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Review

Complementary and alternative medicine (CAM) following traumatic brain injury (TBI): Opportunities and challenges

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ABSTRACT

Traumatic brain injury (TBI) is highly prevalent and occurs in a variety of populations. Because of the complexity of its sequelae, treatment strategies pose a challenge. Given this complexity, TBI provides a unique target of opportunity for complementary and alternative medicine (CAM) treatments. The present review describes and discusses current opportunitites and challenges associated with CAM research and clinical applications in civilian, veteran and military service populations. In addition to a brief overview of CAM, the translational capacity from basic to clinical research to clinical practice will be described. Finally, a systematic approach to developing an adoptable evidence base, with proof of effectiveness based on the literature will be discussed. Inherent in this discussion will be the methodological and ethical challenges associated with CAM research in those with TBI and associated comorbidities, specifically in terms of how these challenges relate to practice and policy issues, implementation and dissemination.

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1. Background

The complexity inherent in traumatic brain injury (TBI), from its mechanisms of injury through to its neurobehavioral sequelae render it a promising target of opportunity for complementary and alternative medicine (CAM) treatment approaches. Indeed, the lack of a "silver bullet" with which to treat TBI-related symptoms supports that a multi-faceted approach is required, and even called for (Marguiles and Hicks, 2009; Rosenbaum and Lipton, 2012). And given the multi-facted nature of many CAM treatments and modalities, there should be potential for an evidence base to develop in the treatment of TBI. That said, such an evidence base would require methodologically rigorous studies, with good control procedures in order to yield unequivocal support of a particular CAM treatment. To this end, this review will describe the developing evidence base from studies of promising CAM treatments (i.e., acupressure, mindfulness-based stress reduction (MBSR), a CAM-augmented residential treatment program, and the Mantram Repetition Program (MRP) for TBI-associated sequelae.

Over the past 30 years, TBI has transitioned from a "silent epidemic" (Klein, 1982), to a highly publicized "signature wound" (Robertson, 2006) of operational conflicts. TBI no longer flies under the radar. Indeed, this increased awareness has led to the recognition of TBI's often persistent sequelae, and the recommendation to treat it as a chronic health condition across the lifespan (Malec et al., 2013). In civilian populations, there are approximately 1.7 million TBIs sustained annually (Faul et al., 2010). Estimates among the 2 million U.S. military personnel deployed to Afghanistan and Iraq since 2001 show an even greater prevalence. In some cohorts, the data suggest up to one-quarter of individuals have sustained a TBI (Terrio et al., 2009) and the rate of disability associated with TBI has been on the rise (Gubata et al., 2014). Over the past decade, sports-related TBI has become a public health concern with the growing number in emergency department (ED) visits (3.42 million visits to the ED between 2001 and 2012 for sports or recreation related TBI) (Coronado et al., 2015). Across all of these populations and including the full range of severity, a TBI can result in a host of sequelae that can individually or in combination negatively impact a variety of important functional domains in the short-term, as well as chronically (Brenner et al., 2009; Ponsford et al., 2014; Kashluba et al., 2008; Rosenbaum and Lipton, 2012).

There are certain barriers to the effective treatment of TBI and associated comorbidities, including misconceptions and stigma (Redpath et al., 2010; Zhou et al., 2014), in addition to the limited, effective treatments available (Maas et al., 2010; Marguiles and Hicks, 2009; Tolias and Bullock, 2004). Given the prevalence of TBI and its potential burden, identifying effective, accessible and self-sustaining treatment strategies would be of significant benefit. Equally important is that potential strategies share an emphasis on patient-centered care, independence and agency, each of which can contribute to good outcome (Lukow et al., 2015). Lastly, and of essential importance, is developing a strong evidence base for such strategies.

2. Improving TBI outcome: the role of CAM

The treatment of and recovery from TBI are similarly vulnerable to the heterogeneity of the injury and contextual factors (Marguiles & Hicks, 2009); a likely contributor to the fact that even with the multitude of pre-clinical and clinical studies to date (Margulies and Hicks, 2009), uniformly promising neuroprotective agents have not been identified acutely or post-acutely (Warden et al., 2006). This lack of uniformity in response is also evident for certain non-pharmacologically based treatments. For example, cognitive rehabilitation therapy may be effective for certain TBI-associated deficits, but its efficacy can be variable in sometimes unpredictable ways (Institute of Medicine, 2011). Because of these limitations and the increasing availability of CAM treatments, individuals with chronic neurological conditions frequently seek CAM treatment modalities as an adjunct to ongoing conventional medical care. This enhanced visibility and increased use resulted in the American Psychological Association Monitor (April 2013) devoting a cover and an entire section to the importance of CAM in Psychology. This section also highlighted the limitations of current research on CAM efficacy and underlying mechanisms (Barnett and Shale, 2013).

CAM is defined as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine" (NCCAM/NCCIH, 2011). Examples of CAM include acupuncture, acupressure, chiropractic manipulation and yoga, with deep breathing, relaxation, and meditation serving as examples of the more commonly utilized practices (Barnes et al., 2008). CAM surveys and clinical trials in the U.S. from 1990 through to present have generated a wealth of information about