

2018 Annual Report - Task Force on Traumatic Brain Injury and Antiepileptogenesis

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This is an update on the progress made by the ILAE Task Force (TF) on Traumatic Brain Injury (TBI) and Antiepileptogenesis during 2018. The list of deliverables includes:

1. Studying the development of epilepsy following TBI of various severities and etiologies, considering progress in translational studies, regional differences in the healthcare delivery, as well as input from the public. This includes bringing to the table key stakeholders to take advantage of the collective data and efforts.
2. Developing research priorities that promote coordinated research on this topic.

The task force members communicated by email, and the members who were attending the 2018 AES meeting participated in a face-to-face discussion on December 2, 2018. A survey of the members indicated the topics that the TF should pursue. These are:

- A. Clinical Studies
 - a. Current prospective population-based epidemiological analyses of post-traumatic epilepsy.

- b. Identify the injury mechanism resulting in post-traumatic epilepsy, and the relative prevalence of each in unbiased cohorts of TBI patients.
- c. Necessity of identifying and obtaining agreement on 'biomarkers' of epileptogenicity and epileptogenesis in TBI and PTE.
- d. Creation of large databases for best utilization, mining and evaluation of clinical data.

B. Preclinical Studies

- a. Development and validation of animal models of TBI that lead to post-traumatic epilepsy.
- b. Creation of large databases for best utilization, mining and evaluation of preclinical data.

A. Clinical Studies

From the clinical perspective, the focus is on collecting a large number of patients in the acute TBI setting, with similar extents of injury, or grouped into injury categories that make sense functionally (if possible). The TBI can affect many brain areas that may influence the development of epilepsy, as well as associated comorbidities. Additional information will be needed to sort out the effects of multisystem injuries and other factors such as the state of the gut microbiome.

Steps:

- Creation of a widely accepted severity scale based on clinical features, EEG, imaging, and fluid based factors at the earliest evaluation and regular intervals thereafter.
- Creation of a database where this information will be deposited is a key aspect, with information technology to include web-based and telemedicine components of recruitment, interventions and connections with individual participants, their families/significant others, and primary providers with the researchers, to guarantee as much retention as possible in future intervention studies.

There are currently several studies with databases, such as Federal Interagency Traumatic Brain Injury Research (FITBIR), the Epilepsy Bioinformatics Study for Antiepileptogenic Therapy (EpiBioS4Rx), TRACK-TBI, CENTER-TBI, TBI Model Systems National Database, Cure-DOD projects (TBI and Epilepsy databases), BOOST-3 (Brain Oxygen Optimization in Severe TBI—Phase 3), the Australia-New Zealand Critical Care Medicine Trials Network, and the Chronic Effects of Neurotrauma Consortium (CENC). The TF is discussing with the various PIs of these databases possible approaches to create common platforms. The goal is shared by the Epilepsy Research Program, the Congressionally Directed Medical Research Programs (CDMRP), NINDS, and the Cure Foundation, which at this point fund several TBI and Antiepileptogenesis projects.

B. Preclinical Studies

The development of animal models can occur in parallel, harmonizing data from various animal models and correlating to the human perspective.

Steps:

- Harmonization with the human data.
- Identification of additional models, including large animals, for better modelling of human TBI.
- Creation of collaborative environments for drug screening and treatments.

To accomplish these goals, members of the TF have created a clinical and a preclinical group. In addition, efforts are made to engage junior investigators in these research initiatives.

We are very pleased that our efforts have been accepted by the community. An example of this acceptance is seen in a communication by the Epilepsy Research Program (ERP) with the Congressionally Directed Medical Research Programs (CDMRP).

The ERP also coordinates its activities with the international epilepsy research community. The International League Against Epilepsy recently formed the Antiepileptogenesis Following TBI Task Force, with the goal of moving this topic forward from an international perspective. The task force will identify clear goals and steps that can be used to advance PTE science.

We would like to thank the ILAE for all of its support.

Dr. Solomon L. Moshé
Chair of the TBI Task Force on behalf of its members.