The Hong Kong Society of
Child Neurology & Developmental Paediatrics

Annual Scientific Meeting

19-22 September, 2003
Hong Kong

Paediatric Neurocritical Care

Course Director
Dr. Robert Tasker
University Lecturer in Paediatrics and Intensive Care
School of Clinical Medicine, University of Cambridge
Consultant Paediatrician, Addenbrooke's Hospital
Cambridge
UK

TABLE OF CONTENTS

Organizing Committee

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PROGRAM AT A GLANCE

	19 Sep Friday	20 Sep Saturday	21 Sep Sunday	22 Sep Monday
Venue	QEH Blk M G/F	QEH Blk R 12/F	QEH Blk M G/F	Miramar Hotel
AM			***Seminar III*** **Status Epilepticus** 9:30-10:30 **"Status Epilepticus – Acute Care"** by Dr Robert TASKER 10:30-11:00 Discussion & Tea 11:00-12:15 Local presentations Dr. Ada YUNG Dr. NG Yiu Ki Dr. KWONG Ling 12:15-12:30 Discussion	
Lunch		13:00-14:00	12:30-14:00	
PM		***Seminar II*** **Head Injury-Long Term Effects & Management** 14:00-15:00 Local presentations Dr. Dawson FONG Dr. Kate LEUNG 15:00-15:30 Discussion & Tea 15:30-16:30 **"Head Injury-Long Term Outcomes and Late Effects on Cerebral Morphometry"** by Dr. Robert TASKER 16:30-17:00 Discussion	***Seminar IV*** **Hypoxic-Ischaemic Injury** 14:00-15:15 Local presentations Dr. CHEUNGPik To Prof. FOK Tai Fai Dr. CHOW Yu Fat 15:15-15:45 Discussion & Tea 15:45-16:45 **"Pattern of Hypoxic-ischaemic Injury and Intensive Care"** by Dr. Robert TASKER 16:45-17:00 Discussion	
Evening	***Seminar I*** **Head Injury– Acute & Critical Care** 19:00-20:00 Light Buffet 20:00-21:45 **"Head Injury-Acute and Critical Care"** by Dr. Robert TASKER 21:45-22:00 Discussion			Plenary Lecture 19:00 Cocktail 20:00-21:00 **"Head Injury and Neuroscience-inside Fragile Minds"** by Dr. Robert TASKER 21:00-22:00 Chinese Banquet Dinner

COURSE DIRECTOR

Dr. Robert C TASKER
MA MB MD FRCP FRCPCH DCH
University Lecturer in Paediatrics and Intensive Care, Department of Paediatrics
University of Cambridge School of Clinical Medicine
Addenbrooke's Hospital, Hills Road
Cambridge CB2 2QQ

CURRENT APPOINTMENTS

Academic

University Lecturer	Clinical School, Cambridge University
June 1998 - present	**Awarded tenure November 2000**

Clinical (Honorary National Health Service)

Consultant Paediatrician	Addenbrooke's Hospital NHS Trust,
June 1998 - present	Hills Road, Cambridge CB2 2QQ.

UNIVERSITY EDUCATION & TRAINING (DOB 18 January 1958)

Selwyn College, Cambridge University	1976 - 1979
The Royal London Hospital Medical College	1979 - 1982
The Johns Hopkins Medical School	1990 - 1991

DEGREES & DIPLOMAS

B.A., Medical Sciences (Cambridge)	June 1979
M.B., B.S. (London)	July 1982
M.A. (Cambridge)	March 1983
Diploma in Child Health (London)	March 1985
M.R.C.P. (U.K.)	April 1986
F.R.C.P. (U.K.)	May 1996
F.R.C.P.C.H.	April 1997
M.D. (Cambridge)*	July 1999

*Dr. Tasker's thesis on 'Early Postischaemic Mechanisms of Brain Injury in Infancy' was awarded the status of "starred dissertation" by Cambridge University. Out of all his submissions to the School of Clinical Medicine, for the academic year 1997/8, his dissertation achieved first equal marks with a luminosity score of 0.9 (maximum 1.0). For this achievement, Dr. Tasker was awarded one of the University's Ralph Noble Prizes.

NATIONAL AND INTERNATIONAL PRIZES

National prize

British Diabetic Association	Cudworth Prize winner, 1992/3

International (European)

European Society of Paediatric Intensive Care	Dräger Prize winner, 1993/4

GENERAL ACADEMIC ACTIVITIES

Dr. Tasker holds teaching appointment in Selwyn College, Cambridge and obtained teaching qualification from Institution for learning and Teaching Higher Education in 2002. Dr. Tasker is also examiner (both local and overseas) for undergraduate, graduate and professional examinations.

PREVIOUS THEMES OF RESEARCH

1. Acute respiratory failure in infants and children
2. Inhaled nitric oxide therapy for mechanically ventilated infants and children
3. Postischaemic mechanisms of neuronal injury and recovery

RESEARCH ASSESSMENT EXERCISE (RAE) 2001/02 SUBMISSION

Dr. Tasker has submitted 4 original papers for the 2001 assessment exercise, titles included:

1. Bioenergetic recovery following ischemia in brain slices studied by 31P-NMR spectroscopy: differential age effect of depolarization mediated by endogenous nitric oxide.
2. Early postischemic dantrolene-induced amelioration of poly(ADP-ribose) polymerase-related bioenergetic failure in neonatal rat brain slices.
3. Distinct patterns of respiratory difficulty in young children with achondroplasia: a clinical, sleep, and lung function study.
4. Hypercarbia or mild hypothermia, only when not combined, improve postischemic bioenergetic recovery in neonatal rat brain slices.

CURRENT RESEARCH AND COLLABORATIONS

Since moving to Cambridge Dr. Tasker have developed his own ideas around the problem of head injury in children with studies ranging from the initial ictus, through recovery from coma and rehabilitation, to final outcome. Dr. Tasker has also started to consolidate some of these ideas into a theme of research based around the steroid stress response and the brain in childhood.

In regard to translating these plans into funded research, Dr. Tasker has embarked on the following:

1. Pilot neurobehavioural studies supported by locally raised funds (41 children and families recruited).
2. National head injury audit and research collaboration composed of 22 centres caring for children with acute, severe head injury.
3. Acute brain injury: heterogeneity of mechanisms, therapeutic targets and outcome effects.
4. Collaborator on a Wellcome Trust grant held by Professor David Gadian (Institute of Child Health, London). This Department supports his acute brain slice work.

EDITORSHIPS

Section Editor, Intensive Care Medicine (Pediatric and Neonatal Section)	1999 - present
Research Editor, Critical Care Forum (Paediatric Section)	1999 - present
Associate Editor, Pediatric Critical Care Medicine	2001 - present

PROFESSIONAL ACTIVITIES

Dr. Tasker is involved in working parties, steering groups and advisory work (both regional and national) on areas of his expertise.

PUBLICATIONS

Peer reviewed observations and journal reports: 79
Book chapters and textbook contributions: 27

SESSION I

Head Injury: Acute and Critical care

Dr. Robert C TASKER
University Lecturer in Paediatrics and Intensive Care,
School of Clinical Medicine, University of Cambridge,
Consultant Paediatrician, Addenbrooke's Hospital, Cambridge, UK.

The majority of severely head injured children will not require neurosurgery. For the pediatrician, the central question must be whether medical interventions are effective in limiting morbidity and treating the problem of cerebral oedema. However, in order to address this issue we need to give some thought to the system of care in which we practice, how we assess the severity of brain injury and whether, in regard to pathophysiology, responses in children are significantly different from those seen in adults. In this regard, this review highlights some of the recent pediatric neurocritical care literature and provides, for the clinician, a framework on which to base ones medical management of severe traumatic brain injury occurring in childhood.

(see Indian J Pediatr. 2001;68:257-66).

SESSION II

Head Injury: Long Term Outcomes and Late Effects on Cerebral Morphometry

Dr. Robert C TASKER
University Lecturer in Paediatrics and Intensive Care,
School of Clinical Medicine, University of Cambridge,
Consultant Paediatrician, Addenbrooke's Hospital, Cambridge, UK.

Treating and limiting intracranial hypertension complicating head injury is fundamental in the practice of neurological critical care. There has, however, been a failure to identify whether our treatment limits exacerbating pathophysiology, or merely relieves a symptom. In our studies our aim has been to determine whether head injury-induced brain abnormalities detected by late magnetic resonance imaging differed in those who had significantly raised ICP during acute ictus compared with those who did not. We have refured three hypotheses: no difference in anthropometry, head size and cerebral morphometry; no difference with respect to degree of bilateral involvement of cerebral sub-regional volumes or hemisphere diffusion tensor findings; and, in the two groups, difference in hippocampal volume is attributable to diffuse rather than focal injury. Our data suggest dual but separate effects on post-ictal brain growth and cerebral morphometry in relation to ICP.

SESSION III

Status Epilepticus - Acute Care

Dr. Robert C TASKER
University Lecturer in Paediatrics and Intensive Care,
School of Clinical Medicine, University of Cambridge,
Consultant Paediatrician, Addenbrooke's Hospital, Cambridge, UK

Of utmost importance in the practice of neurological critical care is the treatment of cerebral edema, when possible, and the control of life-threatening seizures. In this regard, severe traumatic head injury and refractory status epilepticus are useful clinical therapeutic paradigms. Evidence-based treatment established for these conditions has, by necessity, a wider application to other much less frequent causes of coma and acute neurological illness managed in the intensive therapy unit. Therefore, this review of pediatric neurocritical care literature highlights central clinical reports of the medical management of severe traumatic brain injury, the benzodiazepines used in the treatment of status epilepticus, and the emerging or recently appreciated encephalopathies occurring in children.

(see Curr Opin Pediatr. 2000;12:222-6 and Arch Dis Child. 1998;79:78-83).

SESSION IV

Patterns of Hypoxic-Ischaemic Injury and Intensive Care

Dr. Robert C TASKER
University Lecturer in Paediatrics and Intensive Care,
School of Clinical Medicine, University of Cambridge,
Consultant Paediatrician, Addenbrooke's Hospital, Cambridge, UK

See Pharmacological advance in the treatment of acute brain injury. Arch Dis Child. 1999;81:90-5.

PLENARY LECTURE

Head Injury and Neuroscience - inside Fragile Minds

Dr. Robert C TASKER
University Lecturer in Paediatrics and Intensive Care,
School of Clinical Medicine, University of Cambridge,
Consultant Paediatrician, Addenbrooke's Hospital, Cambridge, UK

This lecture will bring together clinical and neuroscience perspectives in head injury care. Questions that have arisen over the last 20 years first concentrated on how we should mange such individuals. Next we tried to address how we could protect the brain. Now, our emphasis is on how we can influence growth, development, and plasticity during rehabilitation.

The clinical perspective to this lecture is focused on the phenomenon of 'selective vulnerability'. For example, when acute brain insults occur during infancy or childhood, there is the potential for injury to selective or more vulnerable regions. The sequelae may not be immediately apparent. However, later on in childhood, such affected children begin to exhibit a disabling, limited form of global anterograde amnesia, which is characterized by a severe impairment of episodic memory with relative preservation of semantic memory. This syndrome is not the same as that described in some adult-onset cases with very extensive medial temporal damage, in whom there appears to be nearly total inability to acquire new long-term cognitive memories of any kind. Rather, such children may go through the education system, but on closer scrutiny be found to have behavioural and cognitive performance problems in association with smaller hippocampal volumes .

In the 1920s to 1930s this regional vulnerability within the hippocampus led to a graphic discussion between two authorities of neuropathology: Spielmeyer (1927) favoured 'Angiospasmus', or vascular factors, as the underlying cause; as opposed to Vogt and Vogt (1936) who developed the concept of 'Pathoclisis', stating that intrinsic differences in the physiology and biochemistry of neurons were responsible for the regional differences. Nowadays, however, both vascular and intrinsic factors form the basis for continued research into the brain injury induced by cerebral ischaemia.

Background* 'KEY POINTS ON HEAD INJURY' *for the clinician

1. Head injury is the single most common cause of death in children in developed countries.
2. More than 90% of children with head injuries are managed without the need for neurosurgical intervention.
3. In the comatose patient, the objective for acute head injury care is to limit hypoxia and hypotension. Hence, it is important to manage the airway effectively, assure oxygenation, and maintain the circulation as a priority.
4. Raised ICP should be suspected in any head-injured child with a deteriorating level of consciousness or a GCS below 9. If suspected, patients should be acutely managed with oral endotracheal intubation and mechanical ventilation, and intravenous mannitol.
5. Emergency cerebral imaging is required in specific instances in order to exclude the need for surgical intervention.
6. Avoid and treat factors that may precipitate a rise in ICP. These include hypercarbia, hypoxia, hypoglycaemia, hypotension, hyponatraemia, fluid overload and seizures.
7. Regional medical guidelines should be drawn up with the purpose of ensuring consistency in acute management.

READING LIST

EPIDEMIOLOGY

1. Attewell RG, Glase K, McFadden M. Bicycle helmet efficacy: a meta-analysis. *Accid Anal Prev* 2001May; 33 (3) : 345-52.
2. Jennett B, Macmillan R. Epidemiology of head injury. *BMJ* 1981; 282 : 101-104.
3. Kraus JF. Epidemiological features of brain injury in children: occurrence, children at risk, causes and manner of injury, severity, and outcomes. In: Broman SH, Michel ME (ed) *Traumatic Head Injury in Children.* Oxford University Press, Inc 1995 : 22-39.
4. Marsh H, Maurice-Williams RS, Hatfield R. Closed head injuries: where does delay occur in the process of transfer to neurosurgical care? *Br J Neurosurg* 1989; 3 : 13-20.

SCORING

1. Gordon NS, Fois A, Jacobi G, Minns RA, Seshia SS. Consensus statement: the management of the comatose child. *Neuropediatrics* 1983; 14 : 3-5.
2. Morray JP, Tyler DC, Jones TK, Stuntz JT, Lemire RJ. Coma scale for use in brain injured children. *Crit Care Med* 1984; 12 : 1018-1020.
3. Raimondi AJ, Hirschauer J. Head injury in the infant and toddler: coma scoring and outcome scale. *Childs Brain* 1984; 11 : 12-35.

4. Simpson DA, Cockington RA, Hanieh A, Raftos J, Reilly PL. Head injuries in infants and young children: the value of the Paediatric Coma Scale. Review of leterature and report on a study. *Childs Nerv Syst* 1991; 7 : 183-190.

5. Tatman A, Warren A, Wilkliams A, Powell JE, Whitehouse W. Development of a modified paediatric coma scale in intensive care clinical practice. *Arch Dis Child* 1997; 77 : 519-521.

6. Teasdale G, Jennett B. Assessment of coma and impaired consciousness: a practical scale. *Lancet* 1974; 2 : 81-84.

OUTCOME

1. Feltcher JM, Ewing-Cobbs L, Francis DJ, Levin HS. Variability in outcomes after traumatic brain injury in children: a developmental perspective. In Broman SH, Michel ME (ed) *Traumatic Head Injury in Children*. Oxford University Press, Inc 1995 : 10-11.

REPORTS

1. *Better Care for the Severely Injured. A Joint Report from The Royal College of Surgeons of England and the British Orthopaedic Association.* London: RCS, 2000.

2. Brain Trauma Foundation, American Association of Neurological Surgeons, Joint Section on Neurotrauma and Critical Care. Guidelines for the management of severe head injury. *J Neurotrauma* 1996; 13 : 641-734.

MANAGEMENT

1. Alderson P, Roberts I. Corticosteroids for acute traumatic brain injury. *Cochrane Database Syst Rev* 2000; 2 : CD000196.

2. Clifton GL, Miller ER, Choi SC, *et al*. Lack of effect of induction of hypothermia after acute brain injury. *N Engl J Med* 2001; 344 : 556-563.

3. Dickinson K, Bunn F, Reinhard W, Edwards P, Roberts I. Size and quality of randomised controlled trials in head injury: review of published studies. *BMJ* 2000; 320 : 1308-1311.

4. Ghajar J, Hariri RJ, Narayan RK *et al*. Survey of critical care management of comatose, head-injured patients in the United States. *Crit Care Med* 1995; 23 : 560-567.

5. Jeevratnam DR, Menon DK. Survey of intensive care of severely head injured patients in the United Kingdom. *BMJ* 1996; 312 : 944-947.

6. Matta B, Menon D. Severe head injury in the United Kingdom and Ireland: a survey of practice and implications for management. *Crit Care Med* 1996; 24 : 1743-1748.

7. Schierhout G, Roberts I. Hyperventilation therapy for acute traumatic brain injury. *Cochrane Database Syst Rev* 2000; 2 : CD000566.

8. Schierhout G, Roberts I. Anti-epileptic drugs for preventing seizures following acute traumatic brain injury. *Cochrane Database Syst Rev* 2000; 2 : CD000173.

9. Segal S, Gallagher AC, Shefler AG, Crawford S, Richards P. Survey of the use of intracranial pressure monitoring in children in the United Kingdom. Intensive Care Med 2001; 27 (1) : 236-239.

10. Tasker RC. Neurocritical care and traumatic brain injury. *Indian J Pediatr* 2001; 68 (3) : 257-266.