction, of which 50%-70% are in the acute and subacute phases, and 40% are in the chronic phase [1-3]. In Italy, there are approximately 73,000 new stroke patients each year, of which 1/3 die and 2/3 suffer from severe motor dysfunction [4]. In China, nearly 70%-85% of new stroke patients develop hemiplegia, and about 1.6million people die each year due to stroke, with an average of 157 strokes and deaths per 100,000 people. It shows an increasing trend year by year [5].

Evaluated Current Situation for Upper Extremity Motor Function

At present, the assessment of upper extremity motor function in stroke patients is mainly based on scales, including the evaluation Fugl-Meyer of the Upper Extremity Motor Function (FMA-UE), Modified Rankin Scale (MRS), Arm Movement Survey Test (ARAT), Wolf Motor Function Test (WMFT), National Institutes of Health Stroke Scale (NIHSS) and Functional Level Scale (FAS) [2,4,6].

FMA-UE Scale Evaluates Situation in Stroke Patients

Many clinical studies have shown that [1,7-11] FMA-UE scale has high reliability and validity in assessing upper limb motor function in stroke patients, and the inter-rater and intra-rater reliability are high between 0.92-1.00 [1,9,12,13]. *Fu ST, et al.* [14] compared the effectiveness and sensitivity of the FMA-UE scale and WMFT through research. The results showed that the FMA-UE scale has higher sensitivity and validity in evaluating upper limb motor function in stroke patients. It can better reflect the effect of rehabilitation treatment. *Gladstone DJ* [15] also shows that the FMA-UE scale has higher reliability and validity than NIHSS. As a tool recommended by ICF to evaluate the motor function of upper limbs in stroke patients, the FMA-UE scale is of great significance for evaluating the validity and reliability of the original version of the translated FMA-UE scale [16,17].

FMA-UE Scale Evaluate Value in Stroke Patients

At present, Italian [16], Korean [18], Danish [19], Japan [20], and China [21] have all translated and evaluated the reliability of the original version of the FMA-UE scale. The evaluation results also have excellent reliability. Since the FMA-UE scale is time-consuming in the evaluation process and has high requirements for the assessees, the international evaluation of the FMA-UE scale is carried out by streamlining, modifying, readjusting, or using computers, etc., including facilitating the version of the FMA-UE scale, computer adaptive testing system (CAT-FM), revised stroke rehabilitation mobility tool assessment (R-STREAM), automatic FMA assessment system (A-FMAS) and wrist acceleration device system [2,6-8,12,14,22-25], to reduce the evaluation process and obtain higher evaluation reliability. However, due to the cumbersome operation and high price, the FMA-UE scale still needs to be used in clinical practice. The FMA-UE scale is the gold standard for assessing upper extremity motor function in stroke patients [26-29].

Conclusion

In summary, The FMA-UE scale is valid, reliable, easy to use, and inexpensive for assessing upper extremity motor function after stroke. The FMA-UE scale is clinically used as the gold standard for evaluating upper limb motor function in stroke patients.

Conflict of Interest

The authors declare no conflict of interest.

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