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Update article / Mise au point

Preliminary questions before studying mild traumatic brain injury outcome

Questions préliminaires à l'étude du retentissement des traumatismes crâniens légers

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Abstract

Objectives.– To point out from the literature the issues in mild traumatic brain injury outcome.
Methodology–results.– The literature review allows to point out several different factors involved in the difficulty to study mild traumatic brain injury: mild traumatic brain injury definition, postconcussional syndrome definition, diagnosis threshold, severity and functional symptoms outcome, neuropsychological tests, unspecific syndrome feature, individual factors, confounding factors and treatment interventions.
Discussion–conclusion.– The mild traumatic brain injury outcome study is complicated by the definitions issues and especially their practical use and by the multiplicity and the intricate interrelationships among involved factors. The individual outcome and social cost weight is widely emphasized for an event still considered as medically trivial. The well-ordered preventive interventions necessity and the targeted treatment programs need for the persisting postconcussive symptoms complete our critical review.

Résumé

Objectifs.– Dégager de la littérature les questions se posant lors de l'étude du retentissement des traumatismes crâniens légers.
Méthode–résultats.– La lecture de la littérature permet d'objectiver différents facteurs de difficultés dans l'étude du retentissement des traumatismes crâniens légers : définition du traumatisme crânien léger, définition du syndrome postcommotionnel, notion de seuil diagnostique, sévérité et retentissement fonctionnel des symptômes, prise en compte des tests neuropsychologiques, non-spécificité du trouble, facteurs propres au blessé, facteurs parasites et prise en charge.
Discussion–conclusion.– Les problèmes de définitions et surtout de leur utilisation concrète rendent difficile l'étude des traumatismes crâniens légers. La multiplicité et l'intrication des données à prendre en compte compliquent l'étude de son retentissement. L'importance du retentissement individuel et du coût social d'un événement encore considéré comme médicalement anodin est largement objectivée. La nécessité de mesures structurées de prévention systématique et de prises en charge ciblées des troubles invalidants conclut notre revue critique.

Keywords: Brain injury; Mild; Posttraumatic syndrome; Outcome; Research

Mots clés : Traumatisme crânien ; Léger ; Syndrome postcommotionnel ; Devenir ; Recherche

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1. English version

1.1. Introduction

Historically impeded by the sterile dogmatic controversies between the functional and the lesional origins and by suspicions raised by possible search for profits, the mild traumatic brain injury (MTBI) problematic has been regenerated thanks to recent progress in neuropsychology [56] as well as imagery [71]. As for Northern Americans, the 1980–1990 decade was that of severe traumatic brain injuries, the next one rather focused on MTBI [74].

Medical issues nevertheless remain important when one is confronted to the reality of a medical event, which is somatically viewed as anodyne, the negativity of further examinations and the number of patients corresponding to long-lasting complaints, which are sometimes invalidating.

Like many of our colleagues looking after people having suffered from severe TBI, we felt puzzled by the frequency of the demands for medical consultation for less severe traumatic brain injuries, and thus decided to start a large review of literature dealing with MTBI; this was done within a regional Protocole Hospitalier de Recherche Clinique (Clinic Research Hospital Protocol) dealing with epidemiology and the consequences of postconcussionnal syndrome (PCS), and within a France Traumatisme Crânien association task force [31]. All of this was aimed at defining a standard level of information for patients and their families as well as emergency room physicians.

For lack of consensus statements, a general point of view about MTBI may be noted, which one may sum up in a slightly caricatured way. After a MTBI having led to a modification of consciousness, several physiopathological hypotheses (which do not exclude each other) [35], such as the reticular, centripete, cholinergical or epileptic theories, are mentionned.

Functional neuroimaging techniques show, at least temporarily, that there are changes at a cerebral level, sometimes in a lasting way [71]. Neuropsychological studies show that, at an acute stage, there are cognitive impairments affecting global functions such as information-processing speed, attention, and control and regulation of activity processes [2]. Numerous patients will be affected with complaints known as PCS, the term ''subjective syndrome'' having been thankfully abandoned. This syndrome most of the time spontaneously evolves in a positive way in three months time; about 15% of the cases [93], called ''miserable minority'' [75], will be inflicted with long-term effects [1]. Whereas, after initial accident, the cognitive impairments tend to disappear, other factors depending on the subject, such as ability to cope with, compensation implication, psychosocial troubles, life history, are going to interfere in their evolution, raising serious matter such as comorbidity, in particular. The extreme frequency of hospitalized MTBI patients, 100 to 300 per 100 000 [17], clearly sets such problem to the heart of public health management.

Beyond such global point of view, a careful analysis of the writings shows that there are difficulties and disagreements in the different studies, in the definition of MTBI itself, the epidemiology, the homogeneousness of surveys which quite often mingle MTBI with moderate brain injuries, the evaluation of patients complaints, the relationship between different categories of diagnosis, the real repercussions of the symptoms on psychological, cognitive and social functioning of the MTBI individuals.

The aim of this paper is to use the questions raised by our reading of the literature dealing with our topic to offer some ideas and reflections on the complexity and difficulty in the study of such population, thoughts which will focus on the evaluation of brain injury itself and PCS.

1.2. Mild traumatic brain injury

The first difficulty lies in the definition of MTBI. Definitions are indeed numerous. Glasgow Coma Score, duration of loss of consciousness, duration of posttraumatic amnesia (PTA) are the criteria which are most often taken into account, with variable margins [15]. The latest definition is that of the World Health Organisation (WHO) Collaborating Centre Task Force [15], which includes a Glasgow Coma Score from 13 to 15 and one or several of the following manifestations: confusion or disorientation, loss of consciousness for 30 min or less, PTA for less than 24 h, transient neurological abnormalities. Criteria are thus quite specific.

Nevertheless, starting from this definition, the difficulties to establish a diagnosis are maintained. The medical premises where MTBI patients are looked after are emergency departments essentially. The latter have a way of functioning which is destined to the orientation of patients with the problematic of vital risk and the setting of a medical care protocol: ''they have to focus on what's essential'' [81]. MTBI very often remains a diagnosis of exclusion. According to systematic criteria [21], if severe TBI are on the whole of French territory very well detected and looked after [70], it is a different story with moderate TBI, all the more so for MTBI.

The main difficulty is, on the one hand, not to consider as a MTBI some simple shock to the head with no alteration in consciousness, and, on the other hand, not to define as MTBI which is to be considered as moderate.

Even for an emergency room physician who would be dedicated to classifying the initial severity of TBIs, the effective setting up of each criterion of the definition is problematic.

The duration of loss of consciousness is difficult to measure, as it is often assessed a posteriori, not always in the presence of a trustworthy third party; thus, in a multicentre study [76], approximately half of the patients cannot report the duration of their loss of consciousness.

The duration of PTA is viewed as a relevant criterion. As it can be measured when people come to emergency rooms and during their hospitalization, its evaluation is based on a scale validated in French, the Galveston and Amnesia Test [85]. A quicker and a simpler version one of this scale may be used [11]. This scale, as far as the search for brief PTA is concerned, still has the drawback of being based on the calling back of events surrounding the accident, some information that are not always available.