

UNIVERSITY OF PRETORIA



20TH Annual Controversies and
Problems in Surgery 2016

*Theme: New Techniques and Novel Solutions for Common Surgical
Problems”*

UPDATE OF SEVERE TBI MANAGEMENT

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Denkleiers • Leading Minds • Dikgopolo tša Dihalefi

PRESENTATION OUTLAY



- (A) EPIDEMIOLOGY
- (B) PATHOPHYSIOLOGY
- (C) CURRENT MANAGEMENT
- (D) REFRACTORY RAISED ICP
- (E) HYPOTHERMIA AND INDUCED COMA



(A) EPIDEMIOLOGY



- *Acta Neurochir 148: 255 – 268 (2006)*
- Focus on European countries
- Incidence:
235 new cases / 100,000 / year
Mild TBI : Mod TBI : Severe TBI = 22 : 1,5 : 1
- Prevalence: (Total TBI cases at a point in time)
Europe 7,8 millions ; cf. USA 5,3 millions
- Mortality:
Italy: – 24,4 / 100,000 / year
- Case Fatality Rate: 3 / 100 (hosp); 11 / 100 (all)



(B) PATHOPHYSIOLOGY/CLASSIF.

- TBI Mild TBI GCS: 13/15 – 15/15
 Mod TBI GCS: 9/15 – 12/15
 Severe TBI: GCS 3/15 – 8/15

MiTBI:MoTBI:SeTBI = 22:1.5:1

Miller: mort = 0.4%:4%:40% (1960s)

- Primary Brain injury/damage
- Secondary Brain Damage

CPP = MAP - ICP



(C) CURRENT MANAGEMENT SEV. TBI

- Phenytoin; ICPM (ICP > 20 mm Hg)
- Intubate, sedate and paralyse (eg Vecuronim)
- Ventilate: PaO₂ 80 mm Hg – 100 mm Hg
PaCO₂ 30 mm Hg – 35 mm Hg
- Mannitol: Osmolality < 315 mOsm/kg
- Barbiturate coma
- If Refractory Raised ICP :-
CPP = 70 mm Hg; PbtO₂ > 15
Decompressive Craniotomy
Therapeutic Hypothermia



(D) HYPOTHERMIA+ INDUCED COMA

- Effects of profound hypothermia(brain):
 - ↓ Oxygen consumption; ↓ CO₂ production
- Effects of mild hypothermia(brain):
 - ↓EAA(glutamate), ↓ neurotransm. (damaging)
Protects against BBB permeability (trau/isch)
 - ↓ deleterious inflammatory events
 - ↓ apoptotic cell death

Therefore Therapeutic Hypothermia has the potential to be neuroprotective !!



HYPOTH/INDUCED COMA CONT.

- 1960 ... 1970: overtaken by barbiturates, etc
- 1993 Clifton et al: 15 % improved @ 6 mths
- 1997 Marion et al: 38% improvement
- Both at 32 degr C whole body cooling!
- But phase 3 prospective double blind trials were and are still equivocal!
- However TH useful in ischaemic stroke, cardiac arrest resuscitation, and in the treatment of neurogenic hyperthermia.
- ? Time of onset; ? Duration; work is ongoing!!!





ARCTIC SUN (NEW DEVELOPMENT)





ARCTIC SUN MONITOR



WORK STILL ONGOING...

WHAT IS HAPPENING TO....

MICHAEL SCHUMAKER???

