The FOUR score: is it just another new coma scale?

Luis A. Idrovo Freire

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The evaluation of a comatose patient is usually challenging. Within the complex spectrum of consciousness, scoring systems have been developed to obtain a fast and comprehensive assessment, to facilitate communication among examiners, to triage and monitor changes for therapeutic decisions, and to provide prognostic information [1, 2].

The Glasgow Coma Scale (GCS) has become the *gold standard* in clinical practice despite criticism in recent publications about its inconsistent inter-observer agreement, difficulties in evaluating the verbal component in dysphasic (or when encountering “language barriers”) and intubated patients, and inaccuracy in prognosis [3–6]. A new coma scale, the Full Outline Of Unresponsiveness (FOUR) score, is gradually gaining acceptance because of an excellent inter-rater agreement, greater neurologic information, and a high predictive value [3, 5, 9, 12–15]. It *quantifies* consciousness by examining eye and motor responses, brainstem reflexes, and breathing pattern (each with a maximal value of 4). The FOUR score is appropriate for endotracheally intubated patients, helps to recognize patients with a “locked-in syndrome” mimicking coma, identifies patients in a vegetative state or in different stages of brain herniation, and forces one to rule out brain death in those with the lowest score (score of 0: absent eye and motor responses, absence of brainstem reflexes and no respiratory drive) [3].

More recently, this new score is being consistently studied through high-quality validations in many countries,

in various hospital settings [emergency department (ED), Stroke Unit, ICU, etc.], and among examiners with different medical backgrounds and levels of experience [7–15]. In this issue, Marcati et al. properly evaluate the Italian version of the FOUR score in 87 patients with acute brain injuries. The FOUR score would be an ideal scale for evaluating comatose patients, since according to Marcati et al., it has proved to be reliable (measuring what it is supposed to measure), valid (giving similar results with repetition), practical (easy to use after minimum training), and highly accurate as a prognostic indicator (test of accuracy yield even higher positive likelihood ratio values for the FOUR score compared to the GCS) [9]. Recent inter-rater reliability studies demonstrate a better agreement with the use of the FOUR score compared to the GCS among medical examiners (especially neurologists) and a lesser, but still good to excellent agreement among examiners with non-neurological backgrounds (including nurses) [7–11]. This may raise uncertainties whether experience may play a significant role in the use of this scale. However, Marcati et al. [9] demonstrate that the clinical experience is not a problematic issue in their validation, and the examiners with different levels of experience are able to evaluate the patients reliability.

On the other hand, the accuracy of the FOUR score in predicting the outcome may be comparable to the GCS or even better in some situations such as ischemic hypoxic cerebral injury after cardiac arrest. Rabinstein et al. find this score a better prognostic indicator than the GCS in cardiac arrest survivors. The study reveals that none of the patients with a sum FOUR score of eight survive, in contrast to the survival of one patient with the lowest score of the GCS, and a two-point improvement with serial examinations using the FOUR score, but not with the GCS, is associated with survival and a better outcome.

L. A. Idrovo Freire (✉)
Neurology Department and Neurosonology Laboratory,
Hospital La Zarzuela and Hospital Nuestra Sra. Del Rosario,
Madrid, Spain
e-mail: lartidrovo@hotmail.com

Therefore, it seems that for doctors involved in acute care (ED, ICU, stroke Unit, etc.) the FOUR score may be a preferred option for its higher predictive value, reliability, and greater neurological detail [3, 7–15]. Likewise, Marcati et al. [9] point out that, among patients with the most severe brain injuries (GCS 3–5), the FOUR score provides more neurological data than the GCS.

In summary, it seems that the GCS is simpler, and probably more suitable for mild cases, whereas the FOUR score seems to be more precise in severe cases. Further validation studies with larger number of patients are needed, and particularly in the pre-hospital setting where no studies have yet been reported. If this new scale consistently demonstrates to be a more useful tool for in- and out-of-hospital triage and a better predictor of outcome, probably then its popularity and widespread use would increase, and it may be well become the next *gold standard* coma scale.

Conflict of interest None.

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