Acute Non-Traumatic Coma in Childhood

Sam Gwer
So who has Coma

British Man Pleads Guilty After Faking 2 Year Coma to Avoid Court, Cops Say
So who has Coma

### Table 1. Coma scales used in the study.

<table>
<thead>
<tr>
<th>Blantyre coma scale</th>
<th>Glasgow coma scale</th>
<th>Adelaide paediatric coma scale</th>
<th>AVPU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye response</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directed eye movement</td>
<td>1 Spontaneous</td>
<td>4 Spontaneous</td>
<td>4 Alert</td>
</tr>
<tr>
<td>Not directed</td>
<td>0 To speech</td>
<td>3 To speech</td>
<td>3 Voice</td>
</tr>
<tr>
<td></td>
<td>0 To pain</td>
<td>2 To pain</td>
<td>2 Pain</td>
</tr>
<tr>
<td></td>
<td>0 None</td>
<td>1 None</td>
<td>1 Unresponsive</td>
</tr>
<tr>
<td><strong>Best verbal response</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate cry</td>
<td>2 Oriented</td>
<td>5 Oriented</td>
<td>5</td>
</tr>
<tr>
<td>Inappropriate cry/moan</td>
<td>1 Confused</td>
<td>4 Words</td>
<td>4</td>
</tr>
<tr>
<td>No cry</td>
<td>0 Inappropriate words</td>
<td>3 Vocal sounds</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0 Incomprehensible sounds</td>
<td>2 Cries</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>0 None</td>
<td>1 None</td>
<td>1</td>
</tr>
<tr>
<td><strong>Best motor response</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Localises pain</td>
<td>2 Obey</td>
<td>6 Obey commands</td>
<td>5</td>
</tr>
<tr>
<td>Withdraws from pain</td>
<td>1 Localises</td>
<td>5 Localises pain</td>
<td>4</td>
</tr>
<tr>
<td>No response</td>
<td>0 Withdraws</td>
<td>4 Flexion to pain</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0 Abnormal flexion</td>
<td>3 Extension to pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>0 Extensor response</td>
<td>2 None</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0 None</td>
<td>1 Unresponsive</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total 0–5</strong></td>
<td>Total 3–15</td>
<td>Total 3–14</td>
<td>Total 1–4</td>
</tr>
</tbody>
</table>
Epidemiology and prognosis of coma in daytime television dramas

David Casarett, Jessica M Fishman, Holly Jo MacMoran, Amy Pickard, David A Asch

89% Recovery Rate, 86% no functional deficit on the day of recovery
Childhood Acute Non-Traumatic Coma

- Up to 33% case fatality and significant occurrence of Neuro-cognitive sequelae
  - Impaired attention, memory, social functioning
  - Hearing loss
- Acute Bacterial Meningitis, Cerebral Malaria, Viral Encephalitides

Aetiology of Childhood Acute Non-Traumatic Coma in RPCs

Gwer 2013

(Bar chart showing the percentage of different causes of coma in different regions.)
Aetiology of Childhood Acute Non-Traumatic Coma in RPCs

Stroke (6-54%), Post-anoxic coma (3-42%), Poisoning (<1-39%) and Metabolic causes (1-29%)
Bacterial Aetiology

Gwer 2013
Viral Aetiology

Viral CNS infections in children from a malaria-endemic area of Malawi: a prospective cohort study

Maphescon Mallewa, Pam Vallely, Brian Faragher, Dan Banda, Paul Klapper, Movato Mukaka, Herriet Kholi, Paul Pensa, Tenin Taylor, Malcolm Molyneux, Tom Solomon

Summary
Background: Fever with reduced consciousness is an important cause of hospital admission of children in sub-Saharan Africa, with high mortality. Cerebral malaria, diagnosed when acute Plasmodium falciparum infection and coma are recorded with no other apparent reason, is one important cause. We investigated whether viruses could also be an important cause of CNS infection in such patients, and examined the relative contribution of viral pathogens and malaria parasitaemia.

Methods: We did a prospective cohort study in Blantyre, Malawi. From March 1, 2002, to Aug 31, 2004, we enrolled children aged between 2 months and 15 years who were admitted to hospital with suspected non-bacterial CNS infection.

Viral Aetiology in 26% (n/N:133/513)
Adenovirus 32%, Mumps 22%, HHV6 12%, Rabies 11%, CMV 9%, HSV1 6%, Enteroviruses 6%, Others 11%
Viral aetiology in 35% of clinical CM
Dual infection - increases risk of seizures and 38% mortality

Mallewa2013
Aetiology of Childhood Acute Non-Traumatic Coma in RPCs

Differentiating the pathologies of cerebral malaria by postmortem parasite counts

Terrie E Taylor1,2, Wenjiang J Fu3,11, Richard A Carr4, Richard O Whitten5, Jeffrey G Mueller8, Nelson G Fosiker2, Susan Lewallen7, N'George Liomba6 & Malcolm E Molyneux9,10

To study the pathogenesis of fatal cerebral malaria, we conducted autopsies in 31 children with this clinical diagnosis. We found that 23% of the children had actually died from other causes. The remaining patients had parasites sequestered in cerebral capillaries, and 75% of those had additional intra- and perivascular pathology. Retinopathy was...

Taylor 2004
Aetiology of Childhood Acute Non-Traumatic Coma in RPCs

- Unknown Encephalopathy: 238 (32%)
- Bacteremia: 18 (83%)
- Malaria: 363 (15%)
- Bacterial Meningitis: 10 (50%)
- 27 (22%) for the intersection of Malaria and Bacterial Meningitis

Gwer 2012
Risk Factors for Poor Outcome

• Seizures 48hrs after Admission (Seizures within 24 hours of Admission - Good Outcome)
• Features of Raised Intracranial Pressure
• Depth of Coma
• Hypotension
• Breathing Difficulties at Admission
• Bacterial and Viral Aetiology
Seizures and Non-Convulsive Seizures

- Clinical observations do not detect 2 out of every 3 observed seizures
- 93% of seizures on EEG can be detected by leads in 1-4 EEG channel leads
- The relationship between electrographic seizures and outcome is not clear
- What is the role of prophylactic antiepileptic drugs?
  - Fosphenytoin
  - Phenobarbital

Kariuki 2011
Raised Intracranial Pressure

- Raised ICP a common complication of non-traumatic encephalopathy
  Newton 1997, Kumar 2009

- Intensive monitoring and management of RICP and CPP could improve outcome Simma 1998, Khanna 2000

- Children with abnormal tympanometry had greater risk of death compared to those without
  (OR 16.3 95% CI 1.7, 158.5; P<0.001) Gwer 2013
Raised Intracranial Pressure

- Hypertonic Saline useful in acute traumatic and non-traumatic encephalopathy

- Oral glycerol may be useful in children with ABM
Abnormal Movements in Coma

- Seizures
- Posturing
- Shivering and Tremors
- Disordered gesticulation and attacks of orofacial dyskinesia
Other Stories

• Managing status epilepticus
• Mechanical ventilation
• Shock
• Steroids
Opportunities for Greater Elucidation

Aetiology
Co-morbidity
Predisposition - Genetic and Acquired