

Original article / Article original

Prognostic factors of long-term outcome in cases of severe traumatic brain injury

Facteurs prédictifs du devenir à long terme de patients traumatisés crâniens sévères

M. Jaeger^{a,*}, G. Deiana^b, S. Nash^c, J.-Y. Bar^c, F. Cotton^{d,e}, F. Dailier^f, C. Fischer^{g,h,i},
G. Rode^{c,h,i,j}, D. Boisson^{c,h,i,j}, J. Luauté^{c,h,i,j}

^a Service de médecine physique et réadaptation neurologique, hôpital Sud, institut de rééducation, avenue de Kimberley, 38434 Échirolles, France

^b Service de neuroradiologie, hôpital neurologique Pierre-Wertheimer, groupe hospitalier Est, 59, boulevard Pinel, 69500 Bron, France

^c Service de médecine physique et réadaptation, hôpital Henry-Gabrielle, 69230 Saint-Genis-Laval, France

^d Service de radiologie, université de Lyon, université Lyon 1, hospices civils de Lyon, centre hospitalier Lyon Sud, 69495 Pierre-Bénite cedex, France

^e Creatis Insa-502, université de Lyon, université Lyon 1, 69621 Villeurbanne cedex, France

^f Service de neuroréanimation, hôpital neurologique Pierre-Wertheimer, groupe hospitalier Est, 59, boulevard Pinel, 69500 Bron, France

^g Service de neurophysiologie clinique, hôpital neurologique Pierre-Wertheimer, groupe hospitalier Est, 59, boulevard Pinel, 69500 Bron, France

^h Inserm, U1028, centre de recherche en neurosciences de Lyon, 69500 Bron, France

ⁱ CNRS, UMR5292, centre de recherche en neurosciences de Lyon, 69500 Bron, France

^j Université de Lyon, université Lyon 1, 69100 Villeurbanne, France

Received 17 September 2013; accepted 10 June 2014

Abstract

Introduction. – The purpose of this monocentric study was to assess the long-term outcome of a group of severe traumatic brain-injured patients and explore the prognostic values of some clinical and paraclinical parameters available at the initial stage.

Methodology. – The patients included were victims of severe traumatic brain injuries in 2007 or 2008. A standardized assessment was performed for each patient including clinical, radiological, and electrophysiological data collected at the initial stage. The outcomes were assessed at least 2 years after injury. Depending on the patients' availability and ability to communicate, the assessments included measures of dependency for activities of daily living (ADL), cognitive functions, behaviour, mood, and quality of life.

Results. – Eighteen patients were included, of whom ten were autonomous for ADL at the time of assessment. Memory complaints, attentional deficits, anxiety, and irritability were the main long-term impairments observed. A correlation analysis showed significant correlations between the dependency level (as rated by the Functional Independence Measure) and each of length of coma, length of the post-traumatic amnesia, and the N100 auditory evoked potentials.

Discussion. – These results confirm the uniqueness of each patient regarding the long-term consequences of a traumatic brain injury and the multi-determined nature of each prognosis.

© 2014 Elsevier Masson SAS. All rights reserved.

Keywords: Neuroradiologic evaluation; Evoked potentials; Neuropsychological assessment; Neurobehavioral Rating Scale; Quality of life

Résumé

Introduction. – L'objectif de cette étude monocentrique était d'explorer le devenir à long terme de patients victimes d'un traumatisme crânien grave et de rechercher des marqueurs pronostiques.

Méthodologie. – Le devenir des patients victimes d'un TC sévère a été évalué au moins 2 ans après le traumatisme. Ces patients ont tous bénéficié d'une évaluation standardisée, comprenant des paramètres cliniques, radiologiques et électrophysiologiques recueillis à la phase aiguë, au cours

* Corresponding author.

E-mail address: mjaeger@chu-grenoble.fr (M. Jaeger).

des années 2007 et 2008. Selon la disponibilité et le niveau de communication de chaque patient, l'évaluation à distance comportait des échelles mesurant la dépendance, les fonctions cognitives, le comportement, l'humeur et la qualité de vie.

Résultats. – Parmi les dix-huit patients inclus, dix étaient autonomes pour les gestes de la vie quotidienne lors de l'évaluation tardive. La plainte mnésique, les troubles attentionnels, l'anxiété et l'irritabilité étaient au premier plan des séquelles à distance du TC. L'analyse de corrélation a montré que la durée du coma, la durée de l'amnésie post-traumatique, l'onde N100 des PEA étaient corrélées au niveau de la dépendance à la MIF.

Discussion. – Les résultats confirment la singularité de chaque cas quant aux conséquences du TC à long terme et le caractère multi-déterminé du pronostic.

© 2014 Elsevier Masson SAS. Tous droits réservés.

Mots clés : Évaluations neuroradiologiques ; Potentiels évoqués ; Tests neuropsychologiques ; *Neurobehavioral Rating Scale* ; Qualité de vie

1. English version

1.1. Introduction

Traumatic brain injury is a major public health problem. In France, a study carried out in the Aquitaine region revealed an incidence of 280/100,000 inhabitants [1]. The results of this study show that around 9% of patients with traumatic brain injury suffer severe long-term consequences [2]. Cognitive and neurobehavioral sequelae are among the most frequent [3]. While all aspects of cognition may be altered, executive function disorders and memory deficiencies are most often predominant [4]. Thymic disorders are likewise quite frequent, with prevalence of the depressive syndrome that ranges from 25 to 40% according to the studies and the post-trauma time period [5–8]. In fact, prevalence of the depressive syndrome is estimated 7.5 times greater in trauma patients than in the overall population [9]. The thymic and behavioural disorders necessitate organization of a treatment process proceeding through social and vocational rehabilitation [10,11].

Early determination of a prognosis is of prime importance for the families and for patient orientation. With present-day knowledge, however, no single prognostic factor is specific enough to predict absence of awakening and to justify limitation of treatment in the brain-injured patient [12]. Several clinical and paraclinical parameters, which are available during the acute phase, are of demonstrated predictive interest with regard to awakening and functional recovery. They include premorbid condition [13], age [14], pupillary response [15], depth of coma as measured by the Glasgow Coma Scale and occurrence of secondary systemic brain insults (SBI) [16]. A prognostic assessment score concerning probability of mortality and unfavourable outcome through association of clinical and scanning-based prognostic factors was established by Hukkelhoven in 2005 [17]. Age higher than 65 years, bilateral abolition of pupillary response, absent motor response or extensor posturing, hypoxia or arterial hypotension, presence of a subarachnoid hemorrhage and a score of III or IV on the Marshall CT classification are indicators of an adverse outcome (death or severe handicap) at 6 months following severe or moderate brain injury. The two major prognostic factors during the period when consciousness is regained are duration of the coma and duration of post-traumatic amnesia (PTA). Coma length is correlated with mortality, neuropsychological damage and psychosocial adaptation [18]. Brooks et al. [19] have

demonstrated a relationship between PTA duration and long-term persistence of cognitive disorders. In their study, while no cognitive sequel was detected in patients presenting with less than 2 weeks of PTA, cognitive, frequently mnesic troubles persisted in patients presenting with more than 3 months of PTA. From a paraclinical standpoint, numerous works have underscored the importance of imaging data, particularly encephalic MRI, which greatly facilitates assessment of the injuries. The total number of lesions visualized by MRI is correlated with the prognosis as evaluated by the Glasgow Outcome Scale three months after admission [20]. When lesions are located at the level of the corpus callosum and the dorso-lateral part of the brain stem (cerebral peduncles and protuberance), this is a poor prognostic factor with regard to awakening and functional sequelae at 6 months [21,22], as is bilaterality of the lesions [23,24].

Neurophysiologic testing permits prognostic evaluation on awakening from a coma. Auditory evoked potential (AEP) and somesthetic evoked potential (SEP) facilitate study of the functional status of the sensory pathways at different levels of integration in the cortex of the peripheral nerve. The abolition or diminution in amplitude of early AEPs (EAEP) reflects damage of the brain stem and constitutes a poor prognostic factor, while the presence of EAEP confers weak prognostic value [25]. Middle-latency evoked potentials permit evaluation of the sensory pathways to the primary somatosensory cortex. Prognostic value has been largely studied with regard to auditory and somesthetic evoked potentials. Bilateral absence of the primary cortical components of SEP (N20) is strongly correlated with unfavourable evolution (absence of awakening or severe deficit), while the presence of a primary cortical response may signal a possibility of favourable outcome [26]. Identical prognostic value has been found for the primary cortical components (Na and Pa) of the middle-latency AEP (AEPml) [27]. Late and cognitive evoked potentials (N100, mismatch negativity MMN and P300) are the reflection of elaborative processing of the information corresponding to activation of the associative cortical areas. The prognostic value of these components has been extensively studied in its auditory modality. While their presence signifies that the patient is in the process of awakening, it does not necessarily mean that functioning is to be restored [25].

Up until now, no single clinical or paraclinical parameter has allowed for prediction of patient outcome in terms of the neuropsychological, behavioural and emotional difficulties that

Download English Version:

<https://daneshyari.com/en/article/4040535>

Download Persian Version:

<https://daneshyari.com/article/4040535>

[Daneshyari.com](https://daneshyari.com)