Introduction

The Interdisciplinary Study of Posttraumatic Stress Disorder

By Arieh Y. Shalev, MD

Twenty-three years have passed since posttraumatic stress disorder (PTSD) was defined and included in official nomenclature via the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition.* Since then, the disorder has been redefined continuously, to the point where we currently tend to forget that PTSD, as much as most other mental disorders, is a descriptive construct, a phenotype, and a clinical entity in constant search for boundaries and underlying biological mechanisms.

Research has established PTSD as one of the most challenging disorders. It is a clinical entity that we can reliably describe, measure, track back to a triggering event, and clearly assign to the brain's memory and alarm systems. It is also a frequently occurring anxiety disorder which starts acutely but often becomes chronic, tenacious, and disabling. Given today and tomorrow's threats, PTSD is not just a challenge for researchers and clinicians, it also challenges society at large. There are many ways to study PTSD and many centers around the world involved in its study, hence the need for frequent updates.

This issue of CNS Spectrums addresses some of the most productive approaches to PTSD: brain-imaging, neuroendocrinology, descriptive psychopathology, molecular biology, biology of the acute response, and research methodology. It offers a composite picture of the disorder, specifically testing the boundaries of our knowledge, that is, what is not yet known, questions for the future, and ways through which further knowledge might be acquired.

Israel Liberzon, MD, and K. Luan Phan, MD, evaluate the converging results of structural and functional brain-imaging studies of PTSD. They offer a synthesis of the main findings and direct the reader to recent investigations about the role of neuromodulatory systems in PTSD. The reader will find comprehensive coverage of current studies and disciplined discussion of their meaning.

Along with brain imaging, neuroendocrinology has been an area of intense research in PTSD. Ann M. Rasmusson, MD, and colleagues, lead us to consider new directions in this area. They critically review studies of the hypothalamic-pituitary-adrenal (HPA) axis output in PTSD, address underlying difficulties and confounders, and outline a possible role for the adrenal neurosteroid dehydroepiandrosterone as a mediator of the HPA adaptation to extreme stress.

Since September 11, 2001, the early responses to traumatic events and the eventual development of PTSD have become major empirical questions. In a review article, Richard A. Bryant, PhD, explores the biology of acute stress responses and the relevance of such biology to the pathogenesis of PTSD. He also outlines the prevailing biological models and the major challenges for research on psychobiological responses to trauma.

But have the features of PTSD been adequately described? Do we clearly know the specifics of each symptom and associated feature? Borrowing from cognitive neuroscience's methodology of case series, Yoram Yovell, MD, PhD, and colleagues, describe two types of traumatic amnesia: one seemingly related to impaired encoding and storage at the time of the traumatic event, and the other reflecting emotional avoidance. The authors link their observations to both the neuroscience of memory and the psychoanalytic construct of repression.

Still remaining with causation, we now move from descriptive case series to sophisticated data analyses. Lynda A. King, PhD, and colleagues, summarize the contemporary longitudinal methods for the study of trauma and PTSD. They argue for a change in defining the dependent (outcome) variable of longitudinal research and recommend the use of individual trajectories rather than endpoint, group means. They then analyze data from a longitudinal study and illustrate how their approach can outline the trajectory of survivors to either chronicity or recovery.

Moving from modern to forward-looking studies, molecular biology has revolutionized biology and neuroscience. Ronnen H. Segman, MD, and Arieh Y. Shalev, MD, review the emerging molecular biology of PTSD. They show how genetic variation may result in an altered reactivity to stress, which may, in turn, contribute to the occurrence and the maintenance of PTSD. Their review explains different approaches to locating the actual genes involved, and focuses on initial attempts at hypothesis-driven candidate-association studies.

This issue of CNS Spectrums, with contributions from the United States, Australia, and Israel, presents, explains, and shares the excitement of contemporary PTSD research.

On behalf of the authors, I invite readers to explore each of the various approaches, learn about researchers' own awareness of boundaries and challenges, and identify new methods, new findings, and new hopes.

**REFERENCE**