

## APPENDICES

**Appendix A: Antibiotics recommended for infections of the CNS (Source: from Reilly, P. L. and Simpson, D. A. (1995) *Cranio-cerebral injuries*, in *Cranio-maxillofacial Trauma*, (ed. D. J. David and D. A. Simpson), Churchill Livingstone, Edinburgh, pp. 367–396.)**

Organism	Treatment	
	Standard	Alternative
<b>Penicillin/amoxycillin-sensitive organisms</b>		
<i>Haemophilus influenzae</i> (beta-lactamase-negative)	Amoxycillin	Third-generation cephalosporin* Chloramphenicol
<i>Neisseria meningitidis</i>	Penicillin G	Third-generation cephalosporin* Chloramphenicol
<i>Streptococcus</i> species, including <i>Strep. pneumoniae</i>	Penicillin G	Third-generation cephalosporin* Chloramphenicol
<i>Staph. aureus</i> / <i>Staph. epidermidis</i> (beta-lactamase negative)	Penicillin G	Chloramphenicol, vancomycin
Anaerobic bacteria: <i>Clostridia</i> , <i>Fusobacteria</i>	Penicillin G	Metronidazole
<b>Moderately resistant organisms</b>		
<i>Haemophilus influenzae</i> (beta-lactamase-negative)	Third-generation cephalosporin*	Chloramphenicol
<i>Strep. pneumoniae</i> (moderately penicillin-resistant)	Third-generation cephalosporin*	Chloramphenicol
<i>Staph. aureus</i> (beta-lactamase positive)	Flucloxacillin	Vancomycin
<i>Enterobacteriaceae</i> (beta-lactamase inducible negative)	Third-generation cephalosporin*	Imipenem
<i>Bacteroides</i> species (beta-lactamase-positive)	Metronidazole	Chloramphenicol
<b>Very resistant organisms</b>		
<i>Enterobacteriaceae</i> (beta-lactamase-inducible-positive)	Imipenem ± aminoglycoside Anti-pseudomonad penicillin and aminoglycoside	Consult microbiologist Ceftazidime and aminoglycoside Imipenem with aminoglycoside
<i>Pseudomonas aeruginosa</i> <i>Staph. aureus</i> / <i>Staph. epidermidis</i> (methicillin resistant)	Vancomycin and rifampicin	Consult microbiologist

\* ceftriaxone or cefotaxime

## Appendix B: Seizure management in acute head injury

Seizures may arise as a result of the brain injury or from other pre-existing or concurrent factors. These should be identified and corrected where possible while the seizures are being treated.

- Treatment
1. Airway and oxygenation
  2. Intravenous glucose
  3. Anti-epileptic medication

### Initial treatment

Drug	Dose	Rate	Therapeutic range
Diazepam	5–10 mg i.v. (0.05–0.15 mg/kg) Maximum 30 mg	1 mg/min Maximum < 5 mg/min	
Phenobarbitone	10–20 mg/kg	< 60–100 mg/min	10–41 µg/ml
Phenytoin	15–20 mg/kg i.v.	50 mg/min (over a minimum of 20 minutes)	10–30 µg/ml
<i>Maintenance</i>			
Phenytoin	begin 6–8 h after the loading dose 5 mg/kg/24 h (equivalent to 300 mg/d for a 60 kg adult)		

## Appendix C: Possible causes of status epilepticus after head injury

- Drug withdrawal
  - Antiepileptic drugs
  - Alcohol
  - Benzodiazepines
  - Short-acting barbiturates
- Antibiotic and drug reactions
  - Penicillin
  - CSF contrast media
- Fluid and electrolyte disturbances
  - Water intoxication including SIADH
  - Hypocalcemia and hypomagnesemia
- Hypoxia
- Hypoglycemia
- CNS infections
  - Meningitis
  - Encephalitis
  - Brain abscess
  - Subdural empyema
- Cerebrovascular disease
  - Venous thrombosis
  - Thromboembolic arterial occlusion

Aiminoff, M. J. and Simon, R. P. (1980) Status epilepticus. Causes, clinical features and consequences in 98 patients. *American Journal of Medicine*, **69**, 675–666.

Pike, A., Partinene, M. and Kovanen, J. (1984) Status epilepticus and alcohol abuse: an analysis of 82 status epilepticus admissions. *Acta Neurologica Scandinavica*, **70**, 443–450.

## Appendix D: Cardiovascular drugs used for augmentation of cerebral perfusion pressure

General principles: (Refer to Section 17.5.2 (g): pp. 355–357)

1. Ensure euvolemia: hypotension due to hypovolemia is the most common cause of low cerebral perfusion pressures and must be assiduously monitored and corrected.
2. The use of inotropes and vasopressors in other than very small doses requires regular hemodynamic monitoring: intra-arterial line, central venous pressure and where indicated a pulmonary artery catheter.
3. Mean arterial pressure and cardiac output should be interpreted in the context of pre-morbid cardiac function.
4. No single inotrope (or mixture of inotropes) has been shown to be superior to another. Selection of an inotrope or vasopressor is made according to experience and familiarity. If the desired perfusion pressure is not attained or complications arise change to a different agent.
5. Administration:
  - (a) All infusions must be administered through a central vein using volumetric infusion pumps.
  - (b) Start infusion at 3–5 ml/h and titrate until the desired perfusion pressure is reached.

Agent	Dose (solutions in 5% dextrose)	$\beta_1$ effects + Chronotropy + Dromotropy + Inotropy	$\beta_2$ effects + Inotropy Vasodilatation Bronchodilatation	$\alpha_1$ effects + Inotropy Vasoconstriction	$\alpha_2$ effects + Inotropy Vasoconstriction
<b>Inotropes</b>					
Adrenaline	6 mg/100 ml <sup>1</sup>	} $\beta$ effects predominate at low dose		$\alpha$ effects predominate at high dose	
Noradrenaline	6 mg/100 ml <sup>1</sup>				
Dopamine	400 mg/100 ml <sup>2</sup>				
Dobutamine <sup>3</sup>	500 mg/100 ml <sup>2</sup>				
Isoprenaline <sup>3</sup>	6 mg/100 ml <sup>1</sup>	+	+	(+)	–
<b>Vasopressors</b>					
Metaraminol	10 mg/100 ml	–	–	+	+
Phenylphrine	10 mg/100 ml	–	–	+	+

+ = Strong effect; (+) = moderate effect; – = no effect.

1. Rate in ml/h approximates  $\mu\text{g}/\text{min}$ .

2. Rate in ml/h approximates  $\mu\text{g}/\text{kg}/\text{min}$ .

3. These agents are predominantly vasodilators and should be used with caution in head injury.

