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Glasgow Coma Scale: Linguistic-Cultural Adaptation of the Russian Version

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INTRODUCTION Determination of the degree of depression of consciousness in patients with brain damage upon admission to the intensive care unit and intensive therapy is a primary task. In order to carry out a quick and at the same time sufficiently complete assessment of this kind, in 1974 neurosurgeons Graham Teasdale and Bryan Jennett from the University of Glasgow developed an algorithm consisting of a sequential series of tests in the form of eye opening, speech and motor responses, called Glasgow Coma Scale. This scale has received worldwide recognition and for many decades has been the main one for determining the state of consciousness in the most severe patients with brain damage. The absence of a validated version of this scale complicates its application in Russia, and the use of currently available versions that have not passed all the necessary stages of validation distorts the originally intended meaning of the scale and does not allow obtaining reliable clinical results when examining patients with acute impairment of consciousness.

AIM OF STUDY Development of the official Russian-language version of the Glasgow Coma Scale, taking into account linguistic and cultural characteristics (1st stage of the validation study).

MATERIAL AND METHODS The staff of Center for Validation of Health Status Questionnaires and Scales in Russia, Research Center of Neurology obtained consent from G. Teasdale to validate Glasgow Coma Scale in Russia. Two Russian-speaking professional certified translators in the field of medicine performed a direct translation of the original English-language scale, and a reverse translation was carried out by native speakers with a medical education. Pilot study was performed in 15 patients with acute impairment of consciousness, two meetings of the expert committee were held (before and after pilot study).

RESULTS Based on the results of the first meeting of the expert commission, a linguistic and cultural adaptation of the text of the scale was carried out. During the pilot testing of the researchers did not have difficulties in understanding and interpreting instructions. As a result, the second meeting of the expert commission was held and the final Russian-language version was approved, which is presented in this article and is available on the website of Center for Validation of Health Status Questionnaires and Scales in Russia, Research Center of Neurology.

CONCLUSION For the first time, the Russian language version of the Glasgow Coma Scale was officially presented and recommended for use both in clinical and research practice in Russia and other Russian speaking countries. The next publication will highlight the result of assessing the psychometric properties (reproducibility, inter-expert agreement and sensitivity) of the Russian-language version of the scale.

Keywords: Glasgow Coma Scale (GCS), acute impairment of consciousness, validation, neuroresuscitation

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Conflict of interest Authors declare lack of the conflicts of interests

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INTRODUCTION

Acute disturbances of consciousness, represented by stunning, stupor and coma, occur in 5% of patients upon admission to the intensive care units of city clinics. At the same time, a decrease in the level of wakefulness to coma is observed in 1% of cases [1]. There are metabolic (37–75% of cases) [2] and structural types of coma, as well as psychogenic unresponsiveness [3]. Structural coma can be of non-traumatic and traumatic origin (28–64%) [4]. The main reasons for the development of nontraumatic coma are acute cerebrovascular accident (6–54%), hypoxia (3–42%), infections (10–15% of cases) [5–8]. The leading causes of traumatic brain injury include falls and injuries as a result of road traffic accidents [9–10].

In conditions of the need for an urgent assessment of the patient's condition and the adoption of appropriate decisions (by ambulance personnel, admission department, intensive care, resuscitation), it is the clinical determination of the level of wakefulness that is available in all cases. This explains the widespread use in practice of standardized clinical questionnaires and scales, which, as a short structured assessment tool, simplify and optimize the work of medical personnel.

An algorithm for a detailed examination of patients with a reduced level of wakefulness, allowing to differentiate metabolic and structural damage, as well as in the case of structural - to make a topical diagnosis, was proposed by Fred Plum and Jerome B. Posner in 1966 [3]. In 1974, neurosurgeons at the University of Glasgow Graham Teasdale and Bryann Jennett proposed criteria for a patient's "behavioral" response: eye opening ("E"), verbal response ("V"), and motor response ("M") to the presented stimulus. This three-step algorithm and its scoring were used as the basis for the Glasgow Coma Scale (GCS) [11]. The scale consists of a table with tasks and instructions that are so clear and simple that they can be used by different members of the medical team (doctors and nurses) with a high degree of accuracy, which has been demonstrated in the original publications [11-12] and confirmed a number of subsequent studies [13-14].

The GCS was developed to measure the level of wakefulness in patients with traumatic brain injury. On its basis, a classification of the severity of traumatic brain injury was formed based on the summation of points on the scale. Subsequently, the scale began to be used for other nosologies: acute cerebrovascular accident by ischemic [15] and hemorrhagic types [16-17], infectious brain pathology [18-19], as well as with lesions of toxic genesis [20]. These conditions are listed on the official Internet resource of the GCS https://www.glasgowcomascale.org/faq/.

The proven predictive value of the scale made it possible to include it in such integral scales as Hunt Hess Scale [21], APACHE II [22], Traumatic Injury Scoring System [23] and many others, as well as become the basis for creating more advanced scales that assess stem reflexes and applicable in intubated patients [24–25].

The history of interpretation of the results obtained by GCS is interesting. Initially, the data were summed up by specialists and presented as a single number. A certain level of acute disturbance of consciousness corresponded to a certain range of values. The convenience of using the summarized score was also recognized by G. Teasdale, but at the same time he warned against using this approach in clinical practice [26]. However, as experience gained, it became apparent that the same score may reflect clinical situations with different prognosis: for example, it was shown that with the same total GCS score of 14 points, a higher percentage of fatalities is associated with the worst speech response, and not with the lowest score when assessing motor response [27].

A more detailed analysis showed that when using the GCS, a doctor can get up to 120 different combinations if he uses an alphanumeric designation (for example, E2V1M2). Whereas, if we summarize these points, then the data can be presented only by twelve possible options, which significantly reduces the diagnostic potential of the GCS [28]. Moreover, it was noted that the presentation of the GCS assessment results in the form of a sum of points reduces its predictive value, which did not allow recommending this assessment parameter for use in multicenter studies [28]. Thus, the presentation of the GCS assessment results with detailing of each separate section was considered the most correct.

Unfortunately, the GCS, like any other clinical assessment tool, has a number of disadvantages: in particular, a reliable assessment of the speech response is impossible in intubated patients and in patients with aphasia, in addition, there is no detailed assessment of stem reflexes. However, the undoubted advantages of this scale ensured its widespread use in clinical and research practice in the world. Currently, the scale is actively used to assess the level of wakefulness impairment in more than 80 countries and has been translated into national languages in 74% of these countries [29]. The importance of GCS in clinical practice and the continuing interest in it 45 years after its creation is evidenced by numerous modern studies assessing the validity and sensitivity of the scale in different cohorts of patients [30–34].

The GCS is in demand in Russia, as well as in other Russian-speaking countries, but it should be noted that at the moment there is no single official Russian-language version of this scale, and the presence of various versions that distort the content of the original scale offered by its creators reduces the quality of its application. Unfortunately, in our country there has been a long-term practice of using foreign scales, which validity has not been confirmed by their authors; this applies to any specialty, not only neurology and resuscitation. However, this gap has begun to be filled, in particular, for the scales assessing acute impairments of consciousness (GCS and the Russian-language version of the scale for detailed assessment of patients with impaired level of consciousness - FOUR, which has already passed the stage of lingvocultural adaptation) [24–25].

To obtain objective clinical results when examining patients with acute impairments of consciousness, as well as any other patients where certain foreign scales are used, it is necessary to perform validation in Russian, taking into account its linguistic features. It should be emphasized that, regardless of a particular medical specialty, the use of a validated scale / scales will increase their availability for scientific and clinical use in our country, will guarantee the achievement of the same assessment result as when using the original scale, which will provide an opportunity to compare the results with the data of foreign researchers and the acceptance by the world community of the results obtained in Russia and on the Russian sample.

The development and subsequent approval of the official Russian-language version of the GCS with the sequential implementation of lingvocultural adaptation and assessment of its psychometric properties will allow unifying the examination of patients with a reduced level of wakefulness in Russia and other Russian-speaking countries, which will increase the reliability of the data obtained, and the results of studies, which will include the GCS assessment , will be adequate to global practice.

The aim of the work was the development and lingvocultural adaptation of the Russian-language version of the GCS as part of the first stage of the validation study.

MATERIAL AND METHODS

The lingvocultural adaptation was carried out as follows: two Russian-speaking professional certified translators in the field of medicine performed the English-Russian translation, and the reverse translation was carried out by native speakers with medical education. The meeting of the expert commission was chaired by an expert translator who had not previously taken part in direct and reverse translation. The expert commission also included anesthesiologists-resuscitators and neurologists with more than 5 years of experience in the intensive care unit, medical translators.

The inclusion criteria were the presence of different levels of impairment of consciousness lasting at least 6 hours in patients over 18 years of age. A prerequisite for inclusion in the study was an informed consent signed by the patient's representative.

According to the exclusion criteria, the medical history of prior therapy was carefully collected by the investigating physician before beginning the patient's scale assessment. The fact of the introduction of sedatives or blockers of neuromuscular transmission, which make it difficult to reliably determine the degree of impairment of consciousness according to the established protocol, was the reason for waiting for one half-life of the drug to include the patient in the study.

In the pilot test, the assessment was carried out on the first day of the development of consciousness depression. The study was carried out on the basis of the department of anesthesiology-resuscitation with intensive care wards of the Federal State Budgetary Scientific Institution of the National Center for Surgery and the Department of Anesthesiology-Resuscitation for Patients with Acute Cerebrovascular Events No. 35 of S.P. Botkin CCH. The median and interquartile range for the 15 participants (10 women and 5 men) was 78 (59–84) years, respectively. In 13 patients the main diagnosis was "acute cerebrovascular event", in 1 patient - multiple sclerosis of aggressive course, and in 1 patient - encephalitis of unspecified etiology.

RESULTS AND DISCUSSION

During the meeting of the expert commission, special attention was paid to the issue of adapting the translation of medical terms and established expressions into Russian. The greatest difficulty was caused by the correct translation and interpretation of the name of the scale “Glasgow Coma Scale”. From a stylistic and linguistic point of view, a literal translation would sound like Glasgow's Coma Scale. But, given the presence of the already established, widely known in the medical community, the phrase "Glasgow Coma Scale", during the discussion it was decided to give preference to the original version.

The second step was to conduct a pilot study on 15 patients with decreased wakefulness. The results of the assessment carried out were recorded in the form of an alphanumeric designation (for example,

E2V3M4). Thus, the correct use of the GCS was realized, for which it is mandatory to present the obtained data for each of the three sections (assessment of eye opening, verbal and motor reactions), contrary to the prevailing rule in our country of presenting the result in terms of the sum of points. During the pilot testing, understanding and interpreting the instructions on the scale was not difficult for the researchers. The results of the study using the developed version confirmed the availability and clarity of the scale text for a Russian doctor. The final stage of lingvocultural adaptation was the second meeting of the same composition of the expert commission in order to evaluate the results of the pilot version of the Russian-language version of the GCS. This form of the scale is designed in such a way that in the absence of doctors (for example, in times of war and / or with the mass appearance of victims), the determination of the degree of depression of consciousness according to this scale could be entrusted to nursing staff without losing the quality of the assessment.

Based on the results of the 1st stage of the validation study, the final Russian-language version of the scale was approved, which can be found in the Appendix and on the website of the Center for Validation of International Scales and Questionnaires of the FGBNU NTSN https://www.neurology.ru/reabilitaciya/centr-validacii-mezhdunarodnyh-shkal -i-oprosnikov. Also, an adapted version of the scale is posted and available for download on the official international website-project of the authors of the original article https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-Russian.pdf.

ШКАЛА КОМЫ ГЛАЗГО: инструкция

ШКГ | Eyes/реакция глаз
Verbal/речь
Motor /движения

Институт неврологических наук Глазго Государственной службы здравоохранения Великобритании

ПРОВЕРКА

Оцените, присутствуют ли факторы, мешающие коммуникации, возможности реагировать, другие повреждения

НАБЛЮДЕНИЕ

Наблюдайте за открыванием глаз, содержанием речи и движениями правыми и левыми конечностями

СТИМУЛЯЦИЯ

Звуковой стимул: реакция на обычный или громкий голос
Болевой стимул: надавливание на ногтевую пластину, трапециевидную мышцу или надглазничную вырезку

ОЦЕНКА

Оцените в баллах лучшую реакцию

Открывание глаз

Критерий	Результат	Ответ на стимул	Баллы
Произвольное	✔	Стимула не требуется	4
В ответ на обычный или громкий голос	✔	На звук	3
В ответ на надавливание на кончик ногтя	✔	На давление	2
Отсутствует при воздействии звуковых и болевых стимулов, при отсутствии других факторов, затрудняющих открывание глаз	✔	Ответа нет	1
Присутствует фактор, мешающий открыванию глаз	✔	Оценить невозможно	Оценить невозможно

Речевая реакция

Критерий	Результат	Ответ на стимул	Баллы
Называет свое имя, ориентация в пространстве и времени	✔	Ориентирован	5
Дезориентирован, но может свободно общаться	✔	Дезориентирован	4
Произносит отдельные понятные слова	✔	Отдельные слова	3
Издает нечленораздельные звуки	✔	Отдельные звуки	2
Не издает звуков при отсутствии мешающих этому факторов	✔	Ответа нет	1
Присутствуют факторы, мешающие вербальному общению	✔	Оценить невозможно	Оценить невозможно

Двигательная реакция

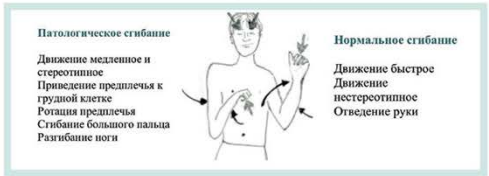
Критерий	Результат	Ответ на стимул	Баллы
Выполнение двухэтапного действия по инструкции врача	✔	Выполняет инструкцию	6
Поднимание руки выше ключицы, когда врач надавливает на трапециевидную мышцу или надглазничную вырезку	✔	Локализует боль	5
Быстрое сгибание руки в локтевом суставе в ответ на болевое раздражение, преобладание признаков нормального сгибания	✔	Нормальное сгибание	4
Сгибание руки в локтевом суставе в ответ на болевое раздражение, преобладание признаков патологического сгибания	✔	Патологическое сгибание	3
Разгибание руки в локтевом суставе	✔	Разгибание	2
Руки и ноги пациента не двигаются в ответ на болевое раздражение при отсутствии мешающих этому факторов	✔	Ответа нет	1
Наличие пареза конечностей или другого фактора, препятствующего выполнению движений	✔	Оценить невозможно	Оценить невозможно

Области болевой стимуляции

Надавливание на кончик ногтя | Сдавливание трапециевидной мышцы | Надавливание на надглазничную вырезку

Особенности сгибательных реакций

Изображение воспроизведено с изменениями из книги Van Der Naalt (2004), Ned Tijdschr Geneeskd.



Подробная информация и видео приведены на сайте www.glasgowcomascale.org

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Валидированная версия Шкалы комы Глазго разработана на базе ФГБНУ НЦН

CONCLUSION

The Glasgow Coma Scale is the most well-known tool in the world community of intensive care physicians for assessing the degree of acute depression of consciousness, which has confirmed its usefulness, quality and validity in many foreign studies. The article presents the Russian-language version of the scale that has passed the first stage of validation, carried out in accordance with international standards for this kind of research. At the time of publication, patients are being recruited as part of a multicenter study to assess the psychometric characteristics of the Russian-language version of the GCS.

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