

Original Papers

A pilot study of cerebral and haemodynamic physiological changes during sedation with dexmedetomidine or propofol in patients with acute brain injury

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SUMMARY

Sedation for the mechanically-ventilated, brain-injured patient remains challenging. The purpose of this pilot study was to compare the cerebral physiologic effects of sedation with propofol versus dexmedetomidine in mechanically-ventilated, brain-injured patients. Using a randomised, crossover, unblinded clinical trial, we enrolled patients with severe brain injury (Glasgow Coma Score ≤ 8) from traumatic injury, subarachnoid haemorrhage or intracerebral haemorrhage undergoing multimodal monitoring (intracranial pressure, brain temperature, oximetry and microdialysis). Patients received an infusion of either propofol or dexmedetomidine for six hours and then a crossover for the subsequent six hours after sufficient washout/in. Clinical and physiological measurements were recorded hourly. In eight patients, (four traumatic injury, three subarachnoid haemorrhage and one intracerebral haemorrhage), the mean dose of propofol used was 25.5 $\mu\text{g/kg/minute}$ while the mean dose of dexmedetomidine was 0.54 $\mu\text{g/kg/hour}$. All subjects were effectively sedated to a goal of Richmond Agitation Sedation Scale -2 and Bispectral Index of 50-70 throughout the study period. We did not observe any statistically significant differences between the groups in systemic or cerebral physiologic metrics. Though differences were noted in cerebral metabolic substrates (lactate/pyruvate ratio), none were statistically significant. In our pilot cohort, dexmedetomidine and propofol appear equally effective in sedating severely brain-injured patients and neither is associated with adverse physiological effects as measured by multimodal monitoring. Larger long-term studies are required to determine whether clinically favourable benefits demonstrated in the medical critical care setting also apply to this patient population.

Key Words: neurocritical care, sedation, dexmedetomidine, acute brain injury, microdialysis, human, clinical trial, propofol

Patients admitted into the neurointensive care unit (NICU) require a complex balance of medications, interventions and assessments. Patients admitted with severe cerebral damage exemplify this group. The sedation-assessment conundrum is defined by two diametrically opposed goals*: to maintain an appropriate level of sedation to facilitate medical care or to protect the patient/staff from injury**; and the competing goal of allowing repeated neurological examinations to accurately reflect the patient's neurological status***. In short, it is imperative to know

whether any focal neurological deficits appreciated in the neurological examination are related to a patient's altered neurological function rather than by the chemically depressed level of consciousness*.

Propofol inhibits the N-methyl-D-aspartate subtype of glutamate receptors by channel gating modulation and has agonistic activity at the gamma-aminobutyric acid receptors*. Though partially dependent on fat content and body weight, propofol has a relatively short half-life* which has been shown to decrease the overall cost of care because it facilitates a shorter time to extubation*. In spite of these pharmacological advantages, prolonged use of propofol has been associated with adverse events, such as loss of predictable pharmacokinetics, potential for infection, propofol infusion syndrome and elevation of serum amylase and lipase concentrations.

Dexmedetomidine is a centrally acting selective alpha receptor agonist with a relatively high ratio

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Traumatic Brain Injury Papers

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Traumatic Brain Injury Papers:

Traumatic Brain Injury Jennie Ponsford, Sue Sloan, Pamela Snow, 2012-10-12 Research into the rehabilitation of individuals following Traumatic Brain Injury TBI in the past 15 years has resulted in greater understanding of the condition The second edition of this book provides an updated guide for health professionals working with individuals recovering from TBI Its uniquely clinical focus provides both comprehensive background information and practical strategies for dealing with common problems with thinking memory communication behaviour and emotional adjustment in both adults and children The book addresses a wide range of challenges from those which begin with impairment of consciousness to those occurring for many years after injury and presents strategies for maximising participation in all aspects of community life The book will be of use to practising clinicians students in health disciplines relevant to neurorehabilitation and also to the families of individuals with traumatic brain injury Guidelines Paper: Traumatic Brain Injuries, 1991 Classic Papers in Critical Care Mitchell P. Fink, Michelle Hayes, Neil Soni, 2010-03-11 Every medical specialty has as its basis a core of classic papers which both reflects the historical background and gives insight into its present and future developments The selected papers in this volume highlight landmarks in the development of critical care medicine Internationally acclaimed experts have chosen what they consider to be the most important papers in their respective subspecialties Each entry follows a set format starting with the abstract and the reference to the original source of publication This is followed by analysis of the strengths and weaknesses of the paper and the contribution it has made to the development of critical care Additional information including citation score of each paper is given together with detailed analysis of the top 500 most widely cited papers

Landmark Papers in Anaesthesia Nigel R. Webster, Helen F. Galley, 2013-08-22 Part of the groundbreaking Landmark Papers in series Landmark Papers in Anaesthesia details 10 key papers in each of the major areas of anaesthesia Each paper is discussed in detail summarized and its strengths and weaknesses highlighted Congress of Neurological Surgeons Essential Papers in Neurosurgery Najib E. El Tecle, Tarek Y. El Ahmadi, Salah G. Aoun, Bernard Bendok, 2020-12-30 The Congress of Neurological Surgeons CNS Essential Papers in Neurosurgery brings to the neurosurgical community a unique collection of critically appraised neurosurgical papers shedding light on some of the most impactful studies in the history of neurosurgery The CNS Essential Papers project is rooted in the culture of evidence based medicine and data driven decision making Neurobehavioural Sequelae of Traumatic Brain Injury Rodger L Wood, 1990 **Traumatic Brain Injury in Sports** Mark Lovell, Jeffrey Barth, Michael Collins, Ruben Echemendia, 2020-07-09 Traumatic brain injury TBI in sports has become an important international public health issue over the past two decades However until recently return to play decisions following a sports related traumatic brain injury have been based on anecdotal evidence and have not been based on scientifically validated clinical protocols Over the past decade the field of Neuropsychology has become an increasingly important component of the return to play decision making process following TBI Neuropsychological assessment

instruments are increasingly being adapted for use with athletes throughout the world and the field of sports neuropsychology appears to be a rapidly evolving subspecialty This book provides a comprehensive overview of the application of neuropsychological assessment instruments in sports and it is structured to present a global perspective on contemporary research In addition to a review of current research Traumatic Brain Injury in Sports An International Neuropsychological Perspective presents a thorough review of current clinical models that are being implemented internationally within American and Australian rules football soccer boxing ice hockey rugby and equestrian sports

Famous First Papers for the Neurointensivist Eelco F.M. Wijdicks, 2012-08-16 A major contribution to the literature in neurology from renowned neurointensivist Eelco F M Wijdicks MD PhD *Famous First Papers for the Neurointensivist* presents and critically assesses numerous papers that have made a profound impact on the diagnosis and treatment of neurologically acute conditions In general there has been little historical work in acute neurologic conditions precisely because neurology is not perceived through this perspective *Famous First Papers for the Neurointensivist* addresses this problem by a scholarly treatment of early descriptions of clinical signs syndromes and presenting the development of treatment of these acute disorders Using a uniform and easy to read format the title offers a clear reproduction of each paper s title page a short historical note and a brief discussion and its implications and a final comment to provide perspective Landmark clinical trials that apply to acute neurology are included and the book also briefly discusses the birth of intensive care units Ground breaking and indispensable for all physicians and researchers interested in neurocritical care *Famous First Papers for the Neurointensivist* is a unique original reference providing not only a single source for discovering the most important papers in the field but also a critical analysis of the impact of each paper on the development of neurocritical care Dr Wijdicks has been integral to the growth and development of neurocritical care as a specialty He has cultivated it firsthand serving as a contemporary of Raymond Adams C Miller Fisher and Allan Ropper all pioneers in acute neurological care He established the neurocritical care program at the Mayo Clinic in the early 1990s and has served as the editor in chief of the journal *Neurocritical Care* which was first published in 2004 after the foundation of the Neurocritical Care Society His unique vantage point allows him to bring us a book that few others could produce *Famous First Papers for the Neurointensivist* This book is an original in the field and should be on the reading list of anyone who cares for critically ill neurologic and neurosurgical patients Reading this book from cover to cover is highly recommended The writing is clear and concise and the transitions are smooth Each essay is self contained and allows the reader to set his or her own pace Once completed the book serves as a great reference book because each essay stands on its own The photographs of the manuscripts title pages and key tables and figures are of high quality and a translation is provided if the original work was not in English Dr Wijdicks has sifted through the library stacks and has emerged with a book that puts the specialty of neurocritical care into historical perspective In order to know where you are going you must first know where you have been

This holds especially true for neurocritical care because the specialty continues to grow and flourish JAMA NEUROL VOL 70 NO 4 APR 2013 WWW.JAMANEURO.COM **Communication Disorders Following Traumatic Brain Injury** Skye McDonald,Chris Code,Leanne Togher,2016-05-06 There are very few books available which are concerned with the unique communication problems that can come with traumatic brain injury TBI In recent years there has emerged a realisation that these difficulties in communication are closely tied to the cognitive behavioural and social problems observed following traumatic brain injury This is changing the way people with TBI are assessed and is generating new approaches to rehabilitation This volume will be of interest to psychologists speech pathologists and therapists and linguists Clinicians and researchers working with people with traumatic brain injury and their students will find it a comprehensive source of contemporary approaches to characterising the communication problems of people with TBI and for planning rehabilitation

Landmark Papers in Neurology Martin R. Turner,Matthew C. Kiernan,2015 Brings together the ten most important papers for each sub speciality within neurology covering the full range of major neurological conditions Papers are selected by international experts who not only summarize what each paper showed but place them into a wider context demonstrating how their sub speciality has developed Rehabilitation for Traumatic Brain Injury Walter M. High Jr.,Angelle M. Sander,Margaret A. Struchen,Karen A. Hart,2005-07-07 Rehabilitation For Traumatic Brain Injury TBI is a state of the science review of the effectiveness of rehabilitation interventions Leading experts conduct evidence based reviews of specific areas of brain injury rehabilitation summarizing what is known in each area critiquing the methodological problems of studies in the area and then outlining new directions for research The book begins with a review of the history of rehabilitation for TBI from World War I until the present The second section of the book examines the rehabilitation of specific cognitive impairments in awareness memory executive functioning communication and emotion and behavior The third section investigates special topics in rehabilitation of persons with TBI including substance abuse interventions for caregivers and vocational rehabilitation The fourth section of the book covers rehabilitation with specific populations children older adults and persons from diverse cultures The final section examines topics in medical rehabilitation including treatment of spasticity minimally conscious patients and the contribution of neuroimaging to rehabilitation *Traumatic Brain Injury as a Systems Neuroscience Problem* H. Isaac Chen,John F. Burke,Akiva S. Cohen,2017-04-27 Traumatic brain injury TBI is traditionally viewed as an anatomic and neuropathological condition Caring for TBI patients is a matter of defining the extent of an anatomical lesion managing this lesion and minimizing secondary brain injury On the research side the effects of TBI often are studied in the context of neuronal and axonal degeneration and the subsequent deposition of abnormal proteins such as tau These approaches form the basis of our current understanding of TBI but they pay less attention to the function of the affected organ the brain Much can be learned about TBI by studying this disorder on a systems neuroscience level and correlating changes in neural circuitry with neurological and cognitive function There are several aspects of TBI that are a

natural fit for this perspective including post traumatic epilepsy consciousness and cognitive sequelae How individual neurons contribute to network activity and how network function responds to injury are key concepts in examining these areas In recent years the available tools for studying the role of neuronal assemblies in TBI have become increasingly sophisticated ranging from optogenetic and electrophysiological techniques to advanced imaging modalities such as functional magnetic resonance imaging and magnetoencephalography Further progress in understanding the disruption and subsequent reshaping of networks is likely to have substantial benefits in the treatment of patients with TBI associated deficits In this Frontiers Topic we intend to highlight the systems neuroscience approach to studying TBI In addition to analyzing the clinical sequelae of TBI in this context this series of articles explores the pathophysiological mechanisms underlying network dysfunction including alterations in synaptic activity changes in neural oscillation patterns and disruptions in functional connectivity We also include articles on treatment options for TBI patients that modulate network function It is our hope that this Frontiers Topic will increase the clinical and scientific communities awareness of this viable framework for deepening our knowledge of TBI and improving patient outcomes

Early traumatic brain injury in Iceland Jonas G Halldorsson, 2013-04-14 Thesis for the Degree of Philosophiae Doctor *Brain Injury Medicine, 2nd Edition* Nathan D. Zasler, MD, Douglas I. Katz, MD, Ross D. Zafonte, DO, 2012-08-27 This book is a clear and comprehensive guide to all aspects of the management of traumatic brain injury from early diagnosis and evaluation through the post acute period and rehabilitation An essential reference for physicians and other health care professionals who work with brain injured patients the book focuses on assessment and treatment of the wider variety of clinical problems these patients face and addresses many associated concerns such as epidemiology ethical issues legal issues and life care planning Written by over 190 acknowledged leaders the text covers the full spectrum of the practice of brain injury medicine including principles of neural recovery neuroimaging and neurodiagnostic testing prognosis and outcome acute care rehabilitation treatment of specific populations neurologic and other medical problems following injury cognitive and behavioral problems post traumatic pain disorders pharmacologic and alternative treatments and community reentry and productivity [Paper 2 - Psychology in Context](#) Nick & Bethan Redshaw, 2016-09-06 IN BLACK AND WHITE Updated rewritten for the new specification this book covers the content for Paper 2 Psychology in Context including Approaches Research Methods and Biopsychology written by leading authors Nick and Bethan Redshaw **Resources in Education**, 1996 **The Evaluation and Treatment of Mild Traumatic Brain Injury** Nils R. Varney, Richard J. Roberts, 1999-05-01 Moving beyond the debate over whether and to what degree mild head injury has lasting neuropsychological sequelae this book is predicated on the assumption that it does cause some problems in some circumstances for some people It focuses on the practical questions of who is injured how injuries manifest themselves and what evaluation and treatment strategies are optimal for families as well as patients The distinguished authors bring to their task not only scientific expertise but extensive day to day

clinical experience This book will be widely welcomed as the first comprehensive overview of what we have learned from research and clinical experience about these difficult cases

Textbook of Traumatic Brain Injury Jonathan M. Silver, Thomas W. McAllister, David B. Arciniegas, 2018-12-13 Despite the increased public awareness of traumatic brain injury TBI the complexities of the neuropsychiatric neuropsychological neurological and other physical consequences of TBI of all severities across the lifespan remain incompletely understood by patients their families healthcare providers and the media Keeping pace with advances in the diagnosis treatment and science of TBI the Textbook of Traumatic Brain Injury Third Edition comprehensively fills this gap in knowledge Nearly all 50 chapters feature new authors all of them experts in their field Chapters new to this edition include biomechanical forces biomarkers neurodegenerative dementias suicide endocrine disorders chronic disease management and social cognition An entirely new section is devoted to the evaluation and treatment of mild TBI including injuries in athletes military service members and veterans and children and adolescents These chapters join newly updated sections on the assessment and treatment of the cognitive emotional behavioral and other physical sequelae of TBI The Textbook of Traumatic Brain Injury is a must read for all of those working in any of the multitude of disciplines that contribute to the care and rehabilitation of persons with brain injury This new volume is also a potentially useful reference for policymakers in both the public and private sectors

Neuropsychological Management of Mild Traumatic Brain Injury Sarah A. Raskin, Catherine A. Mateer, 1999-11-11 Despite the importance of the problem strikingly little has been written about effective approaches to the treatment of individuals with mild to moderate brain injury This book is designed for neuropsychologists counseling and rehabilitation psychologists and other rehabilitation professionals who work with individuals who have sustained brain injuries of mild to moderate severity It provides a context for understanding and evaluating the common consequences of such injuries and offers both theoretical perspectives and practical suggestions for helping individuals to adjust to and compensate for residual difficulties Early chapters focus on different domains of cognitive functioning while later chapters describe clinical approaches to helping clients manage common emotional reactions such as depression irritability and anxiety While the book acknowledges and discusses the controversy about the origins of persistent symptoms following mild brain injuries it does not focus on the controversy Rather it adopts a what works approach to dealing with individuals who have persistent symptoms and perceptions that contribute to disability and to emotional distress Many of these individuals benefit significantly from neuropsychological intervention Case examples throughout the book illustrate the adaptation of cognitive cognitive behavioral and traditional psychotherapeutic approaches to individuals with mild to moderate brain injury Self regulation and self management of both cognitive failures and emotional responses are described as appropriate and effective in this population

Disability and the Life Course Mark Priestley, 2001-07-05 Disability and the Life Course first published in 2001 explores the global experience of disability using a novel life course approach The book explores how disabling societies impact on disabled people s life experiences and

highlights the ways in which disabled people have acted to take more control over their own lives It provides a unique combination of analysis policy issues and autobiography offering the reader a rare opportunity to make links between the theoretical the political and the personal in a single volume The material is set in a truly international context with contributions from thirteen different countries bringing together established and emerging writers both disabled and non disabled The book bridges some important gaps in the existing disability literature by including issues relevant to disabled people of all ages and with different kinds of impairments and also by offering a unique analysis of the relationship between disability and generation in a changing world

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