Cerebral Blood Flow in Acute Head Injury

The Regulation of Cerebral Blood Flow and Metabolism During the Acute Phase of Head Injury, and Its Significance for Therapy

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With 16 Figures

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Preface

The present studies were carried out at the Department of Neurosurgery G, Århus University Hospital 1970–1973; at the Department of Anesthesiology, Hvidovre University Hospital, Copenhagen, 1976–1977; and finally at the Department of Neurosurgery GS, Århus University Hospital, 1986–1987. Accordingly, I want to thank the chiefs of these departments, Professor Richard Malmros, Professor Peter Rasmussen, and Jens Buhl in Århus, and Professor Henning Ruben in Copenhagen.

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Georg Emil Cold

This review is based on the following previously published papers:

I Cold GE, Jensen FT, Malmros R (1977) The cerebrovascular CO_2 reactivity during the acute phase of brain injury. Acta Anaesthesiol Scand 21: 222–231.

II Cold GE, Jensen FT, Malmros R (1977) The effects of $PaCO_2$ reduction on regional cerebral blood flow in the acute phase of brain injury. Acta Anaesthesiol Scand 21: 359–367.

III Cold GE (1978) Cerebral metabolic rate of oxygen ($CMRO_2$) in the acute phase of brain injury. Acta Anaesthesiol Scand 22: 249–256.

IV Cold GE, Jensen FT (1978) Cerebral autoregulation in unconscious patients with brain injury. Acta Anaesthesiol Scand 22: 270–280.

V Cold GE, Jensen FT (1980) Cerebral blood flow in the acute phase after head injury. Part I: Correlation to age of the patients, clinical outcome and localization of the injured region. Acta Anaesthesiol Scand 24: 245–251.

VI Cold GE, Christensen MS, Schmidt K (1981) Effect of two levels of induced hypocapnia on cerebral autoregulation in the acute phase of head injury coma. Acta Anaesthesiol Scand 25: 397–401.

VII Cold GE (1986) The relationship between cerebral metabolic rate of oxygen and cerebral blood flow in the acute phase of head injury. Acta Anaesthesiol Scand 30: 453–457.

VIII Cold GE (1989) Does acute hyperventilation provoke cerebral oligaemia in comatose patients after acute head injury? Acta Neurochir (Wien) 96: 100–106.

IX Cold GE (1989) Measurements of CO_2 reactivity and barbiturate reactivity in patients with severe head injury. Acta Neurochir (Wien) 98: 153–163.

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Abbreviations

$AVDO_2$	Arterio-venous difference of oxygen
BBB	Blood-brain barrier
BI	Brain injury
CA	Cerebral autoregulation
CBF	Cerebral blood flow
CBV	Cerebral blood volume
$CMRO_2$	Cerebral metabolic rate of oxygen
CPP	Cerebral perfusion pressure
CVP	Central venous pressure
CVR	Cerebral vascular resistance
CPH	Controlled prolonged hyperventilation
CSF	Cerebrospinal fluid
GCS	Glasgow coma score
HI	Head injury
ICP	Intracranial pressure
IH	Intracranial hypertension
MABP	Mean arterial blood pressure
MCAO	Middle cerebral artery occlusion
MR	Magnetic resonance