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Oral Presentation

The Changing Landscape of TBI Research

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Abstract

Traumatic Brain Injury (TBI) is a major cause of death and disability, leading to great personal suffering to victim and relatives, as well as huge direct and indirect costs to society. Strong ethical, medical, social and health economic reasons therefore exist for improving treatment. A clear, concise definition of Traumatic Brain Injury is fundamental for reporting, comparison and interpretation of studies on TBI. Researchers and clinicians have welcomed a change in nomenclature from "head injury" to the more precise "traumatic brain injury". However, this change has not directly alleviated a sometimes Babylonian confusion as to what should really be considered under the umbrella of TBI. New insights and the development of new biomarkers and imaging tools have led to the understanding that milder insults and less typical presentations now fit under this umbrella. The diagnostic confound by non-TBI pathologies has increased confounding precise epidemiologic description, clinical management and rational research strategy development. Shifts of research are currently occurring in two directions: first, towards personalized treatment which would require better characterization of the disease TBI in individual patients, and secondly, towards broader approaches with greater generalizability. Improved characterization will aid Precision Medicine, a concept recently advocated by the US National Academy of Science, facilitating targeted management for individual patients. Improvement is much needed as treatment approaches differ widely, and evidence underpinning treatment choices low. Since the first publication of the guidelines on management of severe TBI in 1996 strong evidence in support of treatment recommendations has not been forthcoming. Specific challenges in TBI research relate to the heterogeneity of the disease and the lack of early mechanistic endpoints which can serve as intermediate outcome markers. Conventional approaches to clinical TBI research have been reductionistic, attempting to isolate out one single factor which is treated and by attempting to limit heterogeneity by the use of strict enrolment criteria. These approaches do not reflect the clinical reality of TBI heterogeneity and substantially limit generalizability of results. Modern computational techniques facilitate more holistic approaches allowing us to broaden the scope of current reductionistic thinking. A comparative effectiveness research (CER) framework offers opportunities for addressing both directions. High quality contemporaneous data, on which to base such research, are however lacking. International collaborations are being developed offering vats opportunities both in terms of concentration of knowledge and in terms of increased numbers; recently, InTBIR, the International Initiative for Traumatic Brain Injury Research, was formed as a collaboration of funding agencies (European Commission, NIH and CIHR) to stimulate and support these initiatives.

Keywords: Traumatic Brain Injury, Research, Head Injury.

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