PHC Chapter 21: Emergencies and injuries

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21.1 CARDIOPULMONARY ARREST– CARDIOPULMONARY RESUSCITATION

The following conditions are emergencies and must be treated as such. Medicines used for treatment must be properly secured and recorded (time, dosage, route of administration) on the patient’s notes and on the referral letter.

21.1.1 CARDIAC ARREST, ADULTS

I46.9

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**DESCRIPTION**

Described as the loss of a heart beat and a palpable pulse, irrespective of the electrical activity captured on ECG tracing.

Irreversible brain damage can occur within 2–4 minutes.

Clinical features include:

1. sudden loss of consciousness
2. absent carotid and all other pulses
3. loss of spontaneous respiration

**EMERGENCY TREATMENT**

1. Diagnose rapidly.
2. Make a note of the time of starting resuscitation.
3. Place the patient on a firm flat surface and commence resuscitation immediately.
4. Document medication given and progressafter the resuscitation.
5. Follow instructions as per algorithm.

**HAZARDS, HELLO, HELP**

1. Assess for any hazards and remove. Make use of personal protective equipment i.e. gloves, masks.
2. Speak to the patient. If they respond, turn into recovery position and continue management as directed by findings.
3. If no response, check for carotid pulse and breathing. Take no longer than 10 seconds.
4. Call for skilled help and an automated external defibrillator (AED) or defibrillator.

**CARDIOPULMONARY RESUSCITATION (CPR)**

1. Initiate CAB (Circulation Airways Breathing) sequence of CPR (cardiopulmonary resuscitation).

**C**irculation

1. If there is no pulse or you are not sure, start with 30 chest compressions at a rate of 100-120 compressions per minute, and a depth of 5-6 cm.
2. Allow full chest recoil between compressions
3. Minimize interruptions during compressions

### Airway and Breathing

1. To open the airway, lift the chin forward with the fingers of the one hand and tilt the head backwards with other hand on the forehead. Do not do this where a neck injury is suspected.
2. If there is no normal breathing, give 2 breaths with bag-valve-mask resuscitator and face mask.
3. The administered breaths must cause visible chest rise.
4. If not able to perform breaths, continue compressions. (Reposition head and insert correctly sized oropharyngeal airway and try again after 30 compressions).

**Where neck injury is suspected:**

1. To open the airway, use a jaw thrust:

* place your fingers behind the jaw on each side.
* Lift the jaw upwards while opening the mouth with your thumbs “Jaw thrust”

1. Ideally use a 3rd person to provide in-line manual stabilization of the neck

Repeat the cycle of 30 compressions followed by 2 breaths (30:2) until the AED or defibrillator arrives.

**AED/Defibrillator**

Attach leads and analyse rhythm:

1. If shock advised: (ventricular fibrillation or pulseless ventricular tachycardia)
   * deliver 1 shock
   * immediately resume CPR
   * continue cycles of 30:2 for 2 minutes, then re-assess for a pulse
2. If no shock advised: (asystole or pulseless electrical activity)
   * if no pulse or respirations
   * immediately resume CPR
   * continue cycles of 30:2 for 2 minutes, then re-assess for a pulse

# Immediate emergency medicine treatment:

Adrenaline (epinephrine) is the mainstay of treatment and should be given immediately, IV or endotracheal, when there is no response to initial resuscitation or defibrillation.

* + Adrenaline (epinephrine), 1:1 000, 1 mL, IV immediately as a single dose.
    - Flush with 5–10 mL of sterile water or sodium chloride 0.9%.
    - Repeat every 3–5 minutes during resuscitation.

If no IV line is available

* + Adrenaline (epinephrine), endotracheal, 1:1 000, 2 mL through endotracheal tube.
  + Flush with 5–10 mL of sterile water or sodium chloride 0.9%.
  + Repeat every 3–5 minutes during resuscitation.

**OR**

* Adrenaline, intra-osseous (IO), 1:1000, 1 mL, via IO line.

|  |
| --- |
| *LoE: III[[1]](#endnote-3)* |

**ADDITIONAL GUIDANCE**

Connect bag-valve-mask resuscitator to 100% oxygen at 10-15L/min flow.

Check glucose and treat hypoglycaemia.

Continue CPR until spontaneous breathing and/or heart beat returns.

Assess continuously (every 2 minutes) until the patient shows signs of recovery.

Consider stopping resuscitation attempts and pronouncing death if:

1. further resuscitation is clearly clinically inappropriate, e.g. incurable underlying disease, or
2. no success after all the above procedures have been carried out for ≥30 minutes and no reversible cause detected.
3. No success after all of above procedures have been carried out for ≥30 minutes and the rhythm is asystole or pulseless electrical activity.

Consider carrying on for longer especially when:

1. hypothermia and drowning
2. poisoning or medicine overdose or carbon monoxide poisoning

21.1.2 CARDIOPULMONARY ARREST, CHILDREN

I46.9

**SEE FLOW DIAGRAM (page xxxx)**

|  |
| --- |
| The most experienced clinician present should take control of the resuscitation. |

**DESCRIPTION**

Cardiopulmonary arrest is the cessation of respiration or cardiac function and in children is usually a pre-terminal event as a result of a critical illness.

|  |
| --- |
| **The effective treatment of cardiorespiratory arrest in children is the prevention of the arrest by early recognition and management of severe disease.**  **Bradycardia in children is a pre-terminal event and needs to be treated with resuscitation.** |

Cardiorespiratory arrest in children usually follows poor respiration, poor circulation or poor respiratory effort (e.g. prolonged seizures, poisoning, neuromuscular weakness etc.) If any of the following are present this is evidence of serious disease/impending failure and needs urgent effective management.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Neurological** | **Respiratory** | **Circulatory** |
| Signs of impending failure/  severe disease | Decreased level of consciousness or extreme weakness | Increased respiratory rate:  > 60 | Increased heart rate:  > 160 in infants  > 120 in children |
| Abnormal posture | Marked chest indrawing | Decreased pulse volume |
| Pupils –unequal or abnormal size | Grunting | Capillary refill time > 3 seconds |
| Presence of convulsions | Flaring nostrils,  gasping, shallow or irregular breathing | Poor colour: bluish, grey or marked pallor |

**EMERGENCY TREATMENT**

1. Diagnose the need for resuscitation rapidly.
2. Make a note of the time of starting.
3. Place the patient on a firm flat surface and commence resuscitation immediately.
4. Document timings of interventions, medication and any response to these. (Ideally, during resuscitation, one staff member should act as a ‘scribe’).
5. Collect all ampoules used and total them at the end.

**HAZARDS, HELLO, HELP**

1. Assess for any hazards and remove. Make use of personal protective

equipment i.e. gloves, masks.

1. Check for pulse and breathing. Take no longer than 10 seconds
2. Call for skilled help and an automated external defibrillator (AED) or defibrillator.

**CARDIOPULMONARY RESUSCITATION (CPR)**

**C**irculation

1. Check for signs of life and presence of central pulse for 5–10 seconds. In younger children (infants) check brachial or femoral pulse, in older children use femoral or carotid pulse).
2. If there is no pulse and no signs of life give 30 chest compressions at a rate of 100-120 compressions/minute
3. Compress over lower half of sternum and compress chest by approximately 1/3 of the anteroposterior diameter of the chest.
4. Allow chest to recoil before next compression.
5. Minimize interruptions in compressions

**A**irway

1. Manually remove obvious visible obstruction from the mouth.

|  |
| --- |
| **CAUTION**  Do not use blind finger sweeps of the mouth or posterior pharynx as this can impact any obstruction further down the airway. |

1. In neonates and infants: position the head in neutral position. In children: position in the sniffing position.
2. Lift the chin forward with the fingers under the bony tip of the jaw.

### Breathing

1. If there is **no breathing,** give breaths:

* preferably with bag-valve-mask resuscitator

**or**

* mouth-to-nose (covering child’s mouth AND nose with your mouth)

**or**

* mouth-to-mouth (occluding nose by pinching child’s nostrils)

1. Give 2 effective breaths at one breath/second.
2. Breaths must produce visible chest rise.

**Then**

1. If 2 rescuers are present, carry out cycles of 15 chest compressions followed by 2 breaths (15:2).
2. If only 1 rescuer present, carry out cycles of 30 compressions to 2 breaths (30:2).
3. Review after 5 cycles - if pulse is not palpable continue CPR sequence until help arrives.

* Oxygenate with 100% oxygen, if available.

1. Keep patient covered and warm while resuscitating (although the patient should be fully exposed for short periods during examination).

# Immediate emergency Drug treatment

# If still no pulse or signs of life after cardiac compressions and ventilations:

* Adrenaline (epinephrine), IV, 0.1 mL/kg of 1:10 000 solution.
  + To make an 1:10 000 adrenaline (epinephrine) solution, (dilute 1 mL ampoule of adrenaline (epinephrine) (1:1000) with 9 mL of sodium chloride 0.9% to give 10mL of 1:10000 solution).
  + Administer dose according to table below.
  + If no IV line is available, the same dose may be given intra-osseously (IO).

|  |  |  |  |
| --- | --- | --- | --- |
| **Weight**  kg | **Dose**  mg | **Volume of diluted solution**  (1: 10 000 solution) | **Age**  months/years |
| ˃2.5–7 kg | 0.05 mg | 0.5 mL | Birth–6 months |
| ˃7–11 kg | 0.1 mg | 1 mL | ˃6–18 months |
| ˃11–17.5 kg | 0.15 mg | 1.5 mL | ˃18 months–5 years |
| ˃17.5–25 kg | 0.2 mg | 2 mL | ˃5–7 years |
| ˃25–35 kg | 0.3 mg | 3 mL | ˃7–11 years |
| ˃35–55 kg | 0.5 mg | 5 mL | ˃11–15 years |

Treat hypoglycaemia

* Dextrose 10%, solution, IV, 2–5 mL/kg.
  + To make 20mL of 10% dextrose solution: draw 4 mL of 50% dextrose in to a 20mL syringe and add 16mL of sodium chloride 0.9%or water for injection.
  + Do not give unless hypoglycaemic or hypoglycaemia strongly suspected.
  + Do not give excessive volumes of fluid.
  + If low blood sugar is treated:
* re-check blood glucose 10–15 minutes later;
* if still low, give further bolus of dextrose 10%, IV, 2 mL/kg, and commence dextrose 5 or 10%, infusion, 3–5 mL/kg/hour to prevent blood glucose dropping again.

Assess continuously until the patient shows signs of recovery.

Consider stopping resuscitation attempts and pronouncing death if:

1. no signs of life are present after 30 minutes of active resuscitation. A doctor must be called before resuscitation is stopped. If no doctor on site, telephonic consultation should take place.

Always **carry on** for longer in cases of:

1. hypothermia and drowning
2. suspected poisoning or medicine overdose or carbon monoxide poisoning

**REFERRAL**

Transfer all patients on supportive treatment and with an accompanying skilled worker until taken over by doctor at receiving institution.

For guidance on neonatal resuscitation, see Section 6.6.2: Neonatal resuscitation.

**21.1.3 BRADYCARDIA**

R00.1

**Refer to Adult Hospital Level and Paediatric Hospital Level STGs and EML for relevant guidance**.

**DESCRIPTION**

In adults, bradycardia refers to a pulse rate <50 beats/ minute.

In children, bradycardia refers to a pulse rate <60 beats/ minute despite effective oxygenation and ventilation.

**EMERGENCY TREATMENT**

Assess ABC:

* Airway: ensure airway is open and patent.
* Breathing: give oxygen to target pulse oximeter saturation of 94-98%.
* Circulation: assess peripheral perfusion, measure pulse and blood pressure.

Attach ECG monitor, pulse oximeter and blood pressure cuff.

Establish IV access.

Print rhythm strip to confirm bradycardia; if possible, do 12 lead ECG.

Assess for signs of instability:

|  |  |
| --- | --- |
| * Hypotension | * Altered mental status |
| * Chest pain | * Acute heart failure |
| * Signs of shock: cold clammy peripheries and weak pulses | |

Adult

If unstable:

* Atropine, IV, 0.5 mg as a bolus.
  + - Repeat every 3–5 minutes, if no response.
    - Maximum dose: 3 mg.

1. Look for and treat contributory causes for bradycardia (see table below).
2. If no response to atropine, discuss with referral centre or refer to Adult Hospital Level STG and EML for guidance.

If stable:

Look for and treat contributory causes for bradycardia (see table below)

|  |  |
| --- | --- |
| Table: Contributory causes for bradycardia and treatment | |
| Hypoxia | Give supplemental oxygen or ventilate. |
| Hypothermia | Warm the patient. |
| Head injury | Give oxygen, elevate head of bed. |
| Heart block | Look for cause of heart block. |
| Hydrogen ion (acidosis) | Look for cause of acidosis. |
| Hypotension | If no signs of heart failure: Sodium chloride 0.9%, IV, 200 mL. |
| Toxins and therapeutic agents | Treat as for specific overdose |

Children

If unstable:

Start CPR: 30 compressions: 2 breaths (1 rescuer) *or*

15 compressions: 2 breaths (2 rescuers)

* Adrenaline (epinephrine), IV, 0.1 mL/kg of 1:10 000 solution (Doctor prescribed).
  + To make an1:10 000 adrenaline (epinephrine) solution, (dilute 1mL ampoule of adrenaline (epinephrine) (1:1000) with 9 mL of sodium chloride 0.9% to give 10mL of 1:10000 solution).
  + Administer dose every 3–5 minutes, according to table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Weight**  kg | **Dose**  mg | **Volume of diluted solution**  (1: 10 000 solution) | **Age**  months/years |
| ˃2.5–7 kg | 0.05 mg | 0.5 mL | Birth–6 months |
| ˃7–11 kg | 0.1 mg | 1 mL | ˃6–18 months |
| ˃11–17.5 kg | 0.15 mg | 1.5 mL | ˃18 months–5 years |
| ˃17.5–25 kg | 0.2 mg | 2 mL | ˃5–7 years |
| ˃25–35 kg | 0.3 mg | 3 mL | ˃7–11 years |
| ˃35–55 kg | 0.5 mg | 5 mL | ˃11–15 years |

|  |
| --- |
| *LoE: III[[2]](#endnote-4)* |

If heart block or increased vagal tone suspected:

* Atropine, IV, 0.02 mg/kg/dose as a single dose (Doctor prescribed).
  + - Maximum single dose: 0.5 mg.
    - Repeat dose, if no response.

|  |
| --- |
| *LoE: III[[3]](#endnote-5)* |

If stable:

Look for and treat contributory causes for bradycardia (see table above).

Close monitoring required.

Ensure adequate oxygenation and ventilation if necessary.

**REFERRAL (urgent)**

Transfer all patients on supportive treatment and with an accompanying skilled worker until taken over by doctor at receiving institution.

**21.1.4 TACHYDYSRHYTHMIAS**

R00.0

**Refer to Adult Hospital Level and Paediatric Hospital Level STGs and EML for relevant guidance**.

**DESCRIPTION**

In adults, tachydysrhythmias refer to a pulse rate >150 beats/minute.

In children, tachycardia refers to a pulse rate of more than normal range for age (see table).

**EMERGENCY TREATMENT**

Assess ABC:

1. Airway: ensure airway is open and patent
2. Breathing: give oxygen to target pulse oximeter saturation of 94-98%
3. Circulation: assess peripheral perfusion, measure pulse and blood pressure.

|  |  |
| --- | --- |
| **Table: Child heart rate ranges for age** | |
| **Age** | **Heart rate range** |
| Newborn to 3 months | 85-205 |
| 3 months to 2 years | 100-190 |
| 2 years to 10 years | 60-140 |
| >10 years | 60-100 |

1. Supraventricular tachycardia is suspected in a child when the pulse rate >180 beats/ minute in a child and >220 beats/minute in an infant.

Attach ECG monitor, pulse oximeter and blood pressure cuff.

Establish IV access.

Print rhythm strip to confirm tachycardia, if possible do 12 lead ECG.

Assess for signs of instability:

|  |  |
| --- | --- |
| * Hypotension | * Altered mental status |
| * Chest pain | * Acute heart failure |
| * Signs of shock: cold clammy peripheries and weak pulses | |

Adult

If unstable:

Synchronised cardioversion at 100J.

Consider analgesia and sedation if time permits.

If stable:

Assess QRS length on rhythm strip or 12 lead ECG:

1. If QRS<0.12 = Narrow complex tachycardia (supraventricular tachycardia):

* Attempt vagal stimulation: Vasalva maneavoure.

Ice water applied to face.

Cough, breath holding.

Carotid sinus massage (not in elderly or cardiac disease).

1. If QRS>0.12 = Wide complex tachycardia (ventricular tachycardia):

* Correct electrolyte disturbances.
* Consider toxins, overdoses.

Child

If unstable:

Synchronised cardioversion at 0.5-1J/kg initially (max 4J/kg).

Consider analgesia and sedation if time permits.

If stable:

Assess QRS length on rhythm strip or 12 lead ECG:

1. If QRS<0.08 = Narrow complex tachycardia (supraventricular tachycardia):

* Attempt vagal stimulation: Ice water applied to face

1. If QRS>0.08 = Wide complex tachycardia (ventricular tachycardia):

* Correct electrolyte disturbances.

**REFERRAL (urgent)**

Transfer all patients on supportive treatment and with an accompanying skilled worker until taken over by doctor at receiving institution.

21.1.5 MANAGEMENT OF SUSPECTED CHOKING/FOREIGNBODYASPIRATION IN CHILDREN

T17-T18

|  |  |
| --- | --- |
| If the child is **able to talk and breathe** | Encourage the child to cough repeatedly while arranging transfer to hospital urgently with supervision. |
| If the child is **conscious but with no effective cough or breathing** | Give 5 back blows, followed by 5 chest/ abdominal thrusts, followed by re-assessment of breathing and then repeated as a cycle until recovery or child becoming unconscious  See differences below for infants and children |
| If the child is **unconscious with no effective breathing** | Call for assistance  Open airway and check for any visible foreign body and remove  Start CPR and breaths (30:2) (check airway for foreign body each time before giving breaths) |

(Infant: child < 1 year of age; Child: child >1 year of age until puberty).

Infants

Place the baby along one of the rescuer’s arms in a head down position.

Rest the arm along the thigh and deliver 5 back blows to the child.

If this is ineffective turn the baby over and lay it on the rescuer’s thigh in the head down position.

Apply 5 chest thrusts – use the lower ½ of the sternum – compress at least 1/3 of the anteroposterior diameter of the chest. If too large to carry out on the thigh this can be done across the lap.

Children

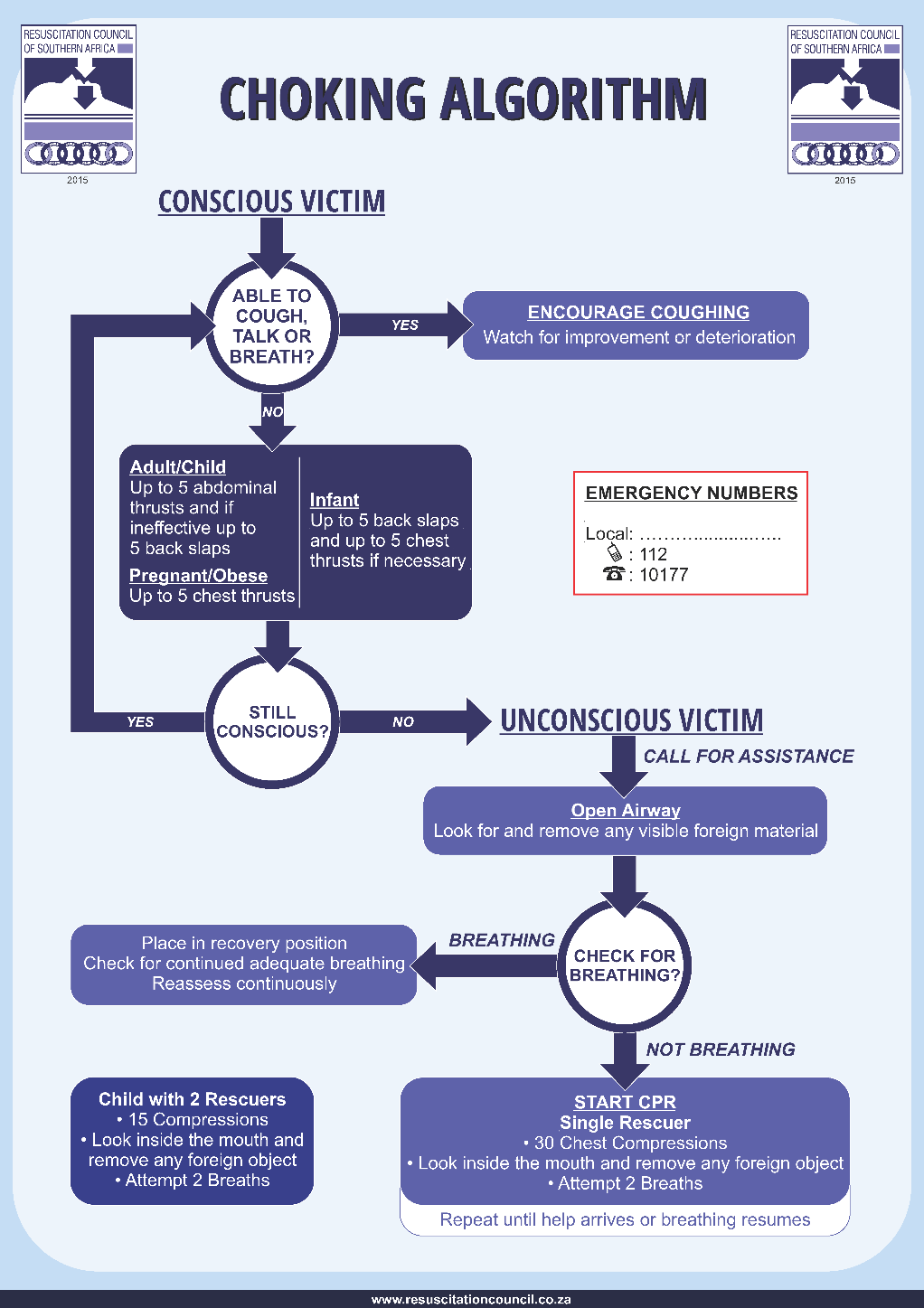
In children back blows are also used but usually across the lap.

In place of the chest thrust, abdominal thrusts are used (Heimlich manoeuvre) and may be used standing, sitting, kneeling or lying.

For abdominal thrust in the standing, sitting or kneeling position the rescuer moves behind the child and passes his arms around the child’s body. One hand is formed into a fist and placed against the child’s abdomen above the umbilicus and below the xiphisternum. The other hand is placed over the fist and both hands are thrust sharply upwards into the abdomen towards the chest.

In the lying (supine) position the rescuer kneels astride the victim and does the same manoeuvre except that the heel of one hand is used rather than a fist.

This is repeated 5 times and then the breathing reassessed. If not relieved the cycle of back blows →abdominal thrusts→reassessment is repeated until the relief of obstruction or failure of resuscitation.



|  |
| --- |
| *LoE: III[[4]](#endnote-6)* |

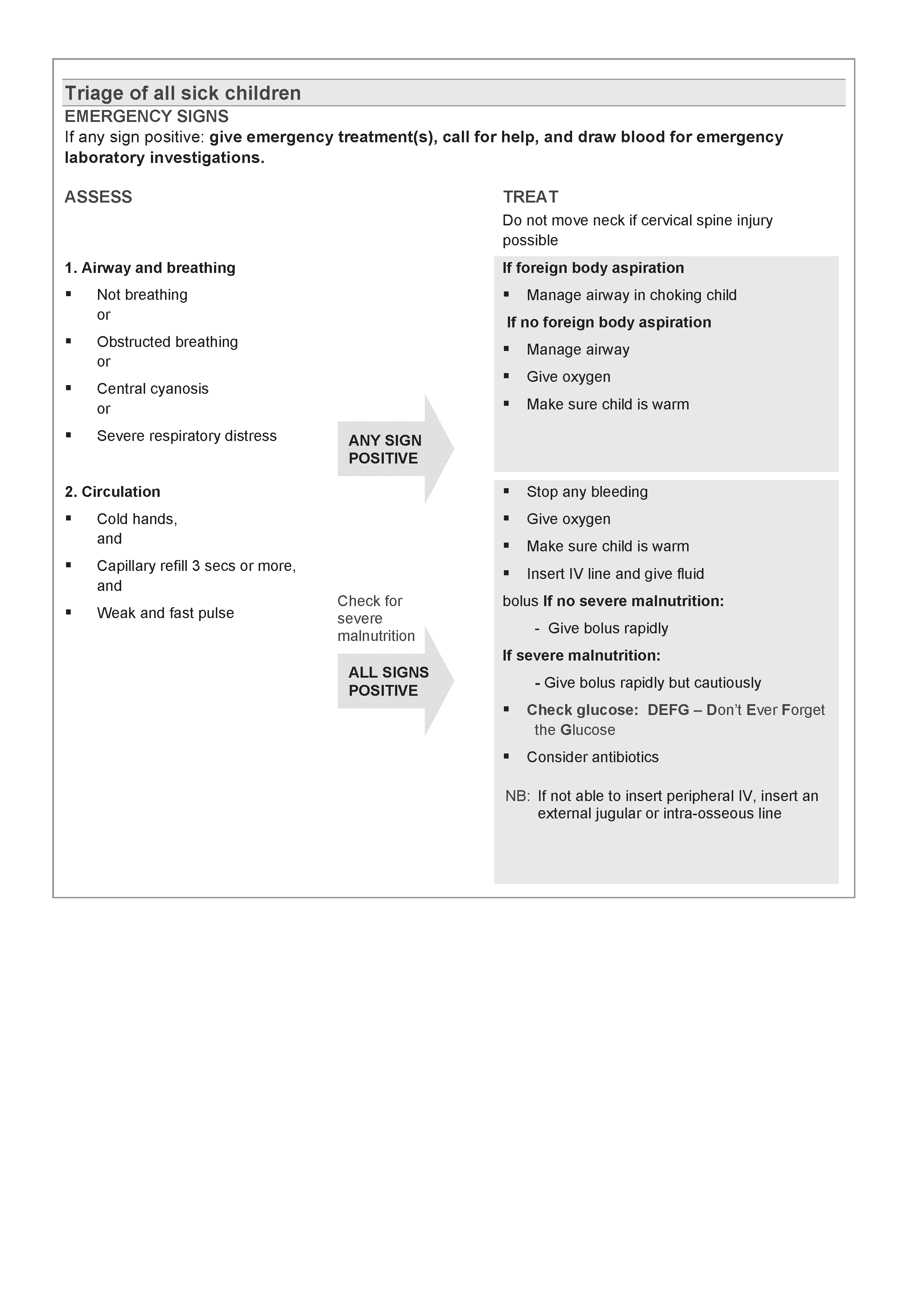
21.2 MEDICAL EMERGENCIES

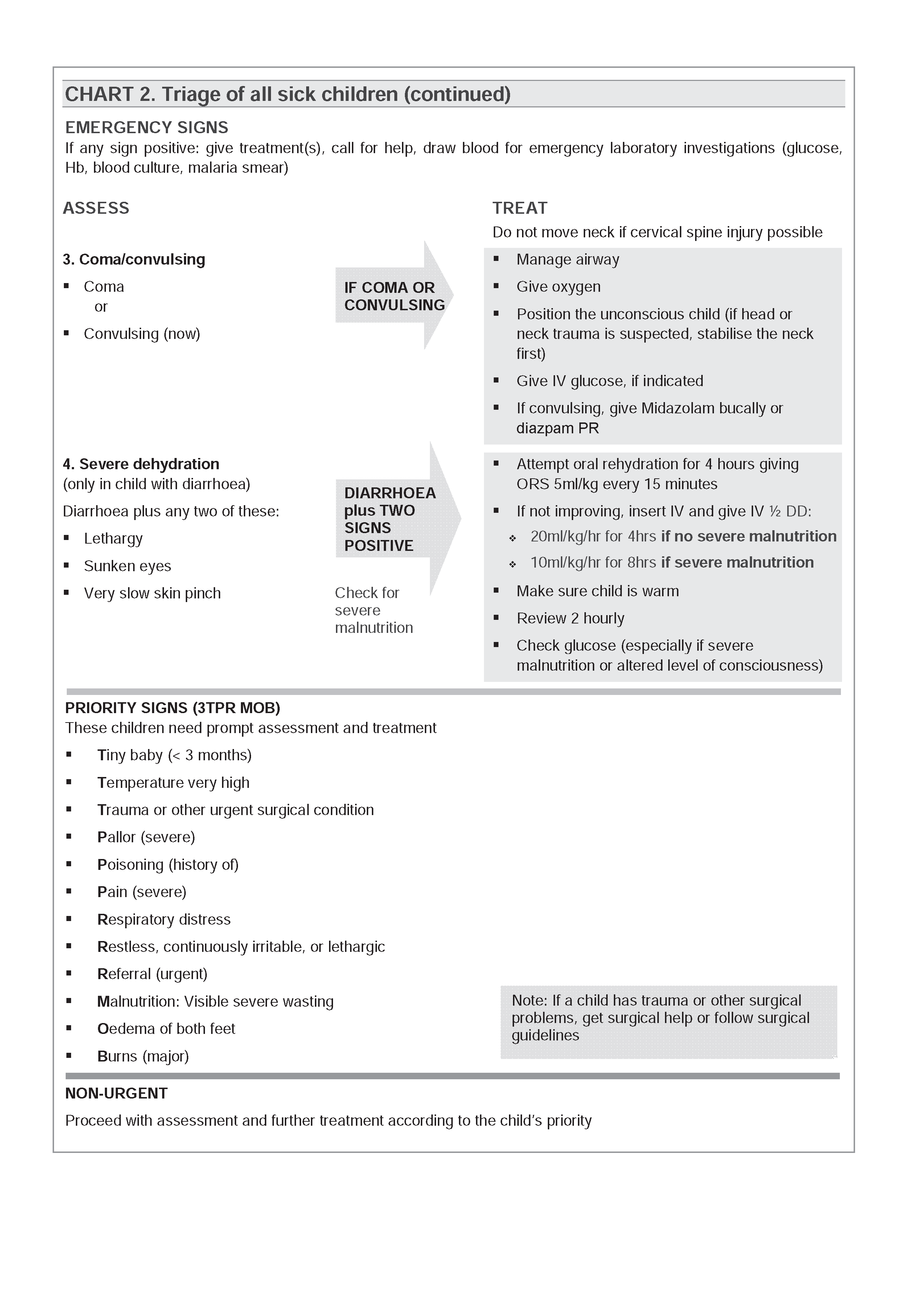
21.2.1 PAEDIATRIC EMERGENCIES

Certain emergencies of the airway, breathing, circulation and neurological system are dealt with in the respiratory, cardiac and nervous system chapters. All doctors should ensure that they have received appropriate training in at least providing basic (and preferably advanced) life support to children.

21.2.1.1RAPID TRIAGE OF CHILDREN PRESENTING WITH ACUTE CONDITIONS IN CLINICS AND CHCs

Triage is the process of rapidly examining all sick children when they first arrive at clinics in order to place them in one of three categories (Emergency, Priority, Non-urgent):





*Adapted from Pocketbook of Hospital Care for Children. Management of Common Childhood Illnesses. Department of Health, South Africa, 2016.*[*www.health.gov.za*](file:///C:\Users\T0034318\Documents\BACKUP\01A_EML-%20updated%2008%20AUG\CHAPTERS\TRAUMA\www.health.gov.za)

If any emergency sign is present, give emergency treatment(s), call for help, and draw blood for emergency laboratory investigations.

**(A&B) A**irway and **B**reathing

1. Not breathing  
   **or**
2. Obstructed breathing  
   **or**
3. Central cyanosis  
   **or**
4. Severe respiratory distress

**(C) Circulation**

1. Cold hands   
   **and**
2. Capillary refill ≥3 seconds  
   **and**
3. Weak and fast pulse

**(C) Coma/convulsing**

1. Coma  
   **or**
2. Convulsing (now)

**(D) Severe dehydration** (e.g. in child with diarrhoea)

1. Diarrhoea

**plus**

1. Any two of:
   * Lethargy
   * Sunken eyes
   * Very slow skin pinch

**PRIORITY**

**Priority signs**

These children need prompt assessment and treatment

1. **T**iny baby (< 3 months of age)
2. High **T**emperature
3. **T**rauma or other urgent surgical condition
4. **P**allor (severe)
5. **P**oisoning (history of)
6. **P**ain (severe)
7. **R**espiratory distress
8. **R**estless, continuously irritable, or lethargic
9. **R**eferred for urgent attention
10. **M**alnutrition: visible severe wasting
11. **O**edema of both feet
12. **B**urns (major)

NON-URGENT (queue)

Proceed with assessment and further treatment according to the child’s priority.

The Emergency Triage Assessment and Treatment (ETAT) tool, presented above, should be a minimum standard of triage in community health centres.

(An alternative tool P-SATS is available, accessible through the Paediatric Hospital level STGs and EML).

21.2.3 ANGINA PECTORIS, UNSTABLE

See Chapter 4: Cardiovascular conditions.

21.2.3 MYOCARDIAL INFARCTION, ACUTE (AMI)

See Section 4.6 Myocardial infarction, acute (AMI).

21.2.4 DELIRIUM WITH ACUTE CONFUSION ANDAGGRESSION

IN ADULTS

F03.91

**DESCRIPTION**

Delirium is a medical emergency.

Delirium is a sudden onset state of confusion in which there is impaired awareness and memory and disorientation.

Delirium should not be mistaken for psychiatric disorders like schizophrenia or a manic phase of a bipolar disorder. These patients are mostly orientated for time, place and situation, can in a way make contact and co-operate within the evaluation and are of clear consciousness.

There are many possible causes including extracranial causes. Organic or physical illness should also be considered as possible causes.

The elderly are particularly prone to delirium caused by medication, infections, electrolyte and other metabolic disturbances.

Main clinical features are:

|  |  |
| --- | --- |
| 1. acute onset (usually hours to days) | 1. confusion |
| 1. impaired awareness | 1. disorientation |

Other symptoms may also be present:

1. restlessness and agitation
2. hallucinations
3. autonomic symptoms such as sweating, tachycardia and flushing
4. patients may be hypo-active, with reduced responsiveness to the environment
5. a fluctuating course and disturbances of the sleep-wake cycle are characteristic
6. aggressiveness
7. violent behaviour alone occurs in exceptional cases only

Risk factors for delirium include

|  |  |
| --- | --- |
| 1. extremes of age | 1. pre-existing neurological disease e.g. epilepsy |
| 1. HIV infection | 1. medicines such as anticholinergics and hypnotics |
| 1. pre-existing dementia | 1. substance intoxication and withdrawal |
| 1. cerebrovascular disease |  |

Checklist for diagnosis:

|  |  |  |
| --- | --- | --- |
| **D** | – | Drugs (Intoxication and withdrawal). |
| **I** | – | Infections, e.g. sepsis, pneumonia, urinary tract infections, peritonitis, meningitis. |
| **M** | – | Metabolic, e.g. hypoglycaemia, electrolyte abnormalities (e.g. hyponatraemia); organ failure (e.g. liver failure, renal dysfunction), CO2 narcosis. |
| **T** | – | Trauma. |
| **O** | – | Oxygen deficit (including hypoxia, carbon monoxide poisoning). |
| **P** | – | Psychiatric or physical conditions, e.g. severe stressor pain. |

**EMERGENCY TREATMENT**

# Calm the patient.

1. Manage in a safe environment.
2. Treat underlying cause first, e.g. hypoglycaemia, hypoxia, pain etc.

If the delirium is caused by seizures or substance withdrawal, or if communication is difficult

* Diazepam, IV, 10 mg for immediate sedative or hypnotic action.
* If no response give a 2nddose.
* Do not administer at a rate over 5 mg/minute.

**OR**

Midazolam, IM, 7.5–15 mg immediately.

* Repeat after 30–60 minutes if needed.

Switch to oral once containment is achieved.

1. Secure airway.
2. Exclude hypoglycaemia.
3. Monitor for respiratory depression.

If the most likely cause of delirium is a medical disorder and if very restless:

* Haloperidol, IM, 5 mg, immediately.
* In elderly: 2.5 mg, immediately.
* If no response give a second dose.

**REFERRAL**

**Urgent**

All cases.

21.2.5 HYPERGLYCAEMIA AND KETOACIDOSIS

E10.1/E11.1

See Section 9.4: Diabetic emergencies

21.2.6 HYPOGLYCAEMIA AND HYPOGLYCAEMIC COMA

E16.2

**DESCRIPTION**

Hypoglycaemia is a blood sugar < 3mmol/L (< 2.6mmol/L in neonate) and **may** rapidly cause irreversible brain damage and/or death.

Clinical features include:

|  |  |
| --- | --- |
| 1. tremor | 1. confusion |
| 1. sweating | 1. delirium |
| 1. tachycardia | 1. coma |
| 1. dizziness | 1. convulsions |
| 1. hunger | 1. transient aphasia or speech disorders |
| 1. headache | 1. irritability |
| 1. impaired concentration |  |

There may be few or no symptoms in the following situations:

1. chronically low blood sugar
2. patients with impaired autonomic nervous system response, e.g.

|  |  |
| --- | --- |
| * the elderly | * malnourished |
| * very ill | * treatment with beta-blockers |
| * those with long-standing diabetes mellitus | |

People at risk of hypoglycaemia:

1. neonates with low birth weight or ill or not feeding well
2. malnourished or sick children
3. shocked, unconscious or convulsing patients
4. alcohol binge
5. liver disease
6. diabetics on treatment

Hypoglycaemia may be a marker of deteriorating renal function.

**EMERGENCY TREATMENT**

1. Obtain blood for glucose determination immediately.
2. Establish blood glucose level with glucometers or testing strip.

**Conscious patient, able to feed**

Adult

* Sweets, sugar, glucose or milk by mouth.

**or**

* Oral sugar solution.
* Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water.

Breastfeeding child

* administer breast milk

Older children

* A formula feed of 5 mL/kg.

**or**

* Oral sugar solution.
* Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water – administer 5 mL/kg

**or**

* Sweets, sugar, glucose by mouth.

**Conscious patient, not able to feed without danger of aspiration**

Administer via nasogastric tube:

* Dextrose 10%, 5mL/kg.

(add 1 part 50% dextrose water to 4 parts water to make 10% solution)

**or**

* Milk.

**or**

* Sugar solution.
* Dissolve 3 teaspoons of sugar (15 g) in a 200 mL cup of water – administer 5 mL/kg.

**Unconscious patient**

Children

* Dextrose 10%, IV, 2–5 mL/kg.
* 10% solution, e.g. add 1 part 50% dextrose water to 4 parts water for injection to make 10% solution.

# IV administration of dextrose in children with hypoglycaemia:

1. Establish an IV line-do not give excessive volumes of fluid-usually can keep line open with 2 mL/kg/hour.
2. Take a blood sample for emergency investigations and blood glucose.
3. Check blood glucose.
   * + If low, i.e. < 2.5 mmol/L or if blood glucose testing strips are not available, administer 2 mL/kg of 10% dextrose solution IV rapidly.

In the majority of cases an immediate clinical response can be expected.

1. Recheck the blood glucose after infusion.
   * + If still low, repeat 2 mL/kg of 10% dextrose solution.
     + Continue maintenance at 3–5 mL/kg of 5% or 10% dextrose, IV.
2. After recovery, maintain with 5–10% dextrose solution until blood glucose is stabilised.
3. Feed the child as soon as conscious.
4. Investigate the cause e.g. infection.

Adults

* + Dextrose 10%, IV, 5 mL/kg immediately and reassess.
* 10% solution, e.g. add 1 part 50% dextrose water to 4 parts water for injection to make 10% solution.
* In the majority of cases an immediate clinical response can be expected.
* Maintain with 5% dextrose solution until blood glucose is stabilised.
* Investigate the cause e.g. infection.

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| *LoE:III[[5]](#endnote-7)* |

**Note:** The volume has been changed in the above-mentioned protocol.

**Alcoholics */*Malnourished**

* + Thiamine, IV/IM, 100mg immediately.

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| --- |
| **CAUTION**  Thiamine should preferably be administered prior to intravenous glucose to prevent permanent neurological damage.  Do not delay the dextrose administration in a hypoglycaemic patient. |

**REFERRAL**

**Urgent**

1. All hypoglycaemic patients on oral hypoglycaemic agents.
2. Hypoglycaemic patients who do not recover completely after treatment.
3. All children who have had documented hypoglycaemia (unless the cause is clearly identified and safe management instituted to prevent recurrence).

21.2.7 NOSE BLEED (EPISTAXIS)

R04.0

**DESCRIPTION**

Nose bleed may be caused by local or systemic diseases, or local trauma, especially nose picking and occurs from an area anterior and inferior to the nasal septum. Consider other conditions associated with nosebleeds, especially if recurrent, e.g. hypertension and bleeding tendency.

**MANAGEMENT**

Acute episode

Most bleeding can be controlled by pinching the nasal wings (alae) together for 5–10 minutes.

If this fails, insert nasal tampons or BIPP stripping into bleeding nostril(s), if available.

Identify the cause.

**REFERRAL**

1. Recurrent nose bleeds.
2. Failure to stop the bleeding.

21.2.8 PULMONARY OEDEMA, ACUTE

J81.0

**DESCRIPTION**

A life-threatening condition with abnormal accumulation of fluid in the lungs.

Common causes include acute heart failure and acute renal failure (e.g. acute nephritis).

Persons with pulmonary oedema may present similarly to acute bronchospasm.

It is important to distinguish this condition from an acute attack of asthma.

**EMERGENCY TREATMENT**

Place the patient in a sitting or semi-Fowler’s position.

Children

* Oxygen, using a 40% face mask **or** nasal cannula at 2–3 L/minute.
* Furosemide, IV, 1 mg/kg immediately administered slowly over 5 minutes. See dosing table, pg xxx
* Do not put up a drip or run in any IV fluids

Adults

* Oxygen, using face mask to deliver 40% oxygen at a rate of 6–8 L/minute.

**AND**

* Furosemide, IV, 40 mg.

If response is adequate follow with:

* Furosemide, IV, 40 mg in 2–4 hours.

If no response within 20–30 minutes:

* Furosemide, IV, 80 mg.

**AND**

* Isosorbide dinitrate, sublingual, 5 mg immediately.

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| *LoE:III* |

* If needed, repeat every 5-10 minutes
* Do not administer if hypotensive. Monitor blood pressure carefully.

If patient very anxious or restless, doctor to consider adding morphine:

* Morphine, IV, to a total maximum dose of 10 mg.
  + Dilute 10 mg up to 10 mL with sodium chloride 0.9%.
  + Morphine, IV, 3–5 mg as a single dose then further boluses of 1–2 mg/minute and monitor closely.
  + Total maximum dose: 10 mg.
  + Repeat after 4 hours if necessary.
  + Monitor response to pain and effects on respiration and BP.

|  |
| --- |
| *LoE:III[[6]](#endnote-8)* |

Pulmonary oedema due to a hypertensive crisis:

**ADD**

To treat hypertension

* ACE-inhibitor,e.g.
* Enalapril10 mg, oral, as a single dose and refer.

**REFERRAL**

# Urgent

All cases.

(Continue oxygen during transfer).

21.2.9 SHOCK

R57.9

**DESCRIPTION**

Shock is a life-threatening condition characterised by any evidence of inadequate organ perfusion.

**Signs and symptoms of shock in adults**

|  |  |
| --- | --- |
| 1. Low blood pressure (systolic BP <80 mmHg) is the key sign of shock. | |
| 1. Weak and rapid pulse | 1. Restlessness and altered mental state |
| 1. Rapid shallow breathing. | 1. Weakness |
| 1. Low urine output |  |

**Signs and symptoms of shock in children**

Shock must be recognised while still in the compensated state to avoid irreversible deterioration. Therefore, the following are primarily assessed in children:

1. Prolonged capillary filling (> 3 seconds).
2. Decreased pulse volume (weak thready pulse).
3. Increased heart rate (>160 beats/minute in infants, > 120 beats/minute in children).
4. Decreased level of consciousness (poor eye contact).
5. Rapid breathing.
6. The signs mentioned above are more sensitive in detecting shock, before irreversible. Decreased blood pressure and decreased urine output are late signs of shock and can be monitored.

Normotensive BP values in children:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Age of child (years)** | | | | |
| **<1** | **1-2** | **2-5** | **5-12** | **>12** |
| **Respiratory rate** (breaths/min) | 30–40 | 25–35 | 25–30 | 20–25 | 15–20 |
| **Heart rate**  (beats/min) | 110–160 | 100–150 | 95–140 | 80–120 | 60–100 |
| **Systolic BP**  (mmHg) | 80–90 | 85–95 | 85–100 | 90–110 | 100–120 |

*Source:* The Hands-on Guide to Practical Paediatrics, First Edition. Rebecca Hewitson and Caroline Fertleman. © 2014 John Wiley & Sons, Ltd. Published 2014 by John Wiley & Sons, Ltd. Companion Website: [www.wileyhandsonguides.com/paediatrics](file:///C:\Users\T0034318\Documents\BACKUP\01A_EML-%20updated%2008%20AUG\CHAPTERS\TRAUMA\www.wileyhandsonguides.com\paediatrics)

|  |  |  |
| --- | --- | --- |
| **Types of shock** | | **Additional symptoms** |
| 1. Hypovolaemic shock | * Most common type of shock * Primary cause is loss of fluid from circulation due to haemorrhage, burns, diarrhoea, etc. | Weak thready pulse, cold and clammy skin. |
| 1. Cardiogenic shock | * Caused by the failure of heart to pump effectively e.g. in myocardial infarction, cardiac failure, etc. | Distended neck veins, weak or absent pulses. |
| 1. Septic shock | * Caused by an overwhelming infection, leading to vasodilation. | Elevated or decreased body temperature |
| 1. Neurogenic shock | * Caused by trauma to the spinal cord, resulting in sudden decrease in peripheral vascular resistance and hypotension. | Warm and dry skin |
| 1. Anaphylactic shock | * Caused by severe allergic reaction to an allergen, or medicine. | Bronchospasm, angioedema and/or urticaria |

**EMERGENCY TREATMENT**

**Treatment depends on the type of shock. Intravenous fluid therapy is important in the treatment of all types of shock except for cardiogenic shock and septic shock after fluid challenge. Prompt diagnosis of underlying cause is essential to ensure optimal treatment.**

1. Maintain open airway.
2. Administer face mask oxygen
3. Consider the need for intubation and seek advice from referral centre.
4. Check for and manage hypoglycaemia.

**Fluid challenge in adults with suspected septic shock:**

* Sodium chloride 0.9%, IV, 500 mL over 30 minutes.
  + Assess blood pressure and pulse rate response. Response is defined by a good urine output and adequate cerebral perfusion rather than an absolute blood pressure value.
  + If there is a positive response, then continue with intravenous fluid. Monitor the patient and stop fluids if patient is breathless. Avoid over hydrating as this could exacerbate hypoxia associated with adult respiratory distress syndrome.
  + If no haemodynamic response to fluid challenge, suspect septic shock.

**Fluid replacement (Not for cardiogenic shock):**

Adults

* Sodium chloride 0.9%, IV, 1 L as a rapid bolus.
* Repeat bolus until blood pressure is improved.

Children

* Sodium chloride 0.9%, IV, 20 mL/kg as a rapid bolus.
* Repeat bolus if no adequate response.

**Note:**

1. Do not administer IV fluids in case of cardiogenic shock but maintain IV access.
2. If patient develops respiratory distress, recheck airway and breathing and continue discontinuing fluids.

**Septicaemia in children:**

All children with shock, which is not obviously due to trauma or simple watery diarrhoea, should in addition to fluid resuscitation, receive antibiotic cover for probable septicaemia.

* Ceftriaxone, IM, 80 mg/kg/dose immediately as a **single dose.** See dosing table, pg 22.2.
* Do not inject more than 1 g at one injection site.

|  |
| --- |
| **CAUTION: USE OF CEFTRIAXONE IN NEONATES AND CHILDREN**   1. If *SUSPECTING SERIOUS BACTERIAL INFECTION* in neonate, give ceftriaxone, even if jaundiced. 2. Avoid giving calcium-containing IV fluids (e.g. Ringer Lactate) together with ceftriaxone:  * If ≤ 28 days old, avoid calcium-containing IV fluids for 48 hours after ceftriaxone administered. * If >28 days old, ceftriaxone and calcium-containing IV fluids may be given sequentially provided the giving set is flushed thoroughly with sodium chloride 0.9% before and after. * Preferably administer IV fluids without calcium contents  1. Always include the dose and route of administration of ceftriaxone in the referral letter. |

**REFERRAL**

**Urgent**

All patients, after resuscitation.

21.2.10 ANAPHYLAXIS

R57.9/T78.0-3/T80.5/T88.6

**DESCRIPTION**

A very severe allergic reaction that usually occurs within seconds or minutes after exposure to an allergen, but may be delayed for up to 1 hour. The reaction can be short-lived, protracted or biphasic, i.e. acute with recurrence several hours later. Immediate reactions are usually the most severe and/or life-threatening.

Clinical features include:

1. Acute onset of signs and symptoms.
2. Urticaria (hives) or angioedema.
3. Bronchospasm, wheezing, dyspnoea, chest tightness.
4. Laryngealoedema with upper airway obstruction or stridor.
5. Gastrointestinal symptoms such as nausea, vomiting, diarrhoea.
6. Hypotension and/or shock.
7. Dizziness, paraesthesia, syncope, sweating, flushing, dysrhythmias.

**EMERGENCY TREATMENT**

1. Resuscitate (CAB) immediately (See Section 21.1: Cardiopulmonary arrest– cardiopulmonary resuscitation).
2. Place hypotensive or shocked patient in horizontal position. Do NOT sit the patient up.
3. Severe anaphylaxis: administer oxygen by facemask at high flow rate of15L/min.

**MEDICINE TREATMENT**

**First line priority:**

Adrenaline (epinephrine) is the mainstay of treatment and should be given immediately.

* Adrenaline (epinephrine), 1:1000, IM, 0.01 mL/kg as a single dose.
  + Children: 1:1000, IM, 0.01 mL/kg as a single dose. See dosing table, pg 22.3.
  + Adults: 1:1000, **IM**, 1 mg (1 mL) as a single dose, into the lateral thigh.
  + **Repeat in 5 minutes if no improvement**

**Second line priority**:

* Oxygen, 8-10 L/minute via facemask or up to 100% oxygen, as needed.

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| *LoE: III[[7]](#endnote-9)* |

**AND**

I**f hypotension** not responding promptly to epinephrine (adrenaline), also give:

* Sodium chloride 0.9%, IV:
  + Children: 20 mL/kg, over 5 to 10 minutes. Repeat as needed.
  + Adults: 1000–2000 mL, at the most rapid flow rate possible in the first minutes of treatment. Repeat as needed.

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| **CAUTION**  Monitor continuously for clinical response and fluid overload. |

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| *LoE: III[[8]](#endnote-10)* |

**AND**

**If wheeze:**

* Salbutamol 0.5%, solution, nebulised, with high flow oxygen.
  + 0.5–1 mL (2.5–5 mg) salbutamol 0.5% solution, in 4 mL of sodium chloride 0.9%.

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| *LoE: III[[9]](#endnote-11)* |

**AND**

* Ipratropium bromide, solution, added to salbutamol solution.
  + Children: 0.5–1 mL (0.125–0.25 mg)
  + Adults: 2 mL (0.5 mg)

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| *LoE: III[[10]](#endnote-12)* |

**AND**

* Hydrocortisone IM/slow IV, immediately.
* Children: 5 mg/kg immediately. See dosing table, pg xxx.

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| *LoE:III[[11]](#endnote-13)* |

* Adults: 200 mg immediately.

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| *LoEIII[[12]](#endnote-14)* |

**AND**

* Promethazine IM/slow IV.

|  |
| --- |
| *LoE: III[[13]](#endnote-15)* |

* Children >2 years: 0.25 mg/kg. See dosing table, pg xxx
* Adults: 25–50 mg.

**REFERRAL**

All patients.

**Note:** Adrenaline (epinephrine) administration may have to be repeated due to its short duration of action. Close observation during transport is essential.

21.2.11 STATUS EPILEPTICUS

G41.9

For initial treatment of seizures see Section 15.2: Seizures.

**DESCRIPTION**

This is a medical emergency andhas the potential for causing high mortality.

Status epilepticus is a series of seizures follow one another lasting > 30 minutes with no intervening periods of recovery of consciousness. The seizure may be generalised or partial, convulsive or non-convulsive.

Do not wait for established status epilepticus to terminate convulsions. Convulsions lasting > 5 minutes should be terminated.

**GENERAL MEASURES**

1. Place the patient in a lateral (recovery) position.
2. **Do not** place anything (spoon or spatula etc) in the patient's mouth.
3. Do not try to open the patient’s mouth.
4. Maintain airway.
5. Assist respiration and give high flow oxygen.
6. Prepare for intubation if sufficiently skilled in the procedure and relevant rescue devices are available.
7. Check blood glucose (exclude hypoglycaemia).
8. Monitor vital signs every 15 minutes.
9. Establish an IV line.

**MEDICINE TREATMENT**

Children< 12 years of age

* Midazolam, buccal, 0.5 mg/kg/dose. See dosing table, pg xxx
  + Use midazolam for injection 5 mg in 1 mL undiluted.
  + Draw up the required volume in a 5 mL syringe.
  + Remove needle then administer midazolam into the buccal cavity (between gum and cheeks).
  + If seizures persist for > 5 minutes, repeat the dose and refer urgently*.*
  + **Note**: Buccal midazolam should not be used in infants < 6 months of age.

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| *LoE:II[[14]](#endnote-16)* |

**OR**

* Midazolam, IM:
* Child > 13 kg: midazolam, IM, 5 mg, repeat after 5-10 minutes if still fitting.

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| *LoE:II[[15]](#endnote-17)* |

**OR**

* Diazepam, rectal, 0.5 mg/kg/dose as a single dose. See dosing table, pg xxx.
* Use diazepam for injection 10mg in 2 mL undiluted.
* Draw up the required volume in a 2 mL syringe.
* Remove needle then insert the whole barrel of the lubricated syringe into the rectum and inject the contents.
* Remove syringe and hold buttocks together to minimise leakage.
* Maximum dose: 10 mg in 1 hour.
* May be repeated after 10 minutes if convulsions continue.
* Expect a response within 1–5 minutes.

|  |
| --- |
| **CAUTION**  Benzodiazepines, can cause respiratory depression.  Monitor closely for respiratory depression. If this occurs, assist ventilation with bag-valve mask (1 breath every 3-5 seconds) and refer urgently. |

If no response after two consecutive doses of either midazolam **or** diazepam, and if the convulsion has lasted more than 20 minutes:

**ADD**

* Phenobarbital, oral, crushed and given by nasogastric tube, 20 mg/kg as a single dose. See dosing table, pg xxx.

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| *LoE: III[[16]](#endnote-18)* |

Adults

Midazolam, IM, 10 mg, immediately.

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| *LoE: I[[17]](#endnote-19)* |

* + Repeat after 5–10 minutes if still fitting.

**OR**

* Midazolam, buccal, 10 mg using the parenteral formulation.
  + Repeat after 5–10 minutes if still fitting.

|  |
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| *LoE: III* |

**OR**

* Diazepam, slow IV, 10 mg.
  + Administer at a rate not exceeding 5mg/minute.
  + Repeat within 5 minutes if needed.
  + Maximum dose: 20 mg within 1 hour.

|  |
| --- |
| *LoE: III[[18]](#endnote-20)* |

* + Expect a response within 1–5 minutes.

|  |
| --- |
| **CAUTION**  Benzodiazepines can cause respiratory depression.  Monitor closely for respiratory depression. If this occurs, assist ventilation with bag-valve mask (1 breath every 3-5 seconds) and refer urgently.  **Avoid** diazepam IM since absorption is slow and erratic.  **Do not** mix diazepam with other medicines in same syringe. |

**REFERRAL**

**Urgent**

Seizures that cannot be controlled.

**Non-urgent**

All patients once stabilised.

**Note:** Clinical notes describing medication administered and route of administration should accompany patients.

21.3 TRAUMA AND INJURIES

21.3.1 BITES AND STINGS

21.3.1.1 ANIMAL BITES

S01.0-9/S11.0-2/S11.7-9/S21.0-2/S21.7-9/S31.0-5/S31.7-8/S41.0-1/S41.7-8/S51.0/S51.7-9/S61.0-1/S61.7-9/S71.0-1/S71.7-8/S81.0/S81.7-9/S91.0-3/S91.7/T01.0-3/T01.6/T01.8-9/T09.1/T11.1/T13.1/T14.0-1/A82.0-1/A82.9/Z24.2/Z20.3 + External Cause Code (W,X,Y,Z)

**Note: Rabies and tetanus are notifiable medical conditions.**

**DESCRIPTION**

Animal bites may be caused by:

* Domestic animals e.g. horses, cows, dogs, cats
* Wild animals e.g. jackals, mongooses (meerkats), bats

Animal bites may result in:

* Wound infection, often due to mixed aerobic and anaerobic infection.
* Puncture wounds.
* Tissue necrosis.
* Transmission of diseases, e.g. tetanus, rabies.

|  |
| --- |
| **NICD hotline for rabies advice: 0828839920** |

**Suspected rabid bite**

Any mammal bite can transmit rabies.Rabies incubation period is at least 9–90 days, but could be much longer.In suspected rabies exposure of a person by a domestic animal, observe the suspected rabid animal for abnormal behaviour for 10 days. If the animal remains healthy for 10 days, rabies is unlikely.

**Note:** If the animal has to be put down, care should be taken to preserve the brain, as the brain is required by the state veterinarian for confirmation of diagnosis. The animal must not be killed by shooting it in the head, as this will damage the brain.

|  |  |  |
| --- | --- | --- |
| **Category** | **Type of exposure** | **Management** |
| 1 | 1. Touching/feeding of animal. 2. Licking of intact skin. | 1. No treatment if history is reliable. 2. If history not reliable, treat as category 2. |
| 2 | 1. Nibbling of uncovered skin. 2. Superficial scratch without bleeding. | 1. Wound management. 2. Administer full course vaccine. Only stop if animal tested negative for rabies or is still healthy after 10 days’ observation. 3. Don’t give immunoglobulin, except in immunocompromised patients. |
| 3 | 1. Bites/scratches that penetrate the skin and with any visible blood. 2. Licking of broken skin or mucous membranes e.g. eyes and mouth. 3. Bat bites:    * Any close contact with a bat: single or multiple bites or scratches and bruising (even with minor bites or unapparent skin penetration).    * Direct physical contact with bat saliva or neural tissue; contact of mucous membranes with bat saliva, droppings or urine. | 1. Wound management. 2. Administer full course vaccine. 3. Only stop if animal tested negative for rabies or is still healthy after 10 days’ observation. 4. Administer rabies immunoglobulin. 5. Administer tetanus vaccine. 6. Prescribe antibiotics. |

**MEDICINE TREATMENT**

**Emergency management**

**Wound management:**

Wash wound thoroughly with soap under running water for 5–10 minutes.

* Chlorhexidine 0.05%, solution.

Apply disinfectant if available:

* Povidone-iodine 10%, solution.

|  |
| --- |
| **CAUTION**  Do not suture bite wounds unless on the head/face.  Clean thoroughly, dress (avoid compressive dressings) and review after 48 hours for secondary closure at that time. |

**The following treatment may be commenced in facilities designated by Provincial/Regional Pharmaceutical Therapeutics Committees. If access to rabies vaccine and immunoglobulin is not immediately available refer urgently.**

**Note:** Rabies PEP (post exposure prophylaxis) schedule varies for immunocompromised patients.The degree to which a patient is immunocompromised should preferably be verified by a physician and includes congenital immunodeficiency, HIV infection, leukaemia, lymphoma, generalised malignancy, radiation, immunosuppressant medicines e.g. long-term therapy of corticosteroids, etc.

**Rabies immunoglobulin:**

* 1. Only indicated for:
     + Category 3, immunocompetent patients.
     + Category 2 and 3 immunocompromised patients.
     + All bat exposures.
  2. Available from the nearest district hospital.
  3. If not immediately available, source and give as soon as possible.
* Rabies immunoglobulin 20 IU/kg.
  + Infiltrate as much as possible in and around the wound and inject the rest IM (not buttock, unless the wound is on the buttock).
  + Follow with a complete course of vaccine.

**Rabies vaccination:**

* 1. Only indicated for category 2 and 3 exposure.
  2. Available from the nearest district hospital.

Children

* Rabies vaccine, 1 amp, IM anterolateral thigh.

|  |  |  |
| --- | --- | --- |
| Day 0 | – | single dose |
| Day 3 | – | single dose |
| Day 7 | – | single dose |
| Day 14 | – | single dose |
| Day 28 | – | single dose(only if immunocompromised). |

Adults

* Rabies vaccine, 1 amp, IM deltoid.

|  |  |  |
| --- | --- | --- |
| Day 0 | – | single dose |
| Day 3 | – | single dose |
| Day 7 | – | single dose |
| Day 14 | – | single dose |
| Day 28 | – | single dose(only if immunocompromised). |

|  |
| --- |
| **CAUTION**  Do not administer rabies vaccine into buttocks (gluteus maximus). |

**Tetanus prophylaxis if not previously immunised within the last 5 years:**

* Tetanus toxoid vaccine (TT), IM, 0.5 mL.

**Note:** In a fully immunised person, tetanus toxoid vaccine or tetanus immunoglobulin may produce an unpleasant reaction, e.g. redness, itching, swelling or fever, but in the case of a severe injury the administration is justified.

**Antibiotic treatment (only for category 3 exposure, hand wounds):**

Children

* Amoxicillin/clavulanic acid oral, 15–25 mg/kg/dose of amoxicillin component, 8 hourly for 5 days.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Weight**  kg | **Dose**  mg  (amoxicillin component) | **Use one of the following** | | | **Age**  months/years |
| **Susp**  125/31.5 mg/5 mL | **Susp**  250/62.5 mg/5 mL | **Tablet**  250/125 mg/tab |
| >3.5–5kg | 75 mg | 3 mL | 1.5 mL | – | >1–3 months |
| >5–7 kg | 100 mg | 4 mL | 2mL | – | >3–6 months |
| >7–9 kg | 150 mg | 6 mL | 3 mL | – | >6–12 months |
| >9–11 kg | 200 mg | 8 mL | 4 mL | – | >12–18 months |
| >11–14 kg | 250 mg | 10 mL | 5 mL | 1 tablet | >18 months–3 years |
| >14–17.5 kg | 300 mg | 12 mL | 6 mL | – | >3–5 years |
| >17.5–25 | 375 mg | 15 mL | 7.5 mL | – | >5–7 years |
| >25–35 kg | 500 mg | 20 mL | 10 mL | 2 tablets | >7–11 years |

Children > 35 kg and adults

* Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly for 5 days.

**Severe penicillin allergy:**

Children

* Macrolide, e.g.:
* Azithromycin, oral, 10 mg/kg daily for 3 days. See dosing table pgxxxx.

Children > 35 kg and adults

* Macrolide, e.g.:
* Azithromycin, oral, 500 mg daily for 3 days.

**AND**

Children

* Metronidazole, oral, 7.5 mg/kg/dose 8 hourly for 5 days. See dosing table, pg xxx.

Adults

* Metronidazole, oral, 400 mg, 8 hourly for 5 days.

**PREVENTION**

* Regular vaccination of domestic cats and dogs.
* Pre-exposure vaccine may be given to those at risk, e.g. occupation, endemic areas, laboratories.

**REFERRAL**

* Deep and large wounds requiring suturing.
* Shock and bleeding.
* Non-immunised or not fully immunised patients for tetanus immunoglobulin.
* Possible rabies exposure (for immunoglobulin and vaccination).
* Severe infected wounds or infected wounds not responding to oral antibiotics.
* Bitten hands.

21.3.1.2 HUMAN BITES

S01.0-9/S11.0-2/S11.7-9/S21.0-2/S21.7-9/S31.0-5/S31.7-8/S41.0-1/S41.7-8/S51.0/S51.7-9/S61.0-1/S61.7-9/S71.0-1/S71.7-8/S81.0/S81.7-9/S91.0-3/S91.7/T01.0-3/T01.6/T01.8-9/T09.1/T11.1/T13.1/T14.0-1 + External Cause Code (W,X,Y,Z)

**DESCRIPTION**

Human bites may be accidental or intentional (form of assault).

Human bites may result in:

* Wound infection, often due to mixed aerobic and anaerobic infection.
* Puncture wounds.
* Tissue necrosis.

Transmission of diseases, e.g. tetanus, HIV, hepatitis, syphilis.

**MEDICINE TREATMENT**

**Wound management:**

Wash wound thoroughly with soap under running water for 5–10 minutes.

* Chlorhexidine 0.05%, solution.

Apply disinfectant if available:

* Povidone-iodine 10%, solution.

|  |
| --- |
| **CAUTION**  Do not suture bite wounds unless on the head/face.  Clean thoroughly, dress (avoid compressive dressings) and review after 48 hours for secondary closure at that time. |

**Tetanus prophylaxis if not previously immunised within the last 5 years:**

* Tetanus toxoid vaccine (TT), IM, 0.5 mL.

**Note:** In a fully immunised person, tetanus toxoid vaccine or tetanus immunoglobulin may produce an unpleasant reaction, e.g. redness, itching, swelling or fever, but in the case of a severe injury the administration is justified.

**Antibiotic treatment:**

Children

* Amoxicillin/clavulanic acid oral, 15–25 mg/kg/dose of amoxicillin component, 8 hourly for 5 days.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Weight**  kg | **Dose**  mg  (amoxicillin component) | **Use one of the following** | | | **Age**  months/years |
| **Susp**  125/31.5 mg/5 mL | **Susp**  250/62.5 mg/5 mL | **Tablet**  250/125 mg/tab |
| >3.5–5kg | 75 mg | 3 mL | 1.5 mL | – | >1–3 months |
| >5–7 kg | 100 mg | 4 mL | 2mL | – | >3–6 months |
| >7–9 kg | 150 mg | 6 mL | 3 mL | – | >6–12 months |
| >9–11 kg | 200 mg | 8 mL | 4 mL | – | >12–18 months |
| >11–14 kg | 250 mg | 10 mL | 5 mL | 1 tablet | >18 months–3 years |
| >14–17.5 kg | 300 mg | 12 mL | 6 mL | – | >3–5 years |
| >17.5–25 | 375 mg | 15 mL | 7.5 mL | – | >5–7 years |
| >25–35 kg | 500 mg | 20 mL | 10 mL | 2 tablets | >7–11 years |

Children > 35 kg and adults

* Amoxicillin/clavulanic acid, oral, 875/125 mg 12 hourly for 5 days.

**Severe penicillin allergy:**

Children

* Macrolide, e.g.:
* Azithromycin, oral, 10 mg/kg daily for 3 days. See dosing table pgxxxx.

Children > 35 kg and adults

* Macrolide, e.g.:
* Azithromycin, oral, 500 mg daily for 3 days.

**AND**

Children

* Metronidazole, oral, 7.5 mg/kg/dose 8 hourly for 5 days. See dosing table, pg 22.6.

Adults

* Metronidazole, oral, 400 mg, 8 hourly for 5 days.

**REFERRAL**

* Deep and large wounds requiring suturing.
* Shock and bleeding.
* Severe infected wounds or infected wounds not responding to oral antibiotics.
* Bitten hands.

21.3.1.3 INSECT STINGS AND SPIDER BITES

T63.2/3/4 + External Cause Code (V,W,X,Y)

**DESCRIPTION**

Injury from spider bites and stings by bees, wasps, scorpions and other insects.

Symptoms are usually local such as pain, redness swelling and itching.

**Bees and wasps**

* Venom is usually mild but may provoke severe allergic reactions such as laryngeal oedema or anaphylaxis (see Section 21.2.10: Anaphylaxis).

**Spiders and scorpions**

* Most are non-venomous or mildly venomous, but some may be extremely venomous and constitute a medical emergency.

**MEDICINE TREATMENT**

# Emergency treatment:

Treat anaphylaxis. See Section 21.2.10: Anaphylaxis.

**Severe local symptoms:**

Children

* Chlorphenamine, oral, 0.1 mg/kg/dose6–8 hourly. See dosing table, pg xxx.

|  |
| --- |
| **CAUTION**  Do not give an antihistamine to children <2 years of age. |

Adults

* Chlorphenamine, oral, 4 mg, 6–8 hourly.

**AND**

* Calamine lotion, applied when needed.

If hypersensitivity response to insect bite with inflamed lesion, see Section 5.10.4:Papular urticaria.

**Pain:**

Children

* Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg xxx.

Adults

* Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
* Maximum dose: 15 mg/kg/dose.
* Maximum dose: 4 g in 24 hours.

**Cytotoxic lesions:**

Avoid giving prophylactic antibiotics for bites and stings.

If secondary skin infection (site red, swollen, hot, tender, pus may be present), manage as cellulitis. See Section 5.4.3: Cellulitis.

**Very painful scorpion stings:**

* Lidocaine 2%, 2 mL injected around the bite as a local anaesthetic.

**REFERRAL**

1. For possible antivenom (neurotoxic spider bites or scorpion stings), if applicable, and intensive care, if necessary.
2. Presence of systemic manifestations:

|  |  |
| --- | --- |
| * weakness | * double vision |
| * drooping eyelids | * muscle cramps |
| * hypersalivation | * paraesthesia |
| * difficulty in swallowing and speaking |  |

**Note:** Send the spider or scorpion with the patient, if available.

1. If secondary infection of bite/sting not responding to first line antibiotics.

21.3.1.4 SNAKEBITES

T63.0

**DESCRIPTION**

Of all the species of snakes found in South Africa, about 12% are considered to be potentially dangerous to humans. However, all snake bites should be considered dangerous until proven otherwise.

**South African poisonous snakes can be broadly divided into 3 groups according to the action of their venom although there is significant overlap of toxic effects in some snake venoms.**

**Cytotoxic venoms**

1. Venom causes local tissue damage and destruction around the area of bite.
2. Bite is painful and symptoms usually start within 10–30 minutes after the bite.
3. Examples include:

|  |  |
| --- | --- |
| * Puff adder | * Berg adder |
| * Gaboon adder | * Night adder |

* Some dwarf adders and the spitting cobras i.e. Mozambique spitting cobra, black spitting cobra, rinkhals.

**Neurotoxic venoms**

1. Neurotoxic venom causes weakness, ptosis, drooling and dysphagia, pins and needles, sweating, blurred vision, hypotension and respiratory difficulty and paralysis of skeletal muscles and respiratory failure.
2. Bite is not as painful as cytotoxic venom bites.
3. Symptoms usually start in 15–30 minutes.
4. Examples include:

|  |  |
| --- | --- |
| * Cape cobra | * Green mamba |
| * Black mamba | * Rinkhals |
| * Black spitting cobra | * Berg adder (Berg adder venom is neurotoxic as well as cytotoxic) |

**Haemotoxic venoms**

1. Venom affects the clotting of blood causing bleeding tendency which may present up to a few days after the bite.

|  |  |
| --- | --- |
| * Boomslang | * Vine snake |

**Symptoms and signs of snakebite envenomation include:**

Local

1. Bite marks with or without pain.
2. Swelling around the bite, which may be severe with discolouration of skin and/or blister formation.

Systemic

1. Nausea, vomiting.
2. Sweating and hypersalivation.
3. Skeletal muscle weakness, which may cause:

|  |  |
| --- | --- |
| * drooping eyelids | * difficulty in swallowing |
| * double vision | * difficulty in breathing |

1. Shock.
2. Rarely bleeding (epistaxis, haematuria, haematemesis or haemoptysis).

|  |
| --- |
| **CAUTION**  Do not apply a tourniquet.  Do not apply a restrictive bandage to the head, neck or trunk.  Do not squeeze or incise the wound.  Do not attempt to suck the venom out. |

**GENERAL MEASURES**

**Emergency treatment**

Remove clothing from site of the bite and rings if an extremity bite; and clean the wound thoroughly with chlorhexidine 0.05% solution.

For non-cytotoxic bites only:

1. To prevent spread to vital organs, immediately apply a wide crepe bandage firmly from just above the bite site up to 10–15 cm proximal to the bite site.Apply no tighter than for a sprained ankle.
2. Immobilise the affected limb with a splint or sling.
3. Try to obtain an accurate history e.g. time of the bite, type of snake.
4. If no signs and symptoms, observe the patient for 6–8 hours with repeated examinations.
5. Absence of symptoms and signs for 6–8 hours usually indicates a harmless bite.
6. Observation for 24 hours is recommended.

**MEDICINE TREATMENT**

**Venom in the eyes:**

Irrigate the eye thoroughly for 15–20 minutes with water or sodium chloride, 0.9%.

|  |
| --- |
| *LoE:III* |

* Tetracaine1%, drops (if available),instill 1 drop into the affected eye(s) before irrigation.

Refer patient.

**Pain:**

* Non-opioid analgesics according to severity. See Section 20.2: Chronic non-cancer pain.

**Shock:**

Treat if present. See Section 21.2.9: Shock.

**Tetanus prophylaxis:**

If not previously immunised within the last 5 years:

* Tetanus toxoid (TT), IM, 0.5 mL.

**Note:**

1. **The majority of patients do not need and should not be given antivenom**.
2. Patients with bites due to other species should receive antivenom onlyat the onset of any symptoms.
3. The dose of antivenom is the same for adults and children.

Criteria for antivenom administration

All patients with systemic signs and symptoms or severe spreading local tissue damage should receive antivenom.

1. signs of systemic poisoning (see signs, above)
2. spreading local damage

* swelling of hand/foot within 1 hour of bite (80% of bites are on hands/ feet)
* swelling extends to elbows or knees within 3–6 hours of a bite
* swelling of the groin or chest at any time or if actively advancing
* significant swelling of head or neck
* muscle weakness and/or difficulty in breathing

**REFERRAL**

1. All patients with bites or likely bites even if puncture marks are not seen.

If possible, take the dead snake to the referral centre for identification.

1. If the patient presents at the clinic with their own antivenom, contact the secondary level hospital for advice.

21.3.2 BURNS

T30.0

**DESCRIPTION**

Burns lead to skin and soft tissue injury and may be caused by:

1. heat, e.g. open flame, hot liquids, hot steam,
2. chemical compounds,
3. physical agents, e.g. electrical/lightning) or
4. radiation.

The extent and depth may vary from superficial (epidermis) to full-thickness burns of the skin and underlying tissues.

Initially, burns are usually sterile.

Assessment of burns

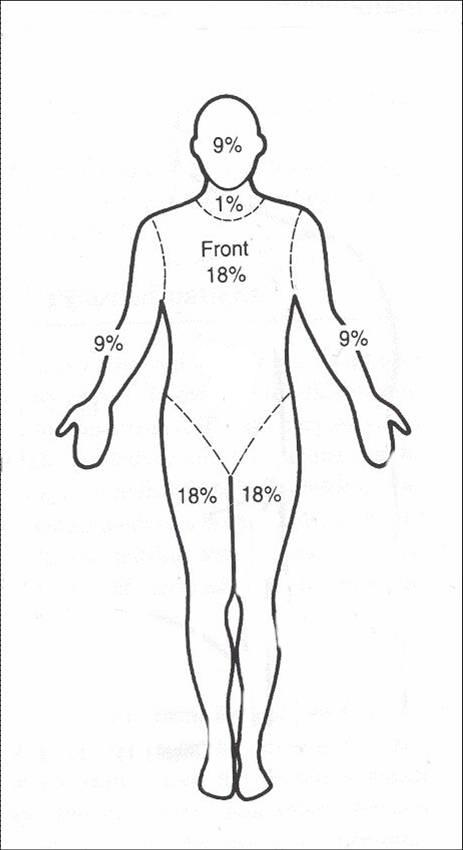
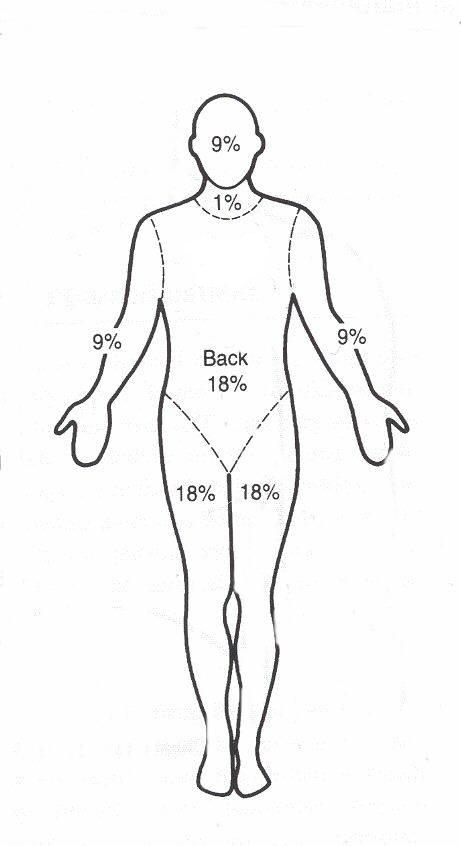
|  |  |  |
| --- | --- | --- |
| **Depth of burn wound** | Surface /colour | Pain sensation/healing |
| Superficial or epidermal | Dry, minor blisters, erythema | 1. Painful 2. Heals within 7 days |
| Partial thickness superficial or superficial dermal | Blisters, moist | 1. Painful 2. Heals within 10–14 days |
| Partial thickness deep or deep dermal | Moist white or yellow slough, red mottled | 1. Less painful 2. Heals within a month or more Generally needs surgical debridement and skin graft |
| Full thickness (complete loss of skin) | Dry, charred whitish, brown or black | 1. Painless, firm to touch 2. Healing by contraction of the margins (generally needs surgical debridement and skin graft) |

**The figures below are used to calculate body surface area %.[[19]](#footnote-3)**

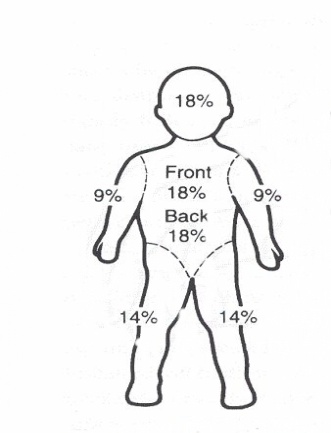
**These diagrams indicate percentages for the whole leg/arm/head (and neck in adults) not just the front or back.**

**In children the palm of the hand, including the fingers, is 1%.**

**Children 8 years and adults**

****

**Children < 8 years of age**

****

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Child and adult percentages** | | | | | |
| **Age**  years | **Head + neck**  **Front + back** | **Torso Front** | **Torso Back** | **Leg + foot Front + back** | **Arm+ hand**  **Front+ back** |
| **<1** | 18% | 18% | 18% | 14% | 9% |
| **1-<2** | 17% | 18% | 18% | 14.5% | 9% |
| **2-<3** | 16% | 18% | 18% | 15% | 9% |
| **3-<4** | 15% | 18% | 18% | 15.5% | 9% |
| **4-<5** | 14% | 18% | 18% | 16% | 9% |
| **5-<6** | 13% | 18% | 18% | 16.5% | 9% |
| **6-<7** | 12% | 18% | 18% | 17% | 9% |
| **7-<8** | 11% | 18% | 18% | 17.5% | 9% |
| **≥ 8** | 10% | 18% | 18% | 18% | 9% |

**EMERGENCY TREATMENT**

Follow the 7C’s:

1. Clothing: remove non-sticking clothing especially if hot or smouldering or constrictive (e.g. rings).
2. Cool: with tap water for 30 minutes
3. Clean: with chlorhexidine
4. Cover: with a non-adherent dressing
5. Comfort: provide pain relief
6. Carbon dioxide poisoning: consider if enclosed fire, decreased LOC, disorientation
7. Consider inhalation injury if: carbonaceous (black-coloured) sputum, shortness of breath, perioral burns, hoarse voice stridor. Discuss with referral centre as early intubation may be needed.

**MEDICINE TREATMENT**

# Fluid replacement

Burns ≤ 10% Total Body Surface Area (TBSA):

* Oral fluids.

Burns >10% of TBSA:

* IV fluid for resuscitation, replacement and maintenance.

**Calculation of fluid replacement**

**Fluids in adults**

If shocked, see Section 21.2.9: Shock.

Replacement fluids for burns

First 24 hours:

* Sodium chloride 0.9%,IV.
  + Calculate total fluid requirement in 24 hours:

Total % burn x weight (kg) x 4 mL.

1. Give half this volume in the first 8 hours
   * Administer remaining fluid volume in next 16 hours.

**Note:** If urine output is not adequate, increase fluids for the next hour by 50%. Continue at a higher rate until urine output is adequate, then resume normal calculated rate.

**Fluids in children**

Replacement fluids for burns

1. First 8 hours:

**Note: Avoid circumferential taping when securing infusion lines, as oedema under the eschar may decrease the venous return.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Weight**  kg | **Fluid volume (mL per hour) for the 1st 8 hours in burns of > 10% seen in PHC clinics while awaiting transfer:**   * 0.9% Sodium Chloride with 100mL of 50% dextrose added to each litre or 10mL of 50% dextrose added to each 100mL. | | | |
| **Burns percentage of total body area** | | | |
| 10–20% | >20–30% | >30–40% | >40% |
| >2–2.5 kg | 15 | 19 | 23 | 28 |
| >2.5–3.5 kg | 20 | 25 | 31 | 36 |
| >3.5–5 kg | 28 | 36 | 44 | 51 |
| >5–7 kg | 40 | 50 | 62 | 73 |
| >7–9 kg | 53 | 70 | 84 | 100 |
| >9–11 kg | 67 | 85 | 105 | 120 |
| >11–14 kg | 82 | 105 | 125 | 150 |
| >14–17.5 kg | 95 | 125 | 155 | 185 |
| >17.5–25 kg | 115 | 155 | 190 | 235 |
| >25–35 kg | 147 | 200 | 250 | 310 |

1. Next 16 hours:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Weight**  kg | **Fluid volume (mL per hour) for the 2nd (next) 16 hours in burns of > 10% seen in PHC clinics if transfer has not been accomplished in the 1st 8 hours:**   * 0.9% Sodium Chloride with 100mL of 50% dextrose added to each litre or 10 mL of 50% dextrose added to each 100 mL. | | | |
| **Burns percentage of total body area** | | | |
| 10–20% | >20–30% | >30–40% | >40% |
| >2–2.5 kg | 12 | 14 | 17 | 19 |
| >2.5–3.5 kg | 16 | 19 | 22 | 25 |
| >3.5–5 kg | 23 | 27 | 31 | 35 |
| >5–7 kg | 33 | 38 | 44 | 49 |
| >7–9 kg | 43 | 50 | 58 | 65 |
| >9–11 kg | 54 | 64 | 72 | 82 |
| >11–14 kg | 64 | 76 | 86 | 97 |
| >14–17.5 kg | 75 | 91 | 104 | 118 |
| >17.5–25 kg | 91 | 110 | 129 | 148 |
| >25–35 kg | 110 | 138 | 165 | 190 |

**Pain:**

Children

* Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg xxx.

Adults

* Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
* Maximum dose: 15 mg/kg/dose.
* Maximum dose: 4 g in 24 hours.

**Severe pain:**

See Section 20.2: Chronic non-cancer pain.

**Wound cleansing:**

1. Clean the burn wound gently.

* Sodium chloride 0.9% or clean water.

**Burn dressing:**

For patients requiring referral:

1. If within 12 hours, transfer patient wrapped in clean dry sheet and blankets.
2. If delayed by > 12 hours, paraffin gauze dressing and dry gauze on top.
3. For full thickness and extensive burns cover with a paraffin gauze occlusive dressing. Cover the dressing with plastic wrap (e.g. cling film).

|  |
| --- |
| *LoE:III* |

For patients not requiring transfer (burns that can be treated at home):

1. Paraffin gauze dressing.

If infected burn:

* Povidone-iodine 5%, cream, applied daily.

**Tetanus prophylaxis:**

If not vaccinated within the last 5 years:

* Tetanus toxoid (TT), IM, 0.5 mL.

See Section 21.3.1.1: Animal bites or 21.3.1.2: Human bites, for detailed indications and management principles.

**REFERRAL**

1. All children < 1 year of age.
2. All burns > 5% in children1–2 years of age.
3. Full thickness burns of any size in any age group.
4. Partial thickness burns > 10% TBSA.
5. Burns of special areas – face, hands, feet, genitalia, perineum and major joints.
6. Electrical burns, including lightning injury.
7. Chemical burns.
8. Inhalation injury – fire or scald injury.
9. Circumferential burns of the limbs or chest.
10. Burn injury in a patient with pre-existing medical disorders which could complicate management, prolong recovery or affect mortality.
11. Any patient with burns and concomitant trauma.
12. Suspected child abuse.
13. Burns exceeding the capabilities of the referring centre.
14. Septic burn wounds.

**Note:** IV fluid replacement is very important in large burns. However, if unable to obtain IV access, give fluids orally or via NGT and transfer urgently.

21.3.3 EXPOSURE TO POISONOUS SUBSTANCES

T65.9

**Note: Poisoning from agricultural stock remedies is notifiable.**

|  |  |  |
| --- | --- | --- |
| **POISON INFORMATION CENTRES** | | |
| **Poisons Information Helpline** (national service) | 24 hours/day, every day for poisons queries | 0861 555 777 |
| **Red Cross War Memorial Children’s Hospital Poisons Information Centre**  Email: [poisonsinformation@uct.ac.za](mailto:poisonsinformation@uct.ac.za)  [**h**ttp://www.paediatrics.uct.ac.za/poisons-information-centre](http://www.paediatrics.uct.ac.za/poisons-information-centre) | Office Hours | (021) 658 5308 |
| **Tygerberg Poison Information Centre**  Email: [toxicology@sun.ac.za](mailto:toxicology@sun.ac.za)  [www.sun.ac.za/poisoncentre](http://www.sun.ac.za/poisoncentre) | Office Hours | (021) 938 9596 |
| **University of the Free State Poison Control and Medicine Information Centre** | 24 hours/day | 082 491 0160 |
| Telephone numbers tested xxxxx | | |

Poison information can be accessed through: <https://www.afritox.co.za/>

If the above centres cannot be contacted, enquire at the nearest trauma and emergency unit.

**DESCRIPTION**

Acute poisoning is a common medical emergency. Poisoning may occur by ingestion, inhalation or absorption through skin or mucus membranes. Frequently encountered poisons include:

1. analgesics
2. anti-epileptic agents
3. antidepressants and sedatives
4. pesticides
5. volatile hydrocarbons, e.g. paraffin
6. household cleaning agents
7. vitamins and minerals, especially iron in children
8. antihypertensive and anti-diabetic agents
9. theophylline

Signs and symptoms vary according to the nature of poisoning.

**GENERAL MEASURES**

1. Remove the patient from the source of poison, especially pesticides, e.g. clothing, etc.
2. If skin contact has occurred, especially pesticides wash the skin with soap and water, ensuring your safety with protective measures e.g., gloves, gowns, masks, etc.
3. Establish and maintain the airway.
4. Ensure adequate ventilation and oxygenation.
5. Treat shock.
6. Take an accurate history.

* Obtain collateral information, especially in patients with impaired consciousness.
* A special effort should be made to obtain tablets, packets, containers, etc. of the suspected agent used in order to identify poisons involved.

1. Document and respond to abnormalities of:

|  |  |
| --- | --- |
| * pulse rate * blood pressure | * level of consciousness * pupillary size and reaction |
| * respiratory rate |  |

**Ingested poisons**

* Activated charcoal.
* Children: 1 g/kg mixed as a slurry with water. See dosing table, pg xxx.
* Adults: 100 g mixed as a slurry with water.
* Only if the patient is fully conscious and able to maintain their airway and if ingestion was within the previous hour prior to presentation.
* Add water to charcoal and not vice versa.
* Do not administer orally if the level of consciousness is reduced.

1. Activated charcoal should not be given in the case of:

* volatile hydrocarbon poisoning, e.g. paraffin, petrol
* corrosive poisons, i.e. acids or alkalis
* camphor and other convulsants
* metals, e.g. iron, lithium etc
* all alcohols
* paracetamol overdose where oral acetylcysteine will be given

1. Protect the airway:

* Place in lateral position if decreased level of consciousness.

1. Identify the poison and keep a sample of the poison or container.
2. Contact the nearest hospital or poison centre for advice.

**EMERGENCY MANAGEMENT**

1. If the patient is unconscious, perform resuscitation. See Section 21.1: Cardiopulmonary – cardiopulmonary resuscitation.
2. Take a history and identify the nature and route of poisoning.
3. Thoroughly wash off any poison from the skin with soap and water and remove contaminated clothes in organophosphate poisoning.

**Note:** Healthcare workers and relatives should avoid having skin contact with the poison or the patient’s bodily fluids e.g. vomitus, faeces.

**Specific antidotes**

**Hypoxia, especially in carbon monoxide poisoning:**

* Give 100% oxygen by non-rebreather mask.

**Organophosphate and carbamate poisoning**

1. Signs and symptoms of organophosphate poisoning include:

|  |  |
| --- | --- |
| * diarrhoea | * weakness |
| * vomiting | * miosis/mydriasis |
| * bradycardia | * confusion |
| * muscle twitching | * convulsions |
| * coma |  |
| * hypersecretions (hypersalivation, sweating,lacrimation, rhinorrhoea) | |
| * brochospasm and bronchorrhoea, causing tightness in the chest, wheezing, cough and pulmonary oedema | |

1. Protect airway if GCS < 8.
2. Intubate and ventilate if hypoxia, hypercarbia or decreased respiratory effort.
3. Consider inotropic support if resistant hypotension is present.

Children

* Atropine, IV, 0.05 mg/kg/dose. See dosing table, pg xxx.
  + - * Reassess after 3 – 5 minutes and if necessary repeat atropine bolus.
* If no response, give double the dose.
* If some response, give the same or reduced dose.
  + - * Give a repeat bolus until adequate response achieved, i.e. reduced bronchial secretions, dry mouth, increasing heart rate and dilating pupils (Note: pupil reversal may be delayed).
* Reassess frequently as additional doses may be required.

|  |
| --- |
| *LoE:III[[20]](#endnote-21)* |

Adults

* Atropine, IV,
* Initial doses 1 mg, repeat doses are 2–4 mg.
* Repeat the dose every 10–15minutes until there is control of bronchial secretions.
* Refer all patients urgently.
* Response to a first dose suggests organophosphate poisoning.

**Opioid overdose in adults**

1. Supportive care is the mainstay of treatment.

* Protect airway if GCS < 8.
* Intubate and ventilate if decreased respiratory effort.
* Consider inotropic support if resistant hypotension is present.
* Naloxone for severe poisoning only(i.e. patients requiring inotropic or ventilatory support) or asa single test dose for uncertain diagnosis.
* Naloxone, IV (preferably) or IM, 0.4–2 mg immediately.

|  |
| --- |
| *LoE:III[[21]](#endnote-22)* |

* Repeat 0.4 mg every 5 minutes until improvement in respiratory function and level of consciousness.
* Total effective dose is 10 mg.
* May be administered endotracheally.
* Duration of action is short, i.e. 45 minutes.
* Repeat doses over 24 hours may be required.

1. All patients need to be kept under direct observation until the effect of the opiates has completely worn off.
2. Further doses of naloxone may be needed while awaiting and during transport as naloxone has a short duration of action.
3. In some patients addicted to opioids, naloxone may precipitate an acute withdrawal syndrome after several hours. This must not prevent the use of naloxone.
4. Refer all patients.

**Paracetamol poisoning**

All symptomatic patients or those with a history of significant single ingestion (≥ 200 mg/kg or 10 g, whichever is less) should be referred urgently for paracetamol blood level and consideration of acetylcysteine.

**REFERRAL**

1. All intentional overdoses.
2. All symptomatic patients.
3. All children in whom toxicity can be expected, e.g. ingestion with:

|  |
| --- |
| *LoE:III[[22]](#endnote-23)* |

* Paracetamol ≥ 200 mg/kg or 10 g (whichever is less)
* anti-epileptics
* warfarin
* tricyclic antidepressants
* sulphonylureas
* paraffin (unless patient has a normal respiratory rate after 6 hours)
* iron tablets

If in doubt, consult the referral hospital or poison centre.

**Note:** Send the following to hospital with the patient:

1. written information
2. a sample of the poison or the empty poison container

21.3.4 EYE, CHEMICAL BURNS

T26.5

(See Chapter 18: Eye conditions)

21.3.5 EYE INJURY, FOREIGN BODY

S05.9 / S05.5

(See Chapter 18: Eye conditions)

21.3.6 POST EXPOSURE PROPHYLAXIS

21.3.6.1 POST EXPOSURE PROPHYLAXIS, OCCUPATIONAL

Z20.6 + Z29.8 + S61.0/Z57.8/X58.92/W46.22

**DESCRIPTION**

This describes post exposure prophylaxis for the health care worker exposed to infectious material from a patient including:

|  |  |
| --- | --- |
| 1. blood | 1. semen |
| 1. body fluids (CSF, synovial, pleural, pericardial, peritoneal, amniotic) | 1. vaginal secretions |

The risk of acquiring HIV following occupational exposure is estimated at 0.3%. There is a higher risk when:

1. the injury is deep or
2. involves a hollow needle or
3. If the source patient is more infectious, e.g.: terminal AIDS, seroconversion illness, or known to have a high viral load.

**GENERAL MEASURES**

1. Where the source patient is on ARVs or has been on ARVs, initiate prophylaxis and seek expert opinion. An extra blood sample (unclotted, EDTA) of the source patient should be stored in case of need for further viral testing.
2. Other blood borne infections that can be transmitted include hepatitis B, hepatitis C and syphilis. Test all source patients (see monitoring table).
3. Offer comprehensive and confidential pre-test HIV counselling.
4. Advise about the need to take precautions, e.g. condom use, to prevent infection of their own sexual partners.

**Monitoring in occupational exposure:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Source patient** | **Exposed health care worker**  \*Only if source patient was positive | | | |
| **Baseline** | **Baseline** | **2 weeks** | **6 weeks** | **4 months** |
| HIV | Rapid test  **PLUS**  HIV ELISA (NHLS test) | Rapid test  **PLUS**  HIV ELISA (NHLS test) |  | HIV ELISA (NHLS test) | HIV ELISA (NHLS test) |
| Hepatitis B | Surface antigen | Surface antibody\* |  |  |  |
| Hepatitis C | HCV antibody | HCV antibody\* |  | HCV PCR\* |  |
| Syphilis | RPR/  TP antibody | RPR/TPantibody\* |  |  | RPR/TPantibody\* |
| Serum creatinine |  | If TDF part of PEP | If TDF part of PEP |  |  |
| FBC |  | If AZT part of PEP | If AZT part of PEP |  |  |

**MEDICINE TREATMENT**

**1. Prevent HIV:**

1. Initiate HIV PEP immediately after the injury - within 72 hours. Do not wait for the confirmatory test results on the source patient and health care worker.
2. If higher risk exposure (defined above) consider initiation of treatment beyond 72 hours, as the risks of prophylaxis in this setting may outweigh the benefits. Avoid initiating PEP beyond 7 days after exposure.

**Note**: HIV PEP is **not** indicated if:

1. HCW exposed to body fluids which carry no risk of infection, e.g. vomitus, urine, faeces or saliva.
2. HCW is HIV-infected. Stop PEP if HIV test of the health care worker is positive at the time of the injury.
3. The source is HIV sero-negative unless there are features suggesting sero-conversion illness.

* Continue prophylaxis until the results of additional tests are available.
* These cases should be discussed with virologists.

|  |  |  |
| --- | --- | --- |
| **Exposure** | **HIV Status of source patient** | |
| **Negative** | **Unknown or Positive** |
| Intact skin | no PEP | no PEP |
| Mucosal splash/ Non-intact skin | no PEP | PEP |
| Percutaneous injury | no PEP | PEP |

When PEP is indicated, the following regimen is recommended:

* Tenofovir, oral, 300 mg daily for 4 weeks (provided baseline eGFR is >60 mL/min).

**and**

* Emtricitabine, oral, 200 mg daily for 4 weeks.

**and**

* Atazanavir/ritonavir 300/100 mg daily for 4 weeks.

**OR**

* Lopinavir/ritonavir 200/50, oral, 2 tablets 12 hourly for 4 weeks.

If tenofovir is contraindicated or if source patient is known to be failing a tenofovir based regimen, replace tenofovir and emtricitabine with:

* Zidovudine, oral, 300 mg 12 hourly for 4 weeks.

**and**

* Lamivudine, oral, 150 mg 12 hourly for 4 weeks.

**Note:** Adverse effects of PEP:

1. PEP is generally not well tolerated. Adverse effects occur in about half of cases and therapy is discontinued in about a third.
2. Nevirapine must never be used for PEP as there is a high risk of severe hepatitis, when given to people without HIV infection.
3. Tenofovir is contra-indicated in renal disease or with concomitant use of nephrotoxic medicines e.g. aminoglycosides (check baseline creatinine clearance). Where tenofovir is contraindicated, switch to zidovudine. If zidovudine is not tolerated consult or refer for further management.
4. Lopinavir/ritonavir often causes diarrhoea. If lopinavir/ritonavir is not tolerated switch to atazanavir/ ritonavir.

When the source patient is known to be failing ART, modify the PEP regimen and seek expert opinion:

* If the patient is on zidovudine or stavudine then tenofovir should be used.
* If the patient is on tenofovir then zidovudine should be used.
* If the patient is on efavirenz or nevirapine then lopinavir/ritonavir should be used.

Patients failing second line ART almost always have no resistance to protease inhibitors, so atazanavir/ritonavir or lopinavir/ritonavir should still be effective.

Consultation with a virologist or infectious diseases physician is recommended for advice on which antiretroviral medicines to use for PEP.

**2. Prevent hepatitis B**

Decide on what treatment to give the exposed HCW according to the vaccination status (and antibody response) of the HCW, as well as the HBsAg results of the source patient, if known.

**PEP for Health Care workers following hepatitis B exposure**

|  |  |  |  |
| --- | --- | --- | --- |
| Vaccination status and antibody response of HCW | **Source patient** | | |
| **HBsAg positive** | **HbsAg negative** | **HBsAg unknown** |
| HCW unvaccinated  or  vaccination incomplete | * HBIG, IM, 500 units\* * HepB vaccine   (3 doses at monthly intervals) | * Initiate HepB vaccination (month 0, 1 and6) | * HBIG, IM, 500 units\* * HepB vaccine   (3 doses at monthly intervals) |
| HCW vaccinated  **AND**  known to have HBsAbtitre≥ 10 units/mL# | No treatment | No treatment | No treatment |
| HCW vaccinated  **AND**  HBsAb< 10 units/mL **OR**  level unknown | * HBIG, IM, 500 units \* * Repeat HepB vaccine   (3 doses at monthly intervals) | No treatment | * HBIG, IM, 500 units\* * Repeat HepB vaccine   (3 doses at monthly intervals) |

\* HBIG and first dose of vaccine to be given simultaneously, but at different sites.

# If the delay in obtaining HBsAb results is more than 24 hours initiate treatment as for vaccinated AND HBsAb< 10 units/mL.

After vaccination ensure the health care worker has aHBsAb≥ 10 units/mL 1 – 2 months after the last vaccine dose.

|  |
| --- |
| *LoE:III[[23]](#endnote-24)* |

**REFERRAL**

**Note:** Refer if there are inadequate resources with regard to:

1. counselling
2. laboratory for testing
3. medico-legal examination
4. medicine treatment

21.3.6.2 POST EXPOSURE PROPHYLAXIS, RAPE AND SEXUAL ASSAULT

T74.2

**DESCRIPTION**

Sexual offences are of grave concern and in particularly to the most vulnerable persons including women, children and disabled persons.

The definitions of sexual offences are within the Criminal Law (Sexual Offences and Related Matters) Amendment Act, No 32 of 2007.Sexual offences are physically and psychologically damaging to victims, and the ability to consent to a sexual act depends on the competence of the person to give consent and be knowledgeable of the consequences of that act - including the risk of contracting sexually transmitted diseases such as HIV.

**GENERAL MEASURES**

1. Sexual offences victims must be regarded as emergencies but do not displace life-threatening management of other cases.
2. Ensure appropriate management is in place for every case. So called “cold cases” (> 72 hours after the incident) may be managed medically and given an appointment for medico-legal investigation.
3. If victim wants to open a case, the Family violence, Child protection and Sexual offences Unit (FCS) must be phoned and requested to come to the hospital.
4. Cases must be opened in all cases of suspected or alleged rape/sexual abuse in children.

Offer 1st dose of antiretroviral PEP in all cases of suspected rape - the following matters can be resolved in due course:

1. Obtain informed consent from the patient and written consent from parent in case of minors before HIV testing and giving treatment.
2. Consent for HIV testing in children can be given by:

* Children who are competent to give consent and are:

(i) ≥ 12 years of age; or

(ii)< 12 years of age and of sufficient maturity to understand the benefits, risks and social implications of such a test.

* Parents or caregivers of children who are not competent to sign consent (but the child should have this explained to them so they understand what is happening, appropriate to their age and development).
* The clinical head of the institution, where a competent person is not available to give consent for HIV testing and PEP (alleged rape in children is a medical emergency).

1. Determine the patient’s HIV status before initiating PEP.

* Prophylaxis given to a previously infected HIV person will have no clinical benefit and may lead to the development of viral resistance. Provide counselling and manage accordingly.

1. It is the patient’s choice to have immediate HIV testing.

* If the patient declines, give a 3–day starter pack of PEP and encourage the patient to reconsider testing within those 3 days.
* **No further PEP will be given in the case of continued refusal of HIV testing in adults, in children where the parent unreasonably refuses PEP this may be taken further.**
* If in doubt about the indications for HIV PEP, give PEP.

1. A patient presenting after 72 hours since the alleged incident should not be given PEP, but should be counselled about the possible risk of transmission.

* HIV testing should still be offered at the time of presentation and 4 months later.

1. Perform a pregnancy test in adult and pubertal girls to exclude pregnancy before initiating post exposure contraception and STI prophylaxis.

* Pregnant rape patients should be referred.

1. If the HIV Elisa/Rapid test is positive in sexually abused children <18 months of age, perform HIV PCR to confirm if HIV infection is truly present.

If HIV-uninfected or if the child has no access to immediate HIV PCR results, they should receive prophylaxis (until the HIV PCR result is obtained).

**Initial Counselling**

# Counsel all cases of sexual offences patients and caregivers in the case of children

1. Explain the side effects of ARVs, e.g. tiredness, nausea and flu-like symptoms.
2. Use condoms for 4months.
3. Avoid blood or tissue donation for 6 months.
4. Emphasise the importance of compliance with ARV PEP.

# Provide psychosocial support pertaining to:

* Restoring control of the victim by avoiding secondary traumatisation, and give choices and participation in treatment decisions.
* Medical risks, e.g. transmission of sexually transmitted infections including HIV, syphilis, hepatitis-B and C.
* Risk of pregnancy.
* Psycho-emotional-social effects of the sexual assault according to their level of understanding and maturity.

**Follow-up support**

# Discuss issues relating to stress management at subsequent visits.

# Inform the patient of the signs and symptoms of post-traumatic stress, including:

* general irritability
* trembling
* pain in neck and/or lower back
* change in appetite
* change in sleep pattern
* post-traumatic stress syndrome (PTSD), that may eventually cause exhaustion and illness.

**Medico-legal assessment of injuries**

1. Complete appropriate required forms and registers.

Investigations

1. The patient/parent should sign a consent form for both HIV testing and PEP. Voluntary rapid HIV testing should be made available and should be done on all opting for PEP.
2. Further baseline blood tests should include creatinine (or FBC, if AZT is part of PEP), RPR/TP antibody test for syphilis and Hepatitis B serology. Do a pregnancy test in all women and female adolescents prior to giving treatment.
3. Follow up bloods include:
   * 2 weeks: creatinine if TDF part of PEP (or FBC if AZT part of PEP)
   * 6 weeks: HIV ELISA
   * 4 months: HIV ELISA, RPR test for syphilis, Hepatitis B serology.

**MEDICINE TREATMENT**

Prevent the following:

* + 1. HIV
    2. Hepatitis B
    3. Pregnancy
    4. STIs

**Note:**

1. Obtain consent for HIV testing from all patients before initiating PEP.
2. Offer PEP if the patient presents within 72 hours of being raped and is HIV-uninfected or HIV status is unknown.
3. Initiate PEP as soon as possible. Testing can be done up to 3 days after the incident.
4. It is important to manage the medical condition before medico-legal examination. Most of these will require referral.
5. In children <18months of age: antiretroviral PEP should be initiated while awaiting transfer and HIV PCR results.
6. Initiate therapy as early as possible after the exposure to maximize the chance of effective prophylaxis. Therapy may be given up to 72 hours after exposure.
7. If, for practical reasons, a person cannot return for the 3 day follow up, a 28 day course of ART should be provided.
8. Do a pregnancy test in all women and female adolescents prior to post exposure contraception and STI prophylaxis to exclude pregnancy.

##### HIV PEP

Children

As the body surface area is very difficult to calculate, the following guidelines are provided:

* + - Zidovudine, oral, 12 hourly for 28 days.
* Paediatric dose: 180–240 mg/m2.See dosing table, pg xxx
* Maximum: 300 mg/dose.

**AND**

* + - Lamivudine, oral, 4 mg/kg 12 hourly or 8mg/kg daily for 28 days.
* Maximum: 150 mg/dose if given 12 hourly or 300 mg/dose if given daily. See dosing table, pg xxx

AND

* Lopinavir/ritonavir, oral 12 hourly for 28 days.
  + Paediatric dose: 300/75mg/m2.See dosing table, pg xxx
  + Maximum: 400/100 mg/dose.

Dosages may vary by±1 mg/kg/dose, to allow a convenient volume of medication.

Use the adult dosage regimen if children require more than the maximum dose.

Follow up visits should be at 6 weeks and4months after the rape. HIV testing should be performed at each of these visits with consent.

Adults

Management for HIV prevention is the same as for occupational HIV exposure. See section 21.3.6.1 Post exposure prophylaxis, occupational.

* + - 1. **HEPATITIS B PREVENTION**
* Hepatitis B vaccine, IM, 3 doses at monthly intervals.

|  |
| --- |
| *LoE:III* |

**3. EMERGENCY CONTRACEPTION (after pregnancy is excluded)**

Do a pregnancy test in all women and female adolescents. Children must be tested and given Emergency contraception from Breast Tanner Stage III, if unsure of staging, give Emergency contraception when you detect any breast development (DO NOT REGARD MENARCHE AS AN INDICATION).

* + - Levonorgestrel oral, 1.5 mg as a single dose as soon as possible after unprotected intercourse.

|  |
| --- |
| **CAUTION**  Tablets must be taken as soon as possible, preferably within 72 hours of unprotected intercourse and not > 5 days later. |

**An anti-emetic:**

Adults

* Metoclopramide oral, 10 mg 8 hourly as needed.

**4. STI PROPHYLAXIS**

**Adults**

* Ceftriaxone, IM, 250 mg as a single dose.
  + For ceftriaxone IM injection: Dissolve ceftriaxone 250 mg in 0.9 mL lidocaine 1% without epinephrine (adrenaline).

**AND**

* Azithromycin, oral, 1 g, as a single dose.

**AND**

* Metronidazole, oral, 2 g immediately as a single dose.

**Children**

Prior to hospital referral, administer:

Children < 45 kg

* + - Macrolide, e.g.,:
    - Azithromycin, oral, 20 mg/kg/dose, as a single dose, and refer. See dosing table, pg xxx.
  + Maximum dose 1 g

Children ≥ 45 kg

* Macrolide, e.g.:
* Azithromycin, oral, 1g, as a single dose, and refer.

**AND**

* Metronidazole, oral, as a single dose, and refer.

|  |  |
| --- | --- |
| * + 1–3 years | 500 mg |
| * + 3–7 years | 600–800 mg |
| * + 7–10 years | 1 g |
| * + > 10 years | 2 g |

**AND**

* Ceftriaxone, IM, 80 mg/kg/dose immediately as a **single dose.** See dosing table, pg xxx
* Do not inject more than 1 g at one injection site.

|  |
| --- |
| **CAUTION: USE OF CEFTRIAXONE IN NEONATES AND CHILDREN**   1. If *SUSPECTING SERIOUS BACTERIAL INFECTION* in neonate, give ceftriaxone, even if jaundiced. 2. Avoid giving calcium-containing IV fluids (e.g. Ringer Lactate) together with ceftriaxone:  * If ≤ 28 days old, avoid calcium-containing IV fluids for 48 hours after ceftriaxone administered. * If >28 days old, ceftriaxone and calcium-containing IV fluids may be given sequentially provided the giving set is flushed thoroughly with sodium chloride 0.9% before and after. * Preferably administer IV fluids without calcium contents  1. Always include the dose and route of administration of ceftriaxone in the referral letter. |

**REFERRAL**

1. All patients with severe physical or psychological injuries.

* All Children: All for medico legal and general care assessment after initiation of PEP as outlined above at PHC.

If uncertain, phone **Childline 0800055555**

* Adults with:

|  |  |
| --- | --- |
| * 1. Active bleeding | * 1. Multiple injuries |
| * 1. Abdominal pain | * 1. History of the use of a foreign object |

**Note:** Refer if there are inadequate resources with regard to:

|  |  |
| --- | --- |
| * + counselling | * + medico-legal examination |
| * + laboratory for testing | * + medicine treatment |

21.3.6.3 POST EXPOSURE PROPHYLAXIS, INADVERTENT (NON-OCCUPATIONAL)

Z20.6

**DESCRIPTION**

Inadvertent (non-occupational) exposure to infectious material from HIV sero-positive persons often requires clinical judgement and includes:

1. human bites
2. sharing of needles during recreational drug use
3. consensual sexual exposure, burst condoms
4. contact sports with blood exposure

Management of inadvertent (non-occupational) HIV exposure is the same as for occupational HIV exposure. See Section: 21.3.6.1 Post exposure prophylaxis, Occupational.

21.3.7 SOFT TISSUE INJURIES

T14.0-1/T14.9

**DESCRIPTION**

Injuries may be minor, moderate or major:

* **Major injuries**: it is important is to recognize potentially life-threatening injuries. Indicators of such injuries are:

1. **Mechanism of injury:** motor vehicle collision at speed exceeding 60 km/hour, ejection from the car, death of other occupant in the same car compartment, roll-over, pedestrian thrown out of his/her shoes, fall from height of more than 2 stories (more than thrice the patient’s height in a child), multiple gunshot wounds.
2. **Physiological status**: unable to maintain airway, tachycardia, hypoxia, hypotension on arrival (even if corrected with crystalloid infusion), tachycardia (especially in a child) or decreased level of consciousness.
3. **Anatomical distribution**: (suspicion of) injuries to more than one body region (face, intracranial, chest, abdominal cavity, spine).
4. **Age**: children < 2 years of age require admission.

* **Moderate injuries** (list is not exhaustive):

1. **Head injuries**: moderate head injuries (i.e. any GCS 11-14), facial fractures (airway maintained).
2. **Neck injuries**: stable patient with a stabbed neck, tenderness over C-spine.
3. **Chest injuries:** pneumothorax, haemothorax, rib fractures (2 or less).
4. **Abdominal injuries:** any suspicion of an intra-abdominal injury in a haemodynamically stable patient: e.g. abdominal bruising(including seat belt sign in children), tenderness, distension, loss of bowel sounds, vomiting, haematemesis or haematuria.
5. **Extremity injuries:** major open wounds, degloving injuries (boggy feel under intact skin), fractures, dislocations (in children: point tenderness around a major joint), crush injuries, multiple soft tissue injuries, enlarging or pulsating swelling.
6. **Suspicion of abuse** (child abuse, intimate partner abuse, elderly abuse).

* **Minor injuries** are injuries that can be managed as an outpatient and include bruises, small lacerations, sprains, concussions etc.

1. Human bites (see XXXX) and animal bites (see XXXX)
2. Sprains or strains (see XXXX)
3. Exclude fractures.

**EMERGENCY MANAGEMENT**

All trauma patients, except for those who only have minor injuries, should undergo these surveys:

PRIMARY SURVEY

A = **Airway**: check and maintain airway. If airway obstructed, first perform a jaw thrust manoeuver, then if able, insert an endotracheal tube. Patients with maxillofacial fractures may require a tracheostomy.

B = **Breathing**: assess respiratory rate, use of accessory muscles, symmetry, oxygen saturation. If needed, support breathing using a Bag-Valve-Mask device (‘AMBU bag’).Look for signs of pneumothorax (affected site is hyperinflated, hypertympanic and has decreased breath sounds). If tension pneumothorax (distended neck veins, deviated trachea, hypoxia and hypotension): perform a needle thoracostomy.

C = **Circulation**: look for tachycardia and hypotension. Put up two large bore peripheral lines, a femoral line or an intraosseous line in the tibia (if no abdominal injury) or the proximal humerus. In adults: if SBP if < 90 mmHg, infuse 2 L of sodium chloride 0.9% until SBP≥ 90 mmHg. If actively bleeding, it is permissible to maintain SBP≥ 80 mmHg (or a palpable radial pulse if you do not have access to a BP machine). In children the SBP should not fall below (70 + [2 x age]) mmHg.

D = **Disability**: perform a brief neurologic assessment and classify according to the Glasgow Coma Score:

|  |  |  |
| --- | --- | --- |
| Glasgow Coma Score:  Add scores to give a single score out of 15: | | |
| Best motor response: | Obeys commands | 6 |
| Localises to pain | 5 |
| Withdraws from pain | 4 |
| Abnormal flexion to pain | 3 |
| Extends to pain | 2 |
| None | 1 |
| Best verbal response: | Orientated | 5 |
| Confused | 4 |
| Inappropriate words | 3 |
| Incomprehensible sounds | 2 |
| None | 1 |
| Eye opening | Spontaneous | 4 |
| To voice | 3 |
| To pain | 2 |
| None | 1 |
| Total | |  |

E = **Exposure/environment**: expose the patient. If any suspicion of spinal cord injury (multi-trauma, decreased level of consciousness, neurological deficit, tenderness over the spine, severe mechanism of injury, anatomic deformity of the spine or any of the following: intoxication, inability to communicate or a distracting injury) cut the patient’s clothes off, so as to minimize movement of the spine, and immobilise neck using a long back board. Use a hard collar and strapping to the trolley in other patients Prevent hypothermia by covering the patient with warm blankets, and infusing warm fluids.

When major physiological derangements have been identified and the patient is stabilised using the ABCDEs of the primary survey, perform an AMPLE history and a secondary survey:

AMPLE history:

A = allergies

M = the patient’s regular medication (including contraceptives and over-the-counter medication)

P = past medical history

L = time of last meal (particularly important is the time between the last meal and the accident)

E = Events leading up to the incident

SECONDARY SURVEY

The secondary survey is a head-to-toe examination of the patient to identify any injuries that may have been missed during the primary survey. The secondary survey is only performed in a stable patient.

First examine patient from the front, then log-roll the patient and examine the back (include a rectal examination).

All fracture sites must be immobilized by external splints.

Finally, any additional investigations are ordered according to availability of resources:

1. Bloods may include FBC, clotting profile, cross-match and U & E’s.
2. Consider whether the patient requires transfer for x-rays.

MANAGEMENT OF WOUNDS AND LACERATIONS

1. Assess wound: if significant devitalized tissue, especially if due to a crush injury or a bite, dress with povidone-iodine and refer for surgical debridement.
2. Assess surrounding tissues and test function: look for associated fractures, ligament/tendon damage and nerve or vascular injuries. Document.
3. If needed, anaesthetise wound. Remove foreign bodies and irrigate the wound with sodium chloride 0.9%.If needed, remove any devitalized tissue with a knife
4. Wounds may be glued with tissue adhesives if wound < 4cm, clean and uncomplicated, especially in children and elderly patients. Avoid in the following cases: lacerations in areas under tension (hands, feet, joints), oral mucosa, wounds in moist or hairy areas (axillae/perineum), if needing high level of precision (hairline or vermilion border of lip), wounds at increased risk of infection (bite wounds, puncture wounds, wounds with contaminated tissue).Wounds on the scalp can be glued but surrounding hair needs to be trimmed.

**Wounds and lacerations:**

**Tissue adhesive (glue):**

* Clean wound thoroughly with chlorhexidine 0.05% aqueous solution.
* Ensure good haemostasis before applying glue,
* Appose wound edges (bring wound edges together).Ensure patient positioned appropriately so that when applied, any excess glue does not run down into areas not meant to be glued. If this happens, quickly wipe away with dry gauze.
* Crush tissues adhesive vial and invert.
* Gently brush adhesive over laceration (avoid contact with gloves/ instruments and avoid pushing adhesive into wound).
* Apply three layers of adhesive (maximum bonding strength is achieved within 2.5 minutes of application).
* Do not put on any covering or dressings.
* Advise patients that they may shower but not soak in bath and to pat area dry.
* The bonded adhesives spontaneously slough off within 5 to 10 days.

**MEDICINE TREATMENT**

If fluid replacement needed, see Section 21.2.9: Shock.

Adults

* Sodium chloride 0.9%, IV, 1L as a rapid bolus.
* Repeat bolus until blood pressure is improved.

Children

* Sodium chloride 0.9%, IV, 20 mL/kg as a rapid bolus.
* Repeat bolus if no adequate response.

**Note:** If patient develops respiratory distress, discontinue fluids.

**Tetanus prophylaxis:**

If not previously immunised within the last 5 years

* Tetanus toxoid (TT), IM, 0.5 mL.

**If sutures needed:**

* + Lidocaine 2%, injection.
* Infiltrate 7 mg/kg (up to 500 mg) of lidocaine component, around the wound as local anaesthetic. See dosing table, pg xxx.

|  |
| --- |
| *LoE:III[[24]](#endnote-25)* |

**Pain:**

Children

* Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg xxx.

Adults

* Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
* Maximum dose: 15 mg/kg/dose.
* Maximum dose: 4 g in 24 hours.

For more severe pain, give analgesia as appropriate. See Section xxx: Pain control.

**Infected wound management:**

Manage as for cellulitis. See Section 5.4.3: Cellulitis.

**REFERRAL**

**Urgent**

1. All major and moderate injuries once stabilised.
2. Infected wounds.

**Note**:

1. If uncertain how to stabilize patient, phone for guidance from referral hospital.
2. Before transport leaves, ensure endotracheal tube is securely strapped, all lines are secured, all drips are running well and patient is well covered to prevent hypothermia.
3. If transport delayed, ensure patient does not deteriorate while waiting: repeat ABCD survey at least hourly.

21.3.8 SPRAINS AND STRAINS

T14.3

**DESCRIPTION**

Clinical features include:

|  |  |
| --- | --- |
| 1. pain, especially on movement | 1. limited movement |
| 1. tenderness on touch | 1. history of trauma |

May be caused by:

|  |  |
| --- | --- |
| 1. sport injuries | 1. overuse of muscles |
| 1. slips and twists | 1. abnormal posture |

# Note: In children always bear non-accidental injuries (assault) in mind.

**EMERGENCY TREATMENT**

Immobilise with firm bandage and/or temporary splinting.

Children

* Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg22.6.

Adults

* Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
* Maximum dose: 15 mg/kg/dose.
* Maximum dose: 4 g in 24 hours.

**AND**

Children>12 years of age and adults

* Ibuprofen, oral, 200–400 mg 8 hourly with or after a meal.

**REFERRAL**

1. Severe progressive pain.
2. Progressive swelling.
3. Extensive bruising.
4. Deformity.
5. Joint tenderness on bone.
6. No response to treatment.
7. Severe limitation of movement.
8. Suspected serious injury.
9. Recurrence.
10. Previous history of bleeding disorder.

1. Adrenaline/epinephrine, IO (CPR): Resuscitation Council of Southern Africa: Basic life support for healthcare provider, algorithm, 2015. [www.resuscitationcouncil.co.za](file:///C:\Users\T0034318\Documents\BACKUP\01A_EML-%20updated%2008%20AUG\CHAPTERS\TRAUMA\www.resuscitationcouncil.co.za) [↑](#endnote-ref-3)
2. Adrenaline/epinephrine, IV (Bradycardia-children): Resuscitation Council of Southern Africa: Basic life support for healthcare provider, algorithm, 2015. [www.resuscitationcouncil.co.za](file:///C:\Users\T0034318\Documents\BACKUP\01A_EML-%20updated%2008%20AUG\CHAPTERS\TRAUMA\www.resuscitationcouncil.co.za)

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