

EMERGENCY HANDBOOK

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Chart 1. Stages in the management of a sick child admitted to hospital: key elements

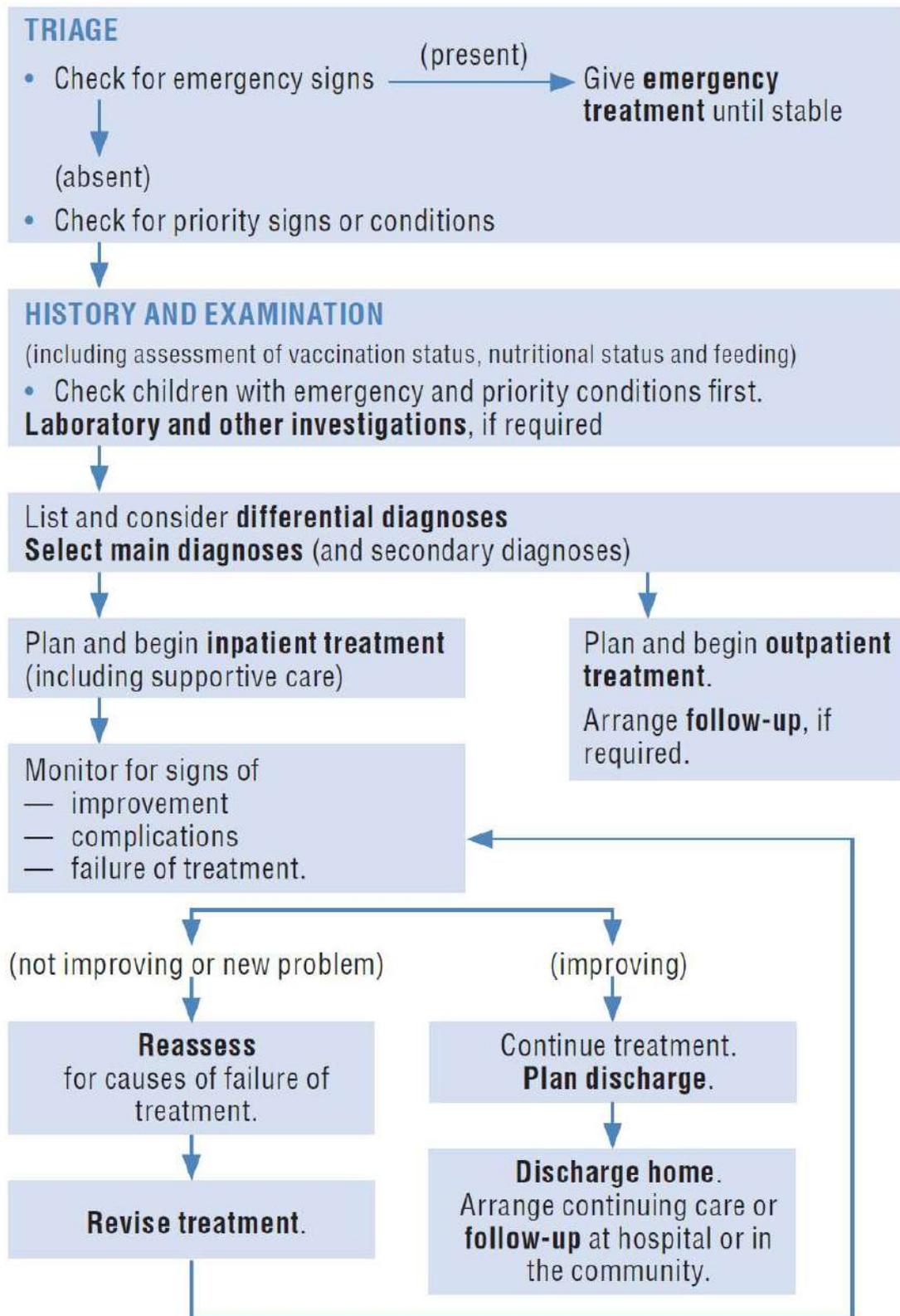


Chart 2. Triage of all sick children

Emergency signs:

If any sign is positive, call for help, assess and resuscitate, give treatment(s), draw blood for emergency laboratory investigations (glucose, malaria smear, Hb)

ASSESS

Airway and breathing

- Obstructed or absent breathing
or
- Central cyanosis
or
- Severe respiratory distress

**ANY SIGN
POSITIVE**

Circulation

Cold skin with:

- Capillary refill longer than 3 s
and
- Weak and fast pulse

**SIGNS
POSITIVE**

*Check for
severe
malnutrition*

TREAT

Do not move neck if a cervical spine injury is possible, but open the airway.

If foreign body aspirated

- ▶ Manage airway in choking child (Chart 3)

If no foreign body aspirated

- ▶ Manage airway (Chart 4)
- ▶ Give oxygen (Chart 5)
- ▶ Make sure the child is warm

- ▶ Stop any bleeding
- ▶ Give oxygen (Chart 5)
- ▶ Make sure the child is warm.

If no severe malnutrition

- ▶ Insert an IV line and begin giving fluids rapidly (Chart 7).

If peripheral IV cannot be inserted, insert an intraosseous or external jugular line (see pp. 340, 342).

If severe malnutrition:

If lethargic or unconscious:

- ▶ Give IV glucose (Chart 10).
- ▶ Insert IV line and give fluids (Chart 8).

If not lethargic or unconscious:

- ▶ Give glucose orally or by nasogastric tube.
- ▶ Proceed immediately to full assessment and treatment.

Chart 2. Triage of all sick children

Emergency signs:

If any sign is positive: call for help, assess and resuscitate, give treatment(s), draw blood for emergency laboratory investigations (glucose, malaria smear, Hb)

ASSESS

TREAT

Do not move neck if you suspect cervical spine injury, but open the airway.

Coma/ convulsing

- Coma
or
- Convulsing
(now)

**IF COMA OR
CONVULSION**

- ▶ Manage the airway (Chart 4)
- ▶ If convulsing, give diazepam rectally (Chart 9)
- ▶ Position the unconscious child (if head or neck trauma is suspected, stabilize the neck first) (Chart 6).
- ▶ Give IV glucose (Chart 10).

Severe dehydration

*(only in a child
with diarrhoea)*

Diarrhoea plus
any two of these
signs:

- Lethargy
- Sunken eyes
- Very slow skin pinch
- Unable to drink or drinks poorly

**DIARRHOEA
PLUS**

*two signs
positive*

*Check for
severe
malnutrition*

- ▶ Make sure the child is warm.
- If no severe malnutrition:**
- ▶ Insert an IV line and begin giving fluids rapidly following Chart 11 and diarrhoea treatment plan C in hospital (Chart 13, p. 131).
- If severe malnutrition:**
- ▶ Do not insert an IV line.
 - ▶ Proceed immediately to full assessment and treatment (see section 1.4, p. 19).

PRIORITY SIGNS

These children need prompt assessment and treatment

- Tiny infant (< 2 months)
- Temperature very high
- Trauma or other urgent surgical condition
- Pallor (severe)
- Poisoning (history of)
- Pain (severe)
- Respiratory distress
- Restless, continuously irritable, or lethargic
- Referral (urgent)
- Malnutrition: visible severe wasting
- Oedema of both feet or face
- Burns (major)

Note: If a child has trauma or other surgical problems, get surgical help or follow surgical guidelines.

NON-URGENT

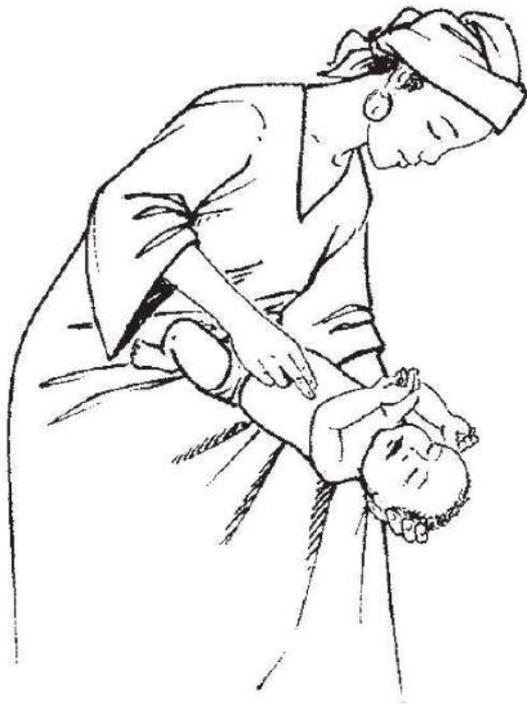
Proceed with assessment and further treatment according to the child's priority.

Chart 3. How to manage a choking infant



Back slaps

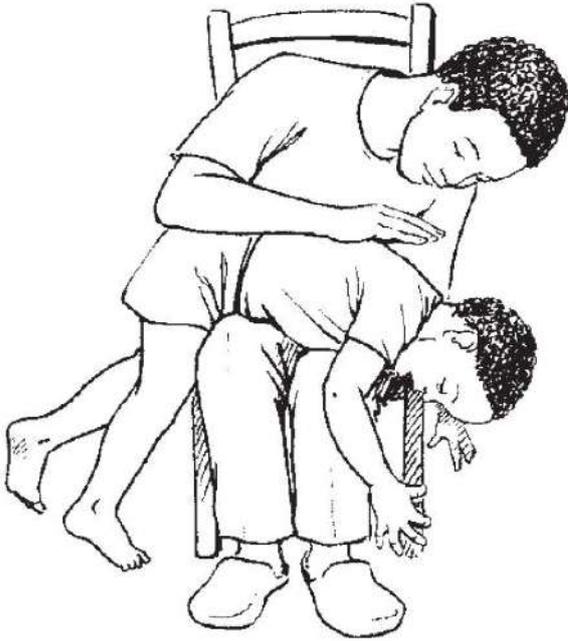
- ▶ Lay the infant on your arm or thigh in a head-down position.
- ▶ Give five blows to the middle of the infant's back with the heel of the hand.
- ▶ If obstruction persists, turn the infant over and give five chest thrusts with two fingers on the lower half of the sternum.



Chest thrusts

- ▶ If obstruction persists, check infant's mouth for any obstruction that can be removed.
- ▶ If necessary, repeat sequence with back slaps.

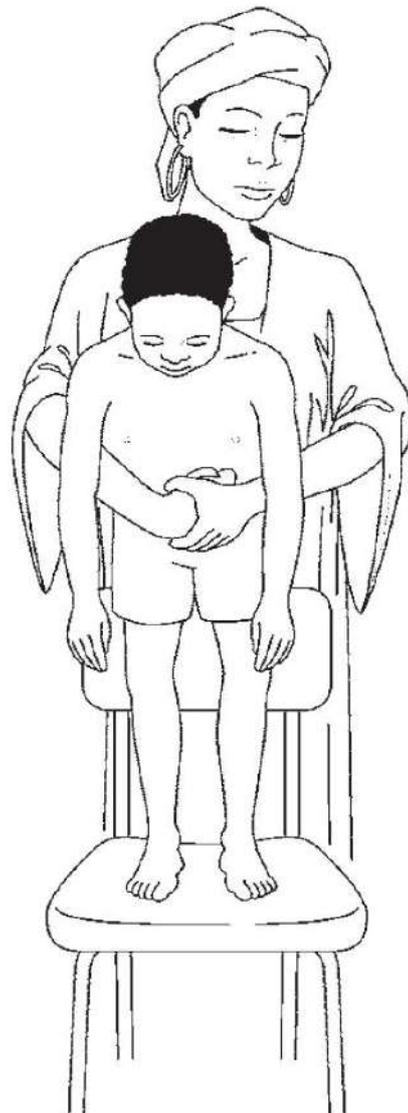
Chart 3. How to manage a choking child (> 1 year of age)



Back blows to clear airway obstruction in a choking child

Administer back blows to clear airway obstruction in a choking child.

- ▶ Give five blows to the middle of the child's back with the heel of the hand, with the child sitting, kneeling or lying.
- ▶ If the obstruction persists, go behind the child and pass your arms around the child's body; form a fist with one hand immediately below the child's sternum; place the other hand over the fist and pull upwards into the abdomen (see diagram); repeat this Heimlich manoeuvre five times.
- ▶ If the obstruction persists, check the child's mouth for any obstruction that can be removed.
- ▶ If necessary, repeat this sequence with back blows.



Heimlich manoeuvre for a choking older child

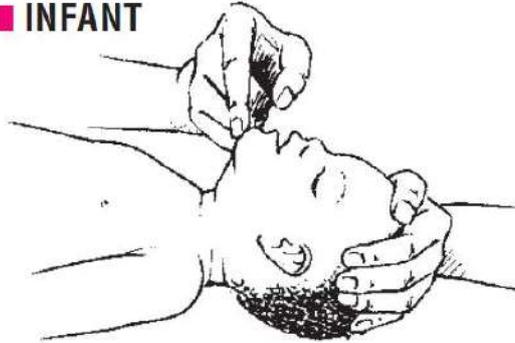
Chart 4. How to manage the airway in a child with obstructed breathing (or who has just stopped breathing)

A: When no neck trauma is suspected

Child conscious

1. Inspect mouth and remove foreign body, if present.
2. Clear secretions from the throat.
3. Let child assume position of maximal comfort.

■ INFANT



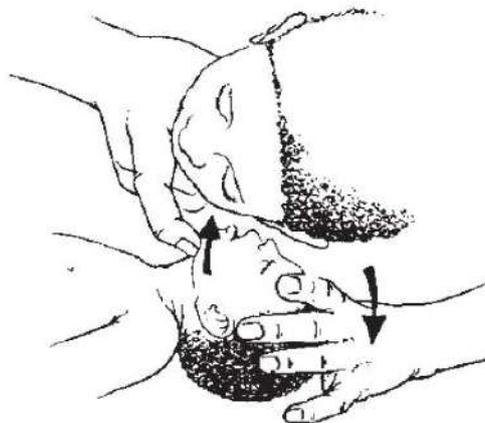
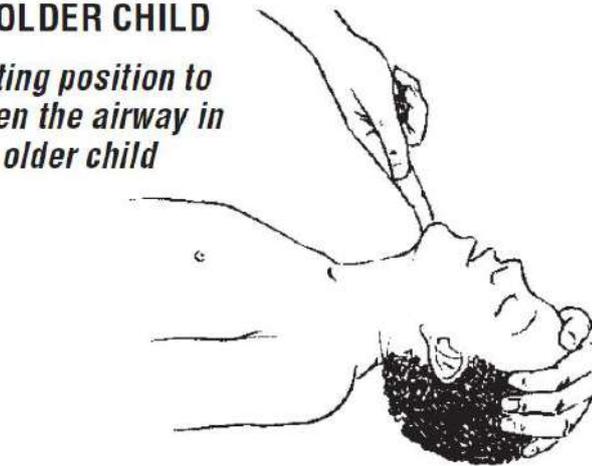
Neutral position to open the airway in an infant

Child unconscious

1. Tilt the head as shown, keep it tilted and lift chin to open airway.
2. Inspect mouth and remove foreign body if present and easily visible.
3. Clear secretions from the throat.
4. Check the airway by looking for chest movements, listening for breath sounds and feeling for breath (see diagram).

■ OLDER CHILD

Tilting position to open the airway in an older child

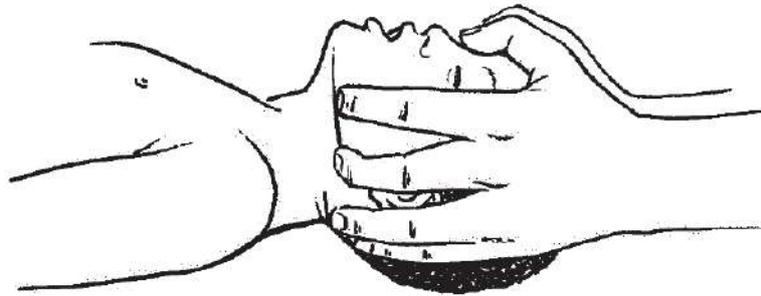


Look, listen and feel for breathing

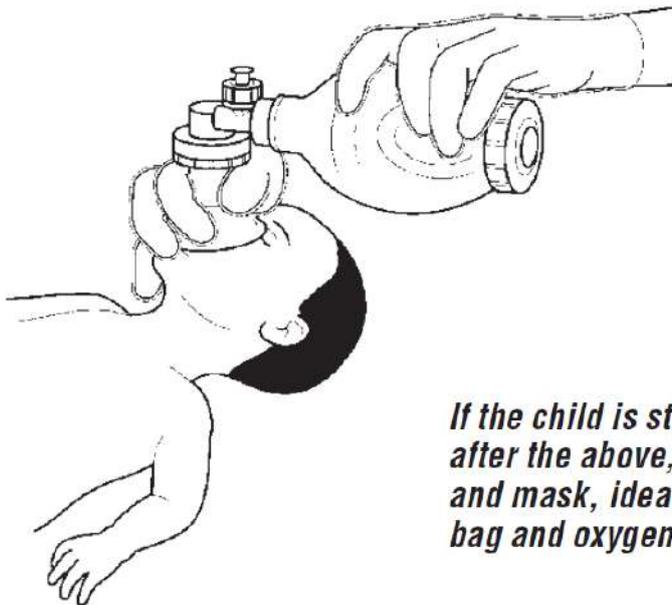
Chart 4. How to manage the airway in a child with obstructed breathing (or who has just stopped breathing)

B: When neck trauma or cervical spine injury is suspected: jaw thrust

1. Stabilize the neck as shown in Chart 6, and open the airway.
2. Inspect mouth and remove foreign body, if present.
3. Clear secretions from throat under direct vision.
4. Check the airway by looking for chest movements, listening for breath sounds and feeling for breath.



Use jaw thrust if airway are still not open. Place the fourth and fifth fingers behind the angle of the jaw and move it upwards so that the bottom of the jaw is thrust forwards, at 90° to the body

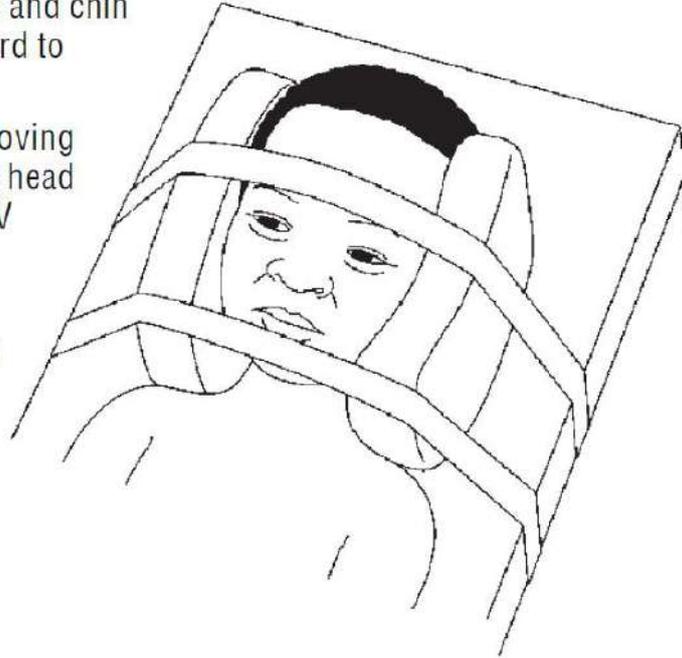


If the child is still not breathing after the above, ventilate with bag and mask, ideally with a reservoir bag and oxygen

Chart 6. How to position an unconscious child

■ If neck trauma is suspected:

- ▶ Stabilize the child's neck and keep the child lying on the back.
- ▶ Tape the child's forehead and chin to the sides of a firm board to secure this position.
- ▶ Prevent the neck from moving by supporting the child's head (e.g. using litre bags of IV fluid on each side).
- ▶ If the child is vomiting, turn on the side, keeping the head in line with the body.



■ If neck trauma is not suspected:

- ▶ Turn the child on the side to reduce risk of aspiration.
- ▶ Keep the neck slightly extended, and stabilize by placing cheek on one hand.
- ▶ Bend one leg to stabilize the body position.

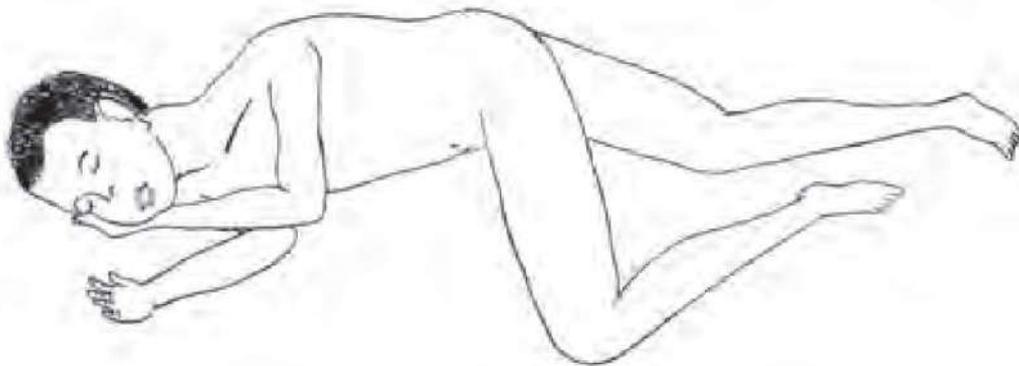


Chart 7. How to give intravenous fluids to a child in shock without severe malnutrition

- ▶ Check that the child is not severely malnourished, as the fluid volume and rate are different. (Shock with severe malnutrition, see Chart 8.)
- ▶ Insert an IV line (and draw blood for emergency laboratory investigations).
- ▶ Attach Ringer's lactate or normal saline; make sure the infusion is running well.
- ▶ Infuse 20 ml/kg as rapidly as possible.

Age (weight)	Volume of Ringer's lactate or normal saline solution (20 ml/kg)
2 months (< 4 kg)	50 ml
2–< 4 months (4–< 6 kg)	100 ml
4–< 12 months (6–< 10 kg)	150 ml
1–< 3 years (10–< 14 kg)	250 ml
3–< 5 years (14–19 kg)	350 ml

Reassess the child after the appropriate volume has run in.

Reassess after first infusion:	<ul style="list-style-type: none"> • If no improvement, repeat 10–20 ml/kg as rapidly as possible. • If bleeding, give blood at 20 ml/kg over 30 min, and observe closely.
Reassess after second infusion:	<ul style="list-style-type: none"> • If no improvement with signs of dehydration (as in profuse diarrhoea or cholera), repeat 20 ml/kg of Ringer's lactate or normal saline. • If no improvement, with suspected septic shock, repeat 20 ml/kg and consider adrenaline or dopamine if available (see Annex 2, p. 353). • If no improvement, see disease-specific treatment guidelines. You should have established a provisional diagnosis by now.

After improvement at **any stage** (pulse volume increases, heart rate slows, blood pressure increases by 10% or normalizes, faster capillary refill < 2 s), go to Chart 11, p. 17.

Note: In children with suspected malaria or anaemia with shock, rapid fluid infusion must be administered cautiously, or blood transfusion should be given in severe anaemia instead.

Chart 8. How to give intravenous fluids to a child in shock with severe malnutrition

Give this treatment only if the child has signs of shock (usually there will also be a *reduced level of consciousness, i.e. lethargy or loss of consciousness*):

- ▶ Insert an IV line (and draw blood for emergency laboratory investigations).
- ▶ Weigh the child (or estimate the weight) to calculate the volume of fluid to be given.
- ▶ Give IV fluid at 15 ml/kg over 1 h. Use one of the following solutions according to availability:
 - Ringer's lactate with 5% glucose (dextrose);
 - Half-strength Darrow's solution with 5% glucose (dextrose);
 - 0.45% NaCl plus 5% glucose (dextrose).

Weight	Volume of IV fluid Give over 1 h (15 ml/kg)	Weight	Volume of IV fluid Give over 1 h (15 ml/kg)
4 kg	60 ml	12 kg	180 ml
6 kg	90 ml	14 kg	210 ml
8 kg	120 ml	16 kg	240 ml
10 kg	150 ml	18 kg	270 ml

- ▶ Measure the pulse rate and volume and breathing rate at the start and every 5–10 min.

If there are signs of improvement (pulse rate falls, pulse volume increases or respiratory rate falls) and no evidence of pulmonary oedema

- repeat IV infusion at 15 ml/kg over 1 h; then
- switch to oral or nasogastric rehydration with ReSoMal at 10 ml/kg per h up to 10 h (see p. 204);
- initiate re-feeding with starter F-75 (see p. 209).

If the child fails to improve after two IV boluses of 15 ml/kg,

- give maintenance IV fluid (4 ml/kg per h) while waiting for blood;
- when blood is available, transfuse fresh whole blood at 10 ml/kg slowly over 3 h (use packed cells if the child is in cardiac failure); then
- initiate re-feeding with starter F-75 (see p. 209);
- start IV antibiotic treatment (see p. 207).

If the child deteriorates during IV rehydration (breathing rate increases by 5/min and pulse rate increases by 15/min, liver enlarges, fine crackles throughout lung fields, jugular venous pressure increases, galloping heart rhythm develops), stop the infusion, because IV fluid can worsen the child's condition by inducing pulmonary oedema.

Chart 9. How to give diazepam rectally

■ Give diazepam rectally:

- ▶ Draw up the dose from an ampoule of diazepam into a tuberculin (1-ml) syringe. Base the dose on the weight of the child, when possible. Then remove the needle.
- ▶ Insert the syringe 4–5 cm into the rectum, and inject the diazepam solution.
- ▶ Hold the buttocks together for a few minutes.

Age (weight)	Diazepam given rectally 10 mg/2 ml solution Dose 0.1 ml/kg
2 weeks to 2 months (< 4 kg) ^a	0.3 ml
2–< 4 months (4–< 6 kg)	0.5 ml
4–< 12 months (6–< 10 kg)	1.0 ml
1–< 3 years (10–< 14 kg)	1.25 ml
3–< 5 years (14–19 kg)	1.5 ml

^a Use phenobarbital (200 mg/ml solution) at a dose of 20 mg/kg to control convulsions in infants < 2 weeks of age:

Weight 2 kg – initial dose, 0.2 ml; repeat 0.1 ml after 30 min	} If convulsions continue
Weight 3 kg – initial dose, 0.3 ml; repeat 0.15 ml after 30 min	

If convulsions continue after 10 min, give a second dose of diazepam (or give diazepam IV at 0.05 ml/kg = 0.25 mg/kg if IV infusion is running).

Do not give more than two doses of diazepam.

If convulsions continue after another 10 min, suspect status epilepticus:

- ▶ Give phenobarbital IM or IV at 15 mg/kg over 15 min;
- or
- ▶ Phenytoin at 15–18 mg/kg IV (through a different line from diazepam) over 60 min. Ensure a very good IV line, as the drug is caustic and will cause local damage if it extravasates.

■ If high fever:

- ▶ Undress the child to reduce the fever.
- ▶ Do not give any oral medication until the convulsion has been controlled (danger of aspiration).
- ▶ After convulsions stop and child is able to take orally, give paracetamol or ibuprofen.

Warning: Always have a working bag and mask of appropriate size available in case the patient stops breathing, especially when diazepam is given.

Chart 10. How to give glucose intravenously

- ▶ Insert an IV line, and draw blood for emergency laboratory investigations.
- ▶ Check blood glucose with a glucose monitoring stick. If the level is < 2.5 mmol/litre (45 mg/dl) in a well-nourished or < 3 mmol/litre (54 mg/dl) in a severely malnourished child or if blood glucose cannot be measured as no stick test is available, treat as for hypoglycaemia:
- ▶ Give 5 ml/kg of 10% glucose solution rapidly by IV injection

Age (weight)	Volume of 10% glucose solution as bolus (5 ml/kg)
< 2 months (< 4 kg)	15 ml
2–< 4 months (4–< 6 kg)	25 ml
4–< 12 months (6–< 10 kg)	40 ml
1–< 3 years (10–< 14 kg)	60 ml
3–< 5 years (14–< 19 kg)	80 ml

- ▶ Recheck the blood glucose in 30 min. If it is still low, repeat 5 ml/kg of 10% glucose solution.
- ▶ Feed the child as soon as he or she is conscious.
If the child is unable to feed without danger of aspiration, give:
 - milk or sugar solution via a nasogastric tube (to make sugar solution, dissolve four level teaspoons of sugar (20 g) in a 200-ml cup of clean water), or
 - IV fluids containing 5–10% glucose (dextrose) (see Annex 4, p. 377)

Note: 50% glucose solution is the same as 50% dextrose solution.

If only 50% glucose solution is available: dilute one part 50% glucose solution in four parts sterile water, or dilute one part 50% glucose solution in nine parts 5% glucose solution. For example, 10 ml 50% solution with 90 ml 5% solution gives 100 ml of approximately a 10% solution.

Note: To use blood glucose stick tests, refer to instructions on box. Generally, the strip must be stored in its box at 2–3 °C, avoiding sunlight or high humidity. A drop of blood should be placed on the strip (it should cover all the reagent area). After 60 s, the blood should be washed off gently with drops of cold water and the colour compared with the key on the bottle or on the blood glucose reader. (The exact procedure varies for different strips.)

Note: Sublingual sugar may be used as an immediate 'first aid' measure in managing hypoglycaemia if IV access is impossible or delayed. Place one level teaspoonful of sugar moistened with water under the tongue every 10–20 min.

Chart 11. How to treat severe dehydration in an emergency after initial management of shock

For children with severe dehydration but without shock, refer to diarrhoea treatment plan C, p. 131.

If the child is in shock, first follow the instructions in Charts 7 and 8 (pp. 13 and 14). Switch to the chart below when the child's pulse becomes slower or capillary refill is faster.

- ▶ Give 70 ml/kg of Ringer's lactate (Hartmann's) solution (or, if not available, normal saline) over 5 h to infants (aged < 12 months) and over 2.5 h to children (aged 12 months to 5 years).

Weight	Total volume IV fluid (volume per hour)	
	Age < 12 months Give over 5 h	Age 12 months to 5 years Give over 2.5 h
< 4 kg	200 ml (40 ml/h)	–
4–6 kg	350 ml (70 ml/h)	–
6–10 kg	550 ml (110 ml/h)	550 ml (220 ml/h)
10–14 kg	850 ml (170 ml/h)	850 ml (340 ml/h)
14–19 kg	–	1200 ml (480 ml/h)

Reassess the child every 1–2 h. If the hydration status is not improving, give the IV drip more rapidly.

Also give oral rehydration salt (ORS) solution (about 5 ml/kg per h) as soon as the child can drink, usually after 3–4 h (in infants) or 1–2 h (in children).

Weight	Volume of ORS solution per hour
< 4 kg	15 ml
4–6 kg	25 ml
6–10 kg	40 ml
10–14 kg	60 ml
14–19 kg	85 ml

Reassess after 6 h for infants and after 3 h for children. Classify dehydration. Then choose the appropriate plan A, B or C (pp. 138, 135, 131) to continue treatment.

If possible, observe the child for at least 6 h after rehydration to be sure that the mother can maintain hydration by giving the child ORS solution by mouth.

Table 3. Differential diagnosis in a child presenting with lethargy, unconsciousness or convulsions

Diagnosis or underlying cause	In favour
Meningitis ^{a,b}	<ul style="list-style-type: none"> – Very irritable – Stiff neck or bulging fontanelle – Petechial rash (meningococcal meningitis only) – Opisthotonus
Cerebral malaria (only in children exposed to <i>P. falciparum</i> ; often seasonal)	<ul style="list-style-type: none"> – Blood smear or rapid diagnostic test positive for malaria parasites – Jaundice – Anaemia – Convulsions – Hypoglycaemia
Febrile convulsions (not likely to be the cause of unconsciousness)	<ul style="list-style-type: none"> – Prior episodes of short convulsions when febrile – Associated with fever – Age 6 months to 5 years – Blood smear normal
Hypoglycaemia (always seek the cause, e.g. severe malaria, and treat the cause to prevent a recurrence)	<ul style="list-style-type: none"> – Blood glucose low (< 2.5 mmol/litre (< 45 mg/dl) or < 3.0 mmol/litre (< 54 mg/dl) in a severely malnourished child); responds to glucose treatment
Head injury	<ul style="list-style-type: none"> – Signs or history of head trauma
Poisoning	<ul style="list-style-type: none"> – History of poison ingestion or drug overdose
Shock (can cause lethargy or unconsciousness, but is unlikely to cause convulsions)	<ul style="list-style-type: none"> – Poor perfusion – Rapid, weak pulse
encephalopathy	<ul style="list-style-type: none"> – Peripheral or facial oedema – Blood and/or protein in urine – Decreased or no urine
Diabetic ketoacidosis	<ul style="list-style-type: none"> – High blood sugar – History of polydipsia and polyuria – Acidotic (deep, laboured) breathing

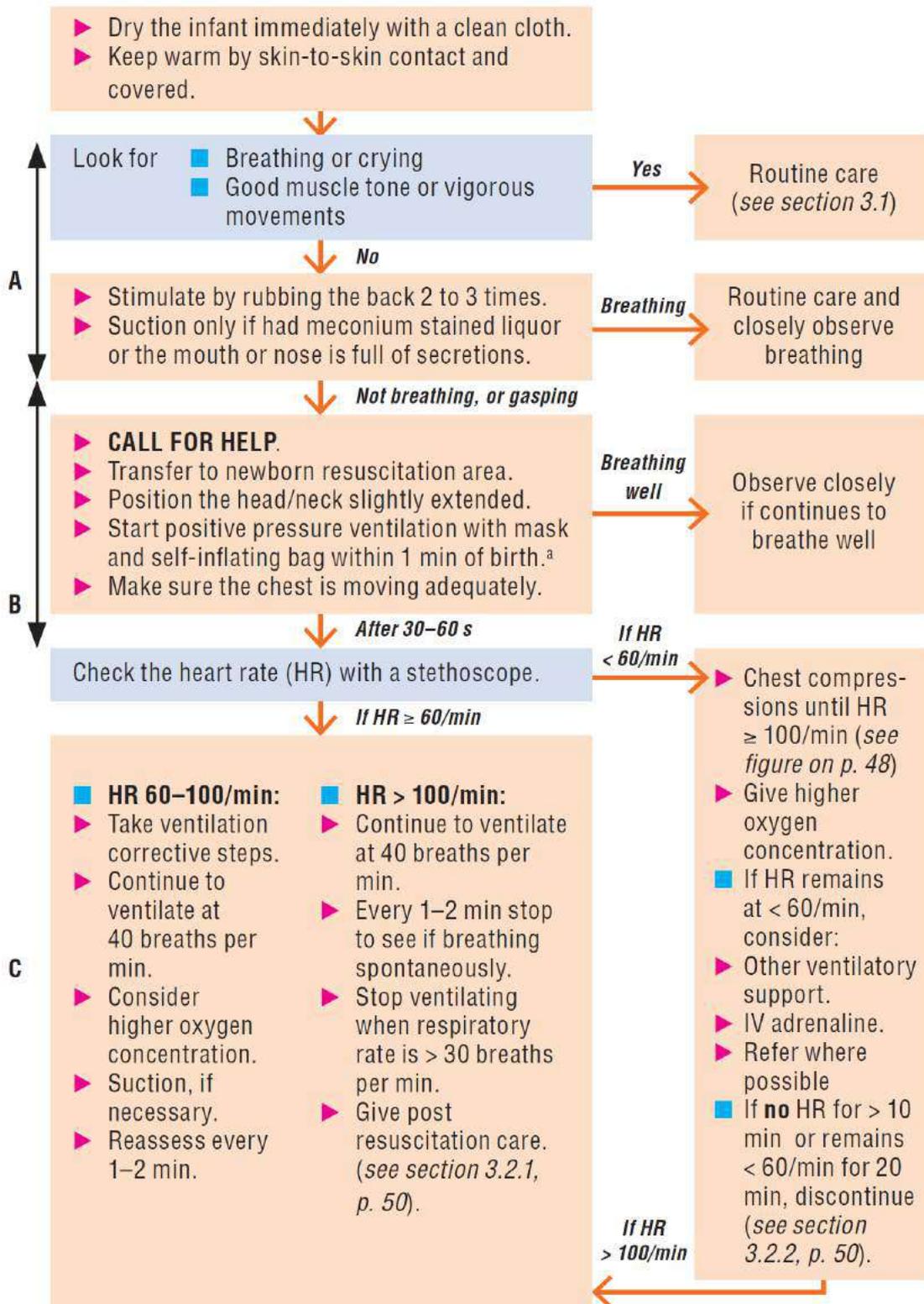
^a The differential diagnosis of meningitis may include encephalitis, cerebral abscess or tuberculous meningitis. Consult a standard textbook of paediatrics for further guidance.

^b A lumbar puncture should not be done if there are signs of raised intracranial pressure (see section 6.3, p. 167 and A1.4, p. 346). A positive lumbar puncture may show cloudy cerebrospinal fluid (CSF) on direct visual inspection, or CSF examination shows an abnormal number of white cells (usually > 100 polymorphonuclear cells per ml in bacterial meningitis). Confirmation is given by a low CSF glucose (< 1.5 mmol/litre), high CSF protein (> 0.4 g/litre), organisms identified by Gram staining or a positive culture.

Table 4. Differential diagnosis in a young infant (< 2 months) presenting with lethargy, unconsciousness or convulsions

Diagnosis or underlying cause	In favour
Birth asphyxia Hypoxic ischaemic encephalopathy Birth trauma	<ul style="list-style-type: none"> – Onset in first 3 days of life – History of difficult delivery
Intracranial haemorrhage	<ul style="list-style-type: none"> – Onset in first 3 days of life in a low-birth-weight or preterm infant
Haemolytic disease of the newborn, kernicterus	<ul style="list-style-type: none"> – Onset in first 3 days of life – Jaundice – Pallor – Serious bacterial infection – No vitamin K given
Neonatal tetanus	<ul style="list-style-type: none"> – Onset at age 3–14 days – Irritability – Difficulty in breastfeeding – Trismus – Muscle spasms – Convulsions
Meningitis	<ul style="list-style-type: none"> – Lethargy – Apnoeic episodes – Convulsions – High-pitched cry – Tense or bulging fontanelle
Sepsis	<ul style="list-style-type: none"> – Fever or hypothermia – Shock (lethargy, fast breathing, cold skin, prolonged capillary refill, fast weak pulse, and sometimes low blood pressure) – Seriously ill with no apparent cause

Chart 12. Neonatal resuscitation: Flow chart



^a Positive pressure ventilation should be initiated with air for infants with gestation > 32 weeks. For very preterm infants, it is preferable to start with 30% oxygen if possible. **A** and **B** are basic resuscitation steps

Chart 12. Neonatal resuscitation: Steps and process

There is no need to slap the infant; rubbing the back two or three times in addition to thorough drying is enough for stimulation.

A. Airway

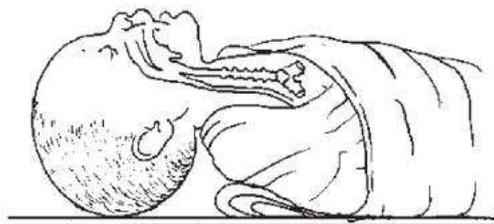
- ▶ Keep the infant's head in a slightly extended position to open the airway.
- ▶ Do not suction routinely. Suction the airway if there is meconium-stained fluid **and** the infant is **not** crying and moving limbs. When the amniotic fluid is clear, suction only if the nose or mouth is full of secretions.
 - Suck the mouth, nose and oropharynx by direct vision; do not suck right down the throat, as this can cause apnoea or bradycardia.

B. Breathing

- ▶ Choose a mask size that fits over the nose and mouth (see below): size 1 for normal-weight infant, size 0 for small (< 2.5 kg) infants
- ▶ Ventilate with bag and mask at 40–60 breaths/min.
- Make sure the chest moves up with each press on the bag; in a very small infant, make sure the chest does not move too much (danger of causing pneumothorax).

C. Circulation

- ▶ Give chest compressions if the heart rate is < 60/min after 30–60 s of ventilation with adequate chest movements: 90 compressions coordinated with 30 breaths/min (three compressions: one breath every 2 s).
- ▶ Place thumbs just below the line connecting the nipples on the sternum (see below).
- ▶ Compress one third the anterior–posterior diameter of the chest.



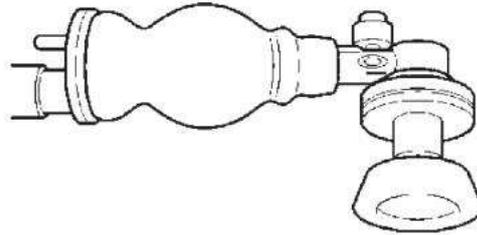
Correct head position to open up airway and for bag ventilation. Do not hyperextend the neck.



Correct position of hands for cardiac massage of a neonate. The thumbs are used for compression over the sternum.

Chart 12. Neonatal resuscitation

Neonatal self-inflating resuscitation bag with round mask



Fitting mask over face:

Right size and position of mask



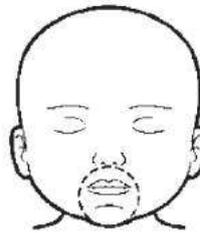
Right

Mask held too low



Wrong

Mask too small



Wrong

Mask too large

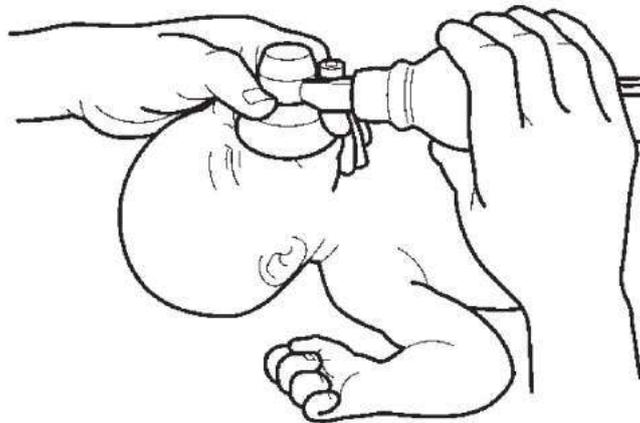


Wrong

Ventilating a neonate with bag and mask

Pull the jaw forwards towards the mask with the third finger of the hand holding the mask.

Do not hyperextend the neck.



Inadequate seal

If you hear air escaping from the mask, form a better seal. The commonest leak is between the nose and the cheeks.

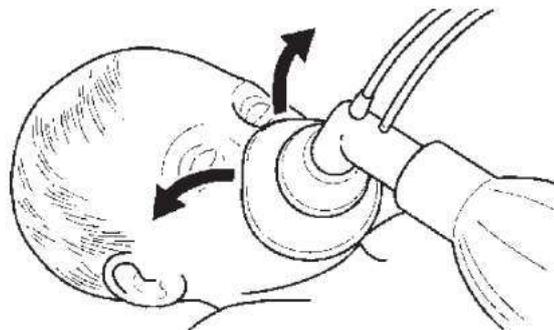


Table 12. Classification of the severity of dehydration in children with diarrhoea

Classification	Signs or symptoms	Treatment
Severe dehydration	Two or more of the following signs: <ul style="list-style-type: none"> ■ lethargy or unconsciousness ■ sunken eyes ■ unable to drink or drinks poorly ■ skin pinch goes back very slowly (≥ 2 s) 	<ul style="list-style-type: none"> ▶ Give fluids for severe dehydration (see diarrhoea treatment plan C in hospital, p. 131)
Some dehydration	Two or more of the following signs: <ul style="list-style-type: none"> ■ restlessness, irritability ■ sunken eyes ■ drinks eagerly, thirsty ■ skin pinch goes back slowly 	<ul style="list-style-type: none"> ▶ Give fluid and food for some dehydration (see diarrhoea treatment plan B, p. 135) ▶ After rehydration, advise mother on home treatment and when to return immediately (see pp. 133–4) ▶ Follow up in 5 days if not improving.
No dehydration	Not enough signs to classify as some or severe dehydration	<ul style="list-style-type: none"> ▶ Give fluid and food to treat diarrhoea at home (see diarrhoea treatment plan A, p. 138) ▶ Advise mother on when to return immediately (see p. 133) ▶ Follow up in 5 days if not improving.

Chart 13. Diarrhoea treatment plan C: Treat severe dehydration quickly

→ Follow the arrows. If the answer is **YES**, go across. If **NO**, go down.

START HERE

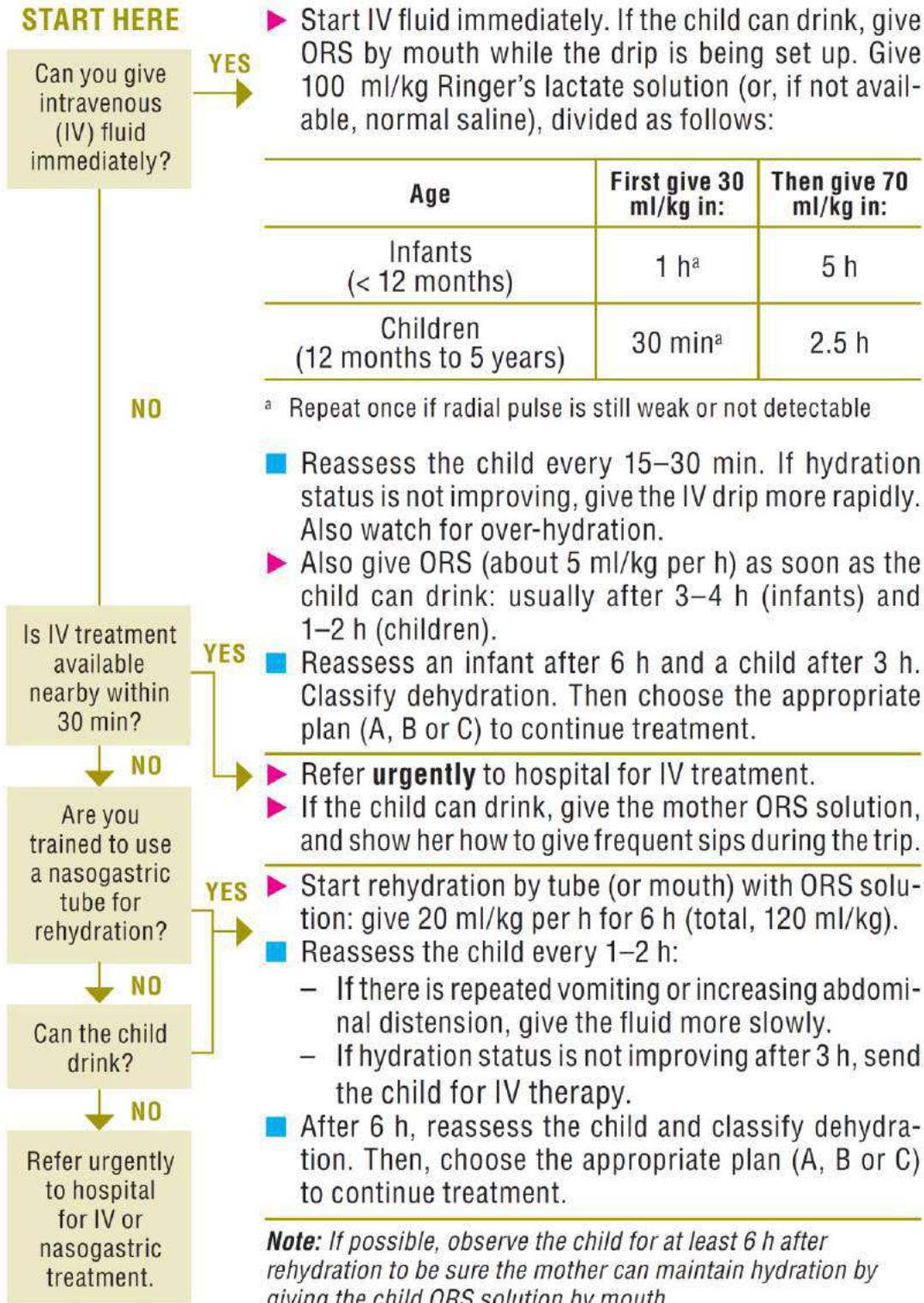


Chart 14. Diarrhoea treatment plan B: Treat some dehydration with oral rehydration salts

GIVE THE RECOMMENDED AMOUNT OF ORS IN THE CLINIC OVER 4 H

► Determine amount of ORS to give during first 4 h:

Age ^a	≤ 4 months	4 to ≤ 12 months	12 months to ≤ 2 years	2 years to ≤ 5 years
Weight	< 6 kg	6–< 10 kg	10–< 12 kg	12–19 kg
	200–400 ml	400–700 ml	700–900 ml	900–1400 ml

^a Use the child's age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the child's weight (in kg) by 75.

If the child wants more ORS than shown, give more.

► Show the mother how to give ORS solution.

- Give frequent small sips from a cup.
- If the child vomits, wait 10 min, then continue, but more slowly.
- Continue breastfeeding whenever the child wants.

■ After 4 h:

- Reassess the child and classify him or her for dehydration.
- Select the appropriate plan to continue treatment.
- Begin feeding the child in the clinic.

► If the mother must leave before completing treatment:

- Show her how to prepare ORS solution at home.
- Show her how much ORS to give to finish the 4-h treatment at home.
- Give her enough ORS packets to complete rehydration. Also give her two packets as recommended in plan A.
- Explain the four rules of home treatment:

1. Give extra fluid.
2. Give zinc supplements.
3. Continue feeding.
4. Know when to return to the clinic.

} See diarrhoea treatment plan A (p. 138) and mother's card (p. 322)

Chart 15. Diarrhoea treatment plan A: Treat diarrhoea at home

**COUNSEL THE MOTHER ON THE FOUR RULES OF HOME TREATMENT:
GIVE EXTRA FLUID. GIVE ZINC SUPPLEMENTS. CONTINUE FEEDING.
KNOW WHEN TO RETURN TO THE CLINIC.**

1. Give as much extra fluid as the child will take.

- ▶ Tell the mother to:
 - Breastfeed frequently and for longer at each feed.
 - If the child is exclusively breastfed, give ORS or clean water in addition to breast milk
 - If the child is not exclusively breastfed, give one or more of the following: ORS solution, food-based fluids (such as soup, rice water and yoghurt drinks) or clean water.

It is especially important to give ORS at home when:

- the child has been treated according to plan B or plan C during this visit.
 - the child cannot return to a clinic if the diarrhoea gets worse.
- ▶ Teach the mother how to mix and give ORS. Give the mother two packets of ORS to use at home.
 - ▶ Show the mother how much fluid to give in addition to the usual fluid intake:
 - ≤ 2 years: 50–100 ml after each loose stool
 - ≥ 2 years: 100–200 ml after each loose stool

Tell the mother to:

- Give frequent small sips from a cup.
- If the child vomits, wait 10 min. Then continue, but more slowly.
- Continue giving extra fluid until the diarrhoea stops.

2. Give zinc supplements.

- ▶ **Tell the mother how much zinc to give:**
 - ≤ 6 months: half tablet (10 mg) per day for 10–14 days
 - ≥ 6 months: one tablet (20 mg) per day for 10–14 days
- ▶ **Show the mother how to give zinc supplement:**
 - For infants, dissolve the tablet in a small amount of clean water, expressed milk or ORS in a small cup or spoon.
 - Older children can chew the tablet or drink it dissolved in a small amount of clean water in a cup or spoon.
- ▶ **REMIND THE MOTHER TO GIVE THE ZINC SUPPLEMENT FOR THE FULL 10–14 DAYS.**

3. Continue feeding.

4. Know when to return to the clinic.

} See mother's card (p. 322)

IV fluid	Composition						
	Na+	K+	Cl-	Ca++	Lactate	Glucose	Calories
	mmol/l	mmol/l	mmol/l	mmol/l	mmol/l	g/l	cal/l
Ringer's lactate (Hartmann's)	130	5.4	112	1.8	27	–	–
Normal saline (0.9% NaCl)	154	–	154	–	–	–	–
10% glucose	–	–	–	–	–	100	400
0.45 NaCl/5% glucose	77	–	77	–	–	50	200
Darrow's solution	121	35	103	–	53	–	–
Half-strength Darrow with 5% glucose ^a	61	17	52	–	27	50	200
Half-strength Ringer's lactate with 5% glucose	65	2.7	56	1	14	50	200
0.18% NaCl/4% glucose ^b	31	–	31	–	–	40	160
5% glucose ^b	–	–	–	–	–	50	200

^a Half-strength Darrow's solution often comes without glucose, and glucose must be added before use.

^b These fluids can be used mainly in the first few days of life but not in other infants or children.

Table 2.1.1. Triage priority categories

Category	Procedure
Red: Signs of an immediately life-threatening emergency are present.	<ul style="list-style-type: none">• The child is immediately admitted to the medical care zone to be stabilised and treated by the doctor.
Yellow: Signs of an urgent, though not immediately life-threatening, situation are present.	<ul style="list-style-type: none">• Child should be given priority in the queue so that he or she can be admitted to the medical care zone after all red cases have been resolved.• The child can wait up to 1 hour to see the doctor.• The child must be reassessed every 20 minutes to ensure that they do not progress to the red category.
Green: Neither emergent nor urgent signs are present.	<ul style="list-style-type: none">• The child is admitted to the medical care zone after all red or yellow cases have been resolved.• The child can wait up to 4 hours to see the doctor.• The child must be reassessed every 60 minutes to ensure that he or she does not progress to either the red or yellow categories.

Table 2.1.2. Emergency signs (ABCD)

<p>Airway and breathing</p> <ul style="list-style-type: none"> • Absence of breathing • Cyanosis • Severe respiratory distress <p>Fast breathing + one of the following:</p> <ul style="list-style-type: none"> – Nasal flaring – Abnormal positioning – Accessory muscle use – Abdominal breathing – Grunting 	<p>Manage airways and breathing</p> <ol style="list-style-type: none"> 1. Support or open airways 2. Administer O₂ 3. Support ventilation as needed
<p>Circulation</p> <p>Signs of shock, including at least three of the following:</p> <ul style="list-style-type: none"> • Fast pulse • Weak or absent pulse • Cold hands and feet • Capillary refill >2 seconds <p>Hypovolaemic shock: Shock + signs of severe dehydration, or Shock + bleeding/haemorrhage</p> <p>Septic shock: Shock + sepsis</p> <p>Anaphylactic shock: Shock + allergen exposure</p> <p>Cardiogenic Shock: Shock + cardiac disease</p>	<p>Manage circulation</p> <ol style="list-style-type: none"> 1. Stop any bleeding 2. Manage airways and support ventilation as needed 3. Administer O₂ 4. Ensure vascular access (IV/IO) 5. Begin IV/IO fluid therapy (Lactated Ringers or NaCl 0.9%) for hypovolaemic shock 6. Follow specific protocols for sepsis and cardiogenic shock 7. Check glucose, malaria and Hb as needed
<p>Disability (neurological status)</p> <ul style="list-style-type: none"> • Coma <ul style="list-style-type: none"> – Altered level of consciousness – AVPU • Convulsion 	<p>Manage coma and convulsion</p> <ol style="list-style-type: none"> 1. Manage airways and support ventilation as needed 2. Ensure vascular access (IV/IO) 3. Check glucose and treat hypoglycaemia if present 4. Administer diazepam if convulsion is present 5. Put patient in recovery position

Table 2.2.1. Primary assessment

ABCDE	Emergency Signs and Symptoms	Management
A irway	<p>Complete or Partial Airway Obstruction The following signs suggest that the upper airway is obstructed:</p> <ul style="list-style-type: none"> • Increased inspiratory effort with retractions • Abnormal inspiratory sounds (snoring or stridor) • Episodes where no airway or breath sounds are present despite respiratory effort 	<p>Call for help</p> <ol style="list-style-type: none"> 1. Support or open airways 2. Suction as needed 3. Remove visualised foreign body <p>(See Chapter 2.3 for information regarding airway management)</p>
B reathing	<p>If the child is cyanotic ($SpO_2 < 95\%$), check for the following.</p> <p>Respiratory Distress Respiratory distress is indicated by rapid + increased work of breathing (any one of the following signs):</p> <ul style="list-style-type: none"> • Nasal flaring • Abnormal positioning • Retractions or chest indrawing • Abdominal breathing • Grunting <p>Respiratory Failure and Apnoea</p> <p>Tension Pneumothorax</p>	<p>Call for help</p> <ol style="list-style-type: none"> 1. Support an open airway (allow the child to assume a position of comfort) 2. Clear the airway if indicated 3. Provide O_2 <p>Call for help</p> <ol style="list-style-type: none"> 1. Support or open the airway 2. Clear the airway if indicated 3. Consider an oropharyngeal airway 4. Provide O_2 5. Administer inhaled medication as needed 6. Assist ventilation with bag-mask device 7. Ensure vascular access (IV/IO) <p>(See Chapter 2.3 for information regarding airway management)</p> <p>Immediate needle aspiration of the chest (see Chapter 8.7)</p>

<p>Circulation</p>	<p>Shock Signs of shock: at least three of the following:</p> <ul style="list-style-type: none"> • Fast pulse • Weak or absent pulse • Cold hands and feet • Capillary refill time >2 seconds <p>Specific Types of Shock</p> <p>Hypovolaemic shock: Shock + Signs of severe dehydration Shock + Bleeding/haemorrhage</p> <p>Septic shock: Shock + Sepsis</p> <p>Anaphylactic shock: Shock + Allergen exposure</p> <p>Cardiogenic Shock: Shock + Cardiac disease</p> <p>Cardiorespiratory Arrest Absence of a central pulse</p> <p>Severe Anaemia Pallor of:</p> <ul style="list-style-type: none"> • Mucous membranes/lips • Nail beds • Palms and soles <p>Plus Signs of decompensation</p> <ul style="list-style-type: none"> • Tachycardia (signs of shock) • Respiratory distress • Altered level of consciousness 	<p>Call for help</p> <ol style="list-style-type: none"> 1. Manage airways 2. Provide O₂ 3. Ensure vascular access (IV/IO) 4. Treat shock according protocols of shock 5. Keep the patient warm <p>Call for help Immediately begin CPR</p> <p>Call for help</p> <ol style="list-style-type: none"> 1. Manage airways 2. Provide O₂ 3. Ensure vascular access (IV/IO) 4. Transfuse blood ASAP according to protocol
<p>Disability</p>	<p>Coma, Convulsion and/or Confusion Look for signs of:</p> <ul style="list-style-type: none"> • Hypoglycaemia • Shock and/or sepsis • Meningitis/encephalitis • Cerebral malaria • Trauma • Diabetic ketoacidosis • Postictal status/Status epilepticus • Toxin ingestion 	<p>Call for help</p> <ol style="list-style-type: none"> 1. Manage airways and assist breathing 2. Provide O₂ 3. Ensure vascular access (IV/IO) and administer bolus for hypovolaemic shock 4. Check glucose and test for malaria 5. Administer D10% for hypoglycaemia or if glucose cannot be checked 6. Administer diazepam if convulsions are present 7. Administer antibiotic for meningitis or sepsis 8. Administer antimalarial drugs for malaria
<p>Exposure</p>	<p>Hypothermia Hyperthermia/Hyperpyrexia Look for:</p> <ul style="list-style-type: none"> • Bleeding • Petechiae/purpura (signs of septic shock) • Trauma • Burns 	<p>Treat hypothermia (survival blanket) Treat fever according protocol Treat burns according protocol</p>

Figure 2.3.1. Assessment algorithm for the seriously ill child

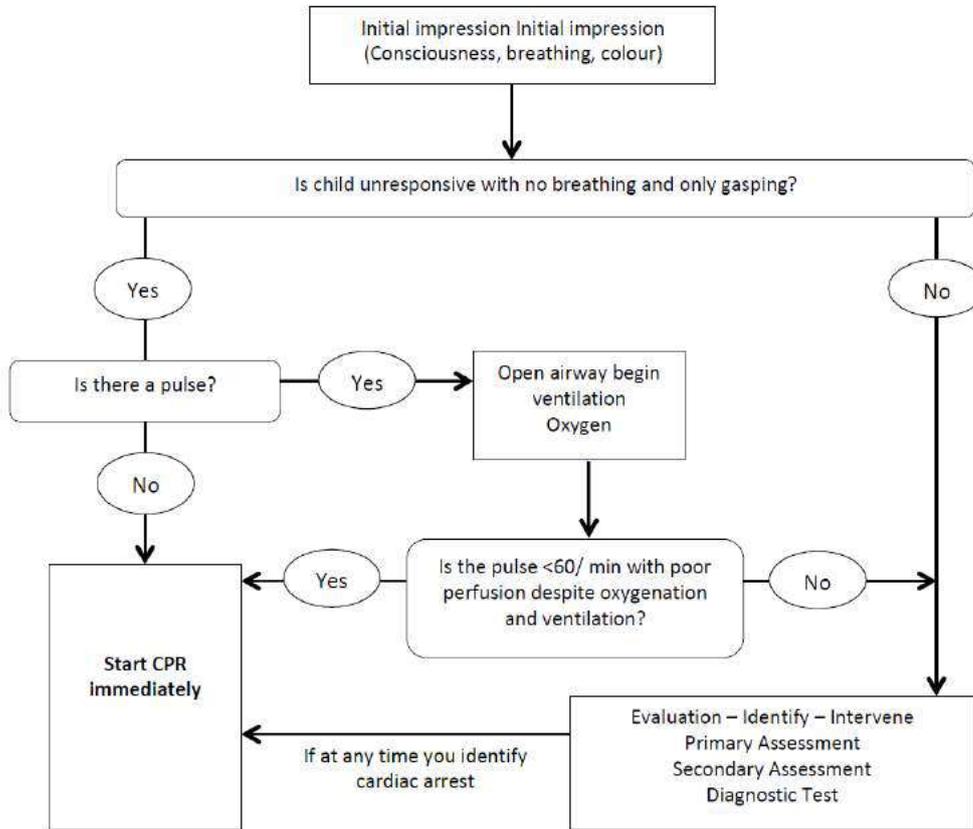
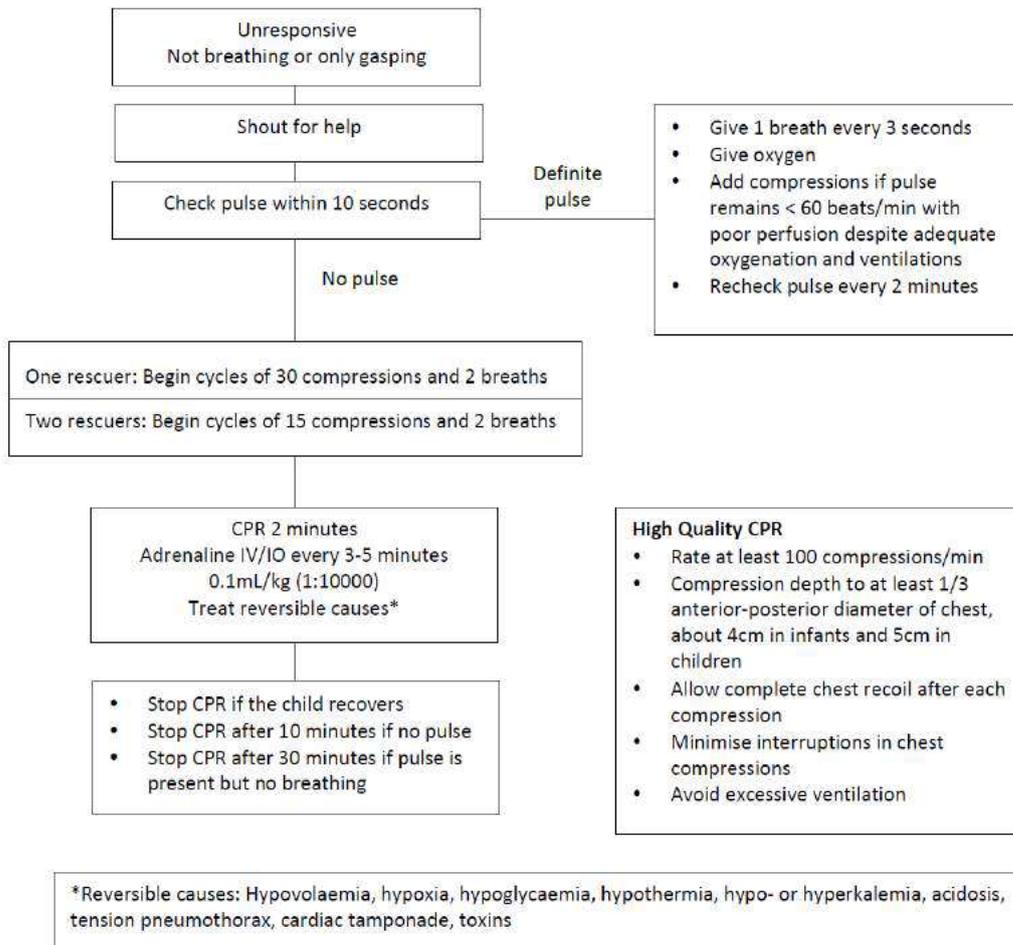


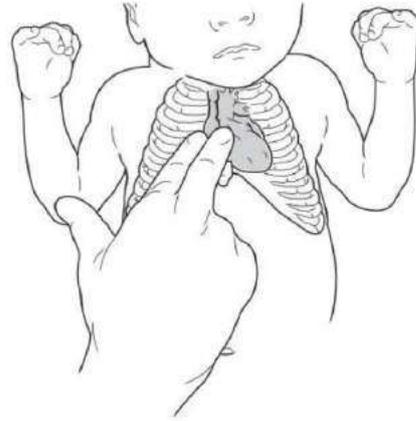
Figure 2.3.2. CPR algorithm



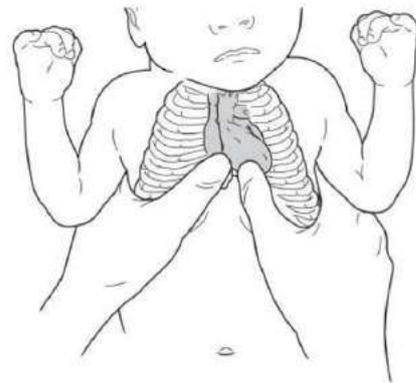
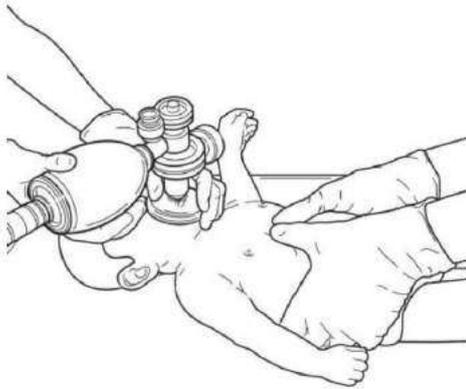
CPR in Infants

Infant CPR is slightly different from that for older children.

Two-finger chest compression technique in infant



Two-thumb encircling hands chest compression in infant (two-person technique)



ANAPHYLAXIS

Anaphylaxis is an acute allergic reaction or anaphylaxis is a life-threatening but rapidly reversible condition if treated promptly. Anaphylaxis can develop within minutes of injection or ingestion of medicines or contact with trigger factors. Common causes are, medicines, intravenous contrast media, vaccines and antisera (e.g. TAT), insect bites, foods (e.g. sea foods, nuts).

Clinical features

- Severe itching
- Urticarial rash
- Difficulty in breathing
- Collapse
- Facial edema
- Angio-edema causing difficulty in breathing due to laryngeal edema and obstruction
- Bronchospasm with wheeze
- Shock with severe hypotension
- Tachycardia
- Cyanosis

Investigation

- Diagnosis is clinical

Treatment Objectives

- Remove the offending cause if possible
- Maintain airways, breathing and circulation

Non pharmacologic

– Airway:

Immediate intubation if evidence of impending airway obstruction from angioedema; delay may lead to complete obstruction; cricothyrotomy may be necessary

– Oxygen:

Give 6 to 8 liters per minute via face mask

– Circulation:

All patients with anaphylaxis should receive intravenous fluids. Some patients may require large amount of intravenous fluids due shift of intravascular fluid to the interstitial space.

– **Remove** the offending agent, if possible

Pharmacologic

Adrenaline, IM, 0.01ml/Kg of 1:1000 at mid-anterolateral thigh; can repeat every 3 to 5 minutes as needed. If symptoms are not responding to epinephrine injections, prepare IV adrenaline (1mL Adrenaline+9 mL Normal Saline) at 0,1-0,2 mL/dose. Possible to repeat every 15 minuts

PLUS **Hydrocortisone**, IV, 10,g/kg/dose, IV, stat

PLUS Chlorpheniramine 1mg, P.O., QID

PLUS If wheeze develops **Salbutamol**, aerosol, 100microgr/dose, 2-4 puffs every 4-6 hr.

BURNS

Depth Appearance Sensation Healing time

First degree (Superficial) Dry (no blister) Erythematous Blanches with pressure painful 3-6 days

Second degree (partial-thickness)-superficial Blisters Moist, red, weeping Blanches with pressure Painful (even to air) 7 to 21 days

Second degree (partial-thickness)-deep Blisters (easily unroofed) Wet or waxy dry Variable color (cheesy white to red) Does not blanch with pressure Senses pressure only Perceptive >21 days-requires surgical treatment

Third degree(full thickness) Waxy white to gray or black Dry and inelastic No blanching with pressure Deep pressure only Rare, unless surgically treated

Fourth degree (extending beyond the skin) Extends into fascia and/or muscle Deep pressure only Never, unless surgically treated

Classification of burns based on the depth of injury

Depth	Appearance	Sensation	Healing time
First degree (Superficial)	Dry (no blister) Erythematous Blanches with pressure	Painful	3-6 days
Second degree (partial-thickness)-superficial	Blisters Moist, red, weeping Blanches with pressure	Painful (even to air)	7 to 21 days
Second degree (partial-thickness) – deep	Blisters (easily unroofed) Wet or wax dry Variable color (cheesy white to red) Does not blanch with pressure	Senses pressure only	Perceptive >21 days requires surgical treatment
Third degree (full thickness)	Waxy to gray or black Dry and inelastic No blanching with pressure	Deep pressure only	Rare, unless surgically treated
Fourth degree (extending beyond the skin)	Extends into fascia and/or muscle	Deep pressure only	Never, unless surgically treated

Burn injury severity grading

Burn Type	Criteria	Disposition
Minor	<10% TBSA burn in adults <5%TBSA burn in young or old <2% full-thickness burn	Outpatient
Moderate	10-20%TBSA burn in adults 5-10% TBSA burn in young or old 2-5% full-thickness burn High voltage injury Suspected inhalation injury Circumferential burn Medical problem predisposing to infection (eg, diabetes mellitus)	Admit
Major	>20% TBSA burn in adults >10% TBSA burn in young or old >5 %full-thickness burn High voltage burn Known inhalation injury Any significant burn to face, eyes, ears, genitalia, or joints Significant associated injuries (fracture or other major trauma)	Refer after emergency management (Make sure the referral center provides burn services)

TBSA: total body surface area;

Young or old: <10 or >50 years old; Adults: >10 or <50 years old

Treatment Objectives

- Prevent ongoing burn
- Secure airway and maintain ventilation
- Correction of fluid and electrolyte deficits
- Prevention and management of infection - Avoid or minimize permanent disability

Non pharmacologic Emergency measures

- Remove clothing and jewelry.
- Maintain adequate airway and give oxygen via face mask
- Establish an IV line. Insert NG tube and avoid oral fluids in children with burns greater

- than 15% BSA.
- Insert Foley catheter
- Wrap all wounds with sterile towels until further decision is made.

Pharmacologic management Fluid resuscitation

- Ringer's lactate or NS 4mL/kg/% BSA burned: 1/2 the fluid is given over the first 8 hours calculated from the time of onset of the injury and the remaining 1/2 is given at an even rate over the next 16 hours
- The rate of the infusion is adjusted according to the patient's response to therapy.
- Adequacy of the resuscitation is reflected by vital signs, skin turgor, adequate urine output (1mL/kg/hr in children and 0.5 mL/kg in adults). Clinical signs of adequate perfusion are monitored every hour for the first twenty-four hours
- During the 2nd 24 hr patients begin to reabsorb edema fluid and to diuresis. ½ of the first day fluid requirement is needed as Ringer's lactate in 5% dextrose.
- Oral supplementation may be started after 48hr post burn **Estimate body surface area of the burnt body**

Wound management Minor burns

- Treated in an outpatient setting
- Debride all loose skin. Blisters are better not excised
- Cleanse with mild soap and irrigate with isotonic saline.
- The wound is then covered with **Silver sulfadiazine** and properly dressed.
- The first dressing change and dressing evaluations are performed 24-48 hrs after injury **Silver sulfadiazine cream 1%**, apply daily with sterile applicator **OR Fusidic acid**, thin films of 2% cream applied to skin 3-4 times daily **Moderate and Severe burns**
- Do all recommended for minor burns
- Apply local antibiotic or Vaseline coated dressing
- Antibiotic prophylaxis is not recommended unless there is obvious infection. **Prevention of stress ulcer** – for severe burns only **First line** for patients who are able to take oral medications **Omeprazole**, 40mg, oral, daily **First line** for patients who are unable to take oral medications **Cimetidine**, 200mg-400mg IV, every 12 hours **Tetanus prophylaxis Tetanus** immunization should be updated for any burns deeper than superficial-thickness.

Pain Management:

First Line use depending on pain severity and response in step wise fashion

Paracetamol, 500-1000mg P.O., 4-6 times a day

OR **Tramadol** 50-100mg, Slow IV or P.O, 3-4 times daily (maximum 400mg/day)

OR **Morphine hydrochloride injection** (for severe pain only), 10-20 mg IM

OR SC, repeat every 4 hours PRN.

OR **Pethidine** 50mg IM every 4 hrs (depending on the need) or 5-10 mg IV 5 minutes

Systemic antibiotics

- Not indicated for prophylaxis
- When there is evidence of infection (e.g. persistent fever, leukocytosis) take specimens for culture and start empiric antibiotics based on suspected site of infection. If wound infection is the suspected source of infection empiric antibiotics should cover *Pseudomonas aeruginosa*, other gram negative bacteria and *Staphylococcus aureus*

Prevention, management and follow up of complications

- Electrolytes
 - o Hypokalemia, hyponatremia/hypermnatremia
- Acute Kidney injury
 - o Correction fluid deficit, avoidance of nephrotoxic medication
- Malnutrition
 - o burn patients require high calorie and high protein diet
- Deep vein thrombosis
 - o Prophylaxis with heparin if patient is immobilized
- Joint Contractures
 - o proper wound care and physiotherapy - Psychiatric attention

POISONING

Toxidromes (adapted from Hand book for the Mangement of poisoning and overodose, Singapore MOH, 2000)

Toxidrome	Mental Status	Pupil	Vital Signs	Other	Examples of toxic agents
Cholinergic	Confusion Coma	Miosis	Bradycardia Hypertension or Hypotension	Salivation, urinary & fecal incontinence, diarrhoea, vomiting, lacrimation, bronchoconstriction, fasciculations, weakness, seizures	Organophosphate and carbamate insecticides, nerve agents
Anticholinergic	Agitation, hallucinations, delirium with mumbling speech, coma	Mydriasis	Hyperthermia, tachycardia, hypertension, tachypnea	Dry skin & mucous membranes, decreased bowel sounds, urinary retention, myoclonus, choreoathetosis	Antihistamines, tricyclic antidepressants, anti parkinson agents, antispasmodics, phenothiazines, atropine
Tricyclic antidepressant	Confusion, agitation, coma	Mydriasis	Hyperthermia, tachycardia, hypertension then hypotension	Seizures, myoclonus, choreoathetosis, cardiac arrhythmias	Amitriptyline, nortriptyline, imipramine
Sedative-hypnotic	CNS depression, stupor, coma	Miosis	Hypothermia, bradycardia, hypotension, hypopventilation	Hyporeflexia	Benzodiazepines, barbiturates, alcohols,
Opioid	CNS depression, coma	Miosis	Hypothermia, bradycardia, hypotension, hypopneventilation	Hyporeflexia pulmonary edema, needle marks	Opiates (eg, heroin, morphine, methadone, oxycodone)
Sympathomimetic	Hyperalert, agitation, hallucinations, paranoia	Mydriasis	Hyperthermia, tachycardia, hypertension, widened pulse pressure, tachypnea,	Diaphoresis, tremors, hyperreflexia, seizures	Cocaine, amphetamines, ephedrine, pseudoephedrine, phenylpropanolamine, theophylline, caffeine

Fundamentals of poisoning management

Supportive Care	Airway protection Treatment of hypoxia Correct hypotension/arrhythmia Treatment of seizures Correction of temperature abnormalities Correction of metabolic derangements
Prevention of Further Poison	Gastric lavage Activated charcoal Decontamination of eye, skin decontamination
Enhancement of elimination	Multiple-dose activated charcoal Urinary pH alkalization Hemodialysis Hyperbaric oxygenation
Administration of Anti-dotes	Neutralization by antibodies Metabolic antagonism or Physiologic antagonism
Prevention of Re-exposure	Child-proofing Psychiatric referral

Induction of vomiting is contraindicated in patients who ingested caustic or corrosive substances and hydrocarbons, comatose patients and those with seizures.

Carbon monoxide**Clinical features**

- Poisoning with carbon monoxide is common where there is incomplete combustion of charcoal.
- Acute poisoning results in headache, nausea and vomiting, mental confusion and agitation.
- Severe toxicity causes confusion, impaired thinking, and may progress to coma, convulsions, and death.

Treatment Objectives

- Support physiological function
- Treat symptoms
- Remove the poison from the body

Non pharmacologic

- Supportive treatment

- Take the patient out to open air.

Pharmacologic

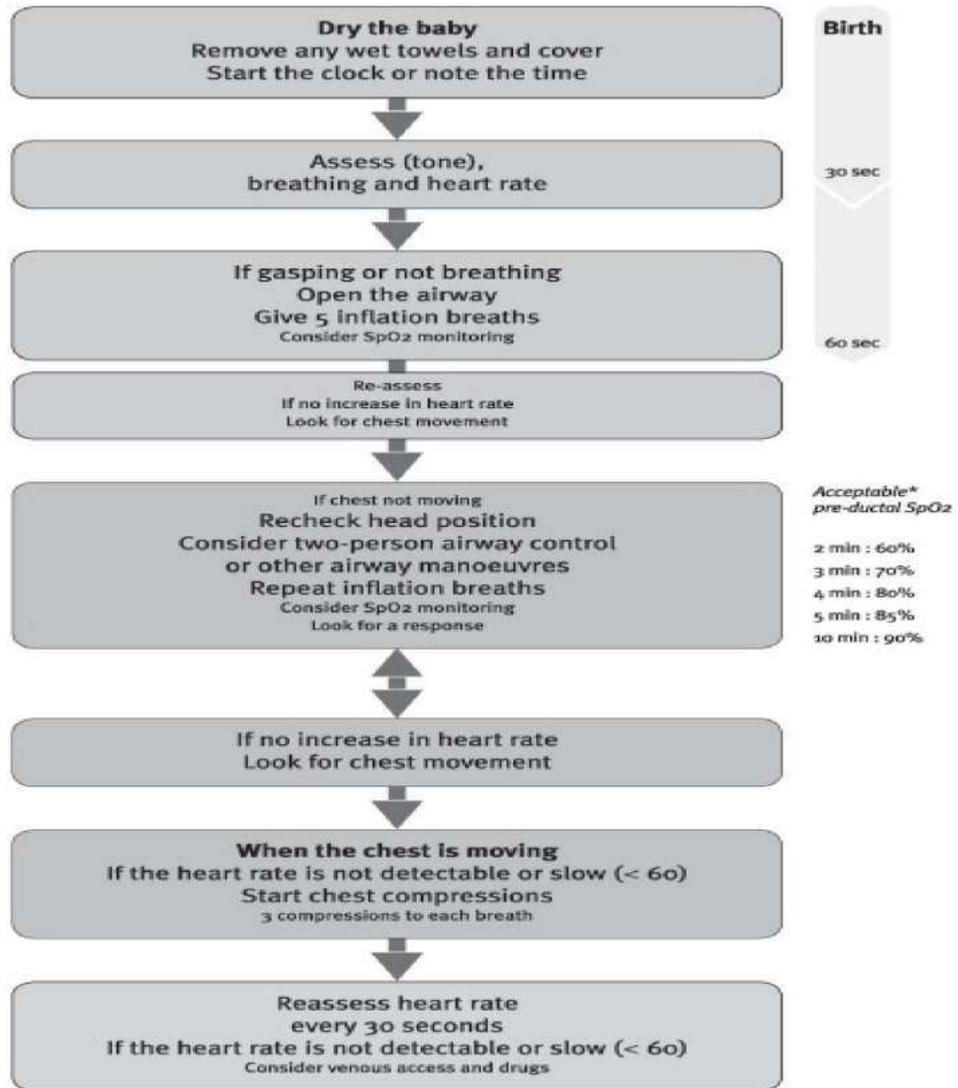
- **Oxygen**, 100% via face mask

Common antidotes

Poison	Antidotes	Dose for adults
Carbon monoxide	Oxygen	high-flow oxygen by tight-fitting facemask or ventilator
Benzodiazepines	Flumazenil	Initial dose: 0.1-0.2mg IV over 30-60 sec, repeat 0.1-0.2mg IV every minute up to 1mg
Acetaminophen	N-acetylcysteine	Initial oral dose: 140mg/kg, then 70mg/kg q 4h x 17 doses
Heparin	Protamine sulfate	1 mg neutralizes 90-115 U heparin; Initial dose: 1 mg/min to total dose 200mg in 2 h
Isoniazid	Pyridoxine (Vitamin B6)	Initial dose: 1 gm pyridoxine for every gm INH ingested or empiric 5gm IV over 10 min if amount ingested unknown
Opiates	Naloxone	Initial dose: 0.1-2.0mg IV push (opioid dependent patients should receive 0.1 mg IV every 30-60 sec until clinical response)
Ticyclic antidepressants	Sodium bicarbonate	Initial dose: 1-2 ampules (50-100mEq) IV push, then IV infusion to maintain blood pH 7.45-7.55 (Preparation: 3 amps 50mEq of NaHCO ₃ in 1liter D5W infused at 200-250 mL/h)
Organophosphates Carbamates Nerve agents	Atropine	Initial dose: 0.5-2.0mg IV; repeat q 3-5 min until sweat and secretions clear
	Pralidoxime	Initial dose: 1 gm IV over 15 min, then IV infusion of 3-4mg/kg/h for 24-72 hrs

Newborn Life Support

AT ALL STAGES ASK: DO YOU NEED HELP?



* www.pediatrics.org/cgi/dol/10.1542/peds.2009-1510

Adrenaline Indication: - Heart rate < 80bpm after 30 seconds of chest compression along with positive pressure ventilation with 100% oxygen - If heart rate is zero Dose: 0.1 – 0.3ml/kg of 1:10,000 solutions Route: Intravenous or intra-tracheal. Give as rapid as possible. After 30 seconds of giving adrenaline, check the heart rate. If the heart rate is still <100bpm, consider repeating adrenaline.