

**SECTION 8: The structured approach to the seriously ill infant, child or mother. (WHO Pregnancy C-1)**

**Introduction**

The outcome for children following cardiac arrest is poor. Earlier recognition and management of potential respiratory, circulatory, or central neurological failure will reduce mortality and secondary morbidity. The following section outlines the physical signs that should be used for the rapid assessment of mothers, babies and children. It is divided systematically into looking for signs of potential respiratory (airway and breathing), circulatory and central neurological failure and constitutes the primary assessment.

**Assessment and resuscitation occur at the same time.** The order of assessment and resuscitation enables identification of immediately life threatening problems, which are treated as they are found.

**Primary assessment during emergencies**

**Airway/Breathing/Circulation/Disability ABCD**

***Primary Assessment of the Airway***

Vocalisations, such as crying or talking, indicate ventilation and some degree of airway patency.

Assess patency by

**Looking** for chest and/or abdominal movement

**Listening** for breath sounds

**Feeling** for expired air

**Reassess after any airway opening manoeuvres** – ie jaw and neck positioning

In addition, note other signs that may suggest upper airway obstruction:

- the presence of stridor
- evidence of recession

**Give oxygen throughout this time**

Consider suction and foreign body removal and oro- or naso- pharyngeal airway

Consider intubation and surgical cricothyroidotomy if all else fails and the upper airway is severely obstructed

***Primary assessment of Breathing***

**Respiratory rate (make count over 1 minute when patient is calm)**

Rates "at rest" at different ages are:

Age (yrs)	Respiratory rate
<1	30-40
1-2	25-35
2-5	25-30
5-12	20-25
>12 and Pregnancy	15-20

Care should be taken in interpreting single measurements: infants can show rates of between 30 and 90 breaths per minute depending on their state of activity. More useful are trends in measurements as an indicator of improvement or deterioration.

**In children with respiratory disorders:**

**WHO definitions of Fast Breathing are:**

<b>&lt; 2 months</b>	<b>is <math>\geq</math> 60 breaths per minute</b>
<b>2 – 12 months</b>	<b>is <math>\geq</math> 50 breaths per minute</b>
<b>12 months to 5 years</b>	<b>is <math>\geq</math> 40 breaths per minute</b>

**Tachypnoea** – from either airway or lung disease or metabolic acidosis

**Bradypnoea** – due to fatigue, raised intracranial pressure, or pre-terminal

### **Recession**

- intercostal, sub-costal or sternal recession shows increased effort of breathing (particularly seen in infants with more compliant chest walls)
- degree of recession indicates severity of respiratory difficulty
- in the patient with exhaustion, chest movement and recession will decrease

### **Inspiratory or expiratory noises**

- stridor, usually inspiratory, indicates laryngeal or tracheal obstruction
- wheeze, predominantly expiratory, indicates lower airway obstruction
- volume of noise is not an indicator of severity

### **Grunting**

- seen in infants and children with stiff lungs to prevent airway collapse (represents closure of the larynx during expiration)
- is a sign of severe respiratory distress

### **Accessory muscle use**

In infants the use of the sternocleidomastoid muscle creates “head bobbing” and is ineffectual

### **Flaring of alae nasi**

## **Gasping**

A sign of severe hypoxaemia and may indicate impending respiratory arrest and death

## **Exceptions**

Increased effort of breathing DOES **NOT** OCCUR in 3 circumstances:

1. exhaustion
2. central respiratory depression eg. from raised intracranial pressure, poisoning or encephalopathy
3. neuromuscular disease eg. poliomyelitis

## **Efficacy of breathing**

Breath sounds on auscultation

1. reduced or absent
2. bronchial
3. symmetrical or asymmetrical

Chest expansion (**most important**) / abdominal excursion

Pulse oximetry (normal oxygen saturation (SaO<sub>2</sub>) in a patient at sea level is 95 – 100% in air).

## **Effects of breathing failure on other physiology**

**Heart rate** Increased by hypoxia, fever or stress and by pregnancy

Bradycardia with hypoxia is a sign of impending cardio-respiratory arrest

## **Skin colour**

Hypoxia first causes vasoconstriction and pallor

Cyanosis is a late sign and may indicate impending cardio-respiratory arrest

## **Mental status**

Hypoxic child will be agitated first, then drowsy, then unconscious

Pulse oximetry may be difficult to measure in the agitated patient

## ***Primary assessment of Circulation***

### **Circulatory status**

#### **Heart rate**

Heart rate increases in shock. Bradycardia may be a sign of imminent cardio-respiratory arrest.

Rates "at rest" at different ages are:

Age (yrs)	Heart rate (beats/min)
<1	110-160
1-2	100-150
2-5	95-140
5-12	80-120
>12	60-100
<b>Pregnancy</b>	65-115

WHO definitions for tachycardia are: > 160 bpm aged under 1 year and >120 bpm aged 1 to 5 years.

Heart rates in pregnancy are increased by 10-15% (65-115 beats/min)

### Pulse volume

Absent peripheral pulses or reduced central pulses can indicate shock

### Capillary refill

Pressure on the centre of the sternum or fingernail for 5 seconds should be followed by return of the circulation to the skin within  $\leq 3$  seconds.

May be prolonged by shock, cold environment, or the vasoconstriction that is present as a fever develops.

**Not a specific or sensitive sign of shock**

**Should not be used alone as a guide to the response to treatment**

### Blood pressure

Cuff should cover at least 80% of the length of the upper arm, and the bladder more than two thirds of the arm's circumference (in pregnancy to avoid missing a raised blood pressure the largest possible cuffs should be used).

Korotkoff 5 sounds (disappearance) should be used for measuring diastolic pressure. K4 sound should only be used if the sound does not disappear until near zero.

**Hypotension is a late sign of circulatory failure in both children and pregnant mothers and will rapidly be followed by cardio-respiratory arrest unless treated urgently**

Blood pressure may increase in pregnancy and be accompanied by proteinuria and oedema.

Age (yrs)	Systolic blood pressure	Diastolic blood pressure
<1	70-90	
1-2	80-90	
2-5	80-95	
5-12	90-110	
>12	100-120	
Pregnancy	90 -120	50-70

Blood pressure is a difficult measure to obtain and interpret especially in infants and children <5 years. A formula for calculating normal systolic blood pressure in children is

$$80 + (2 \times \text{Age in years})$$

The cardiovascular system in a child and mother compensates well initially in shock. **Hypotension is a late and often sudden sign of decompensation and, if not reversed, will be rapidly followed by death.** Serial measurements of blood pressure should be performed frequently

### Effects of circulatory inadequacy on other organs

Respiratory system – tachypnoea and hyperventilation occurs with acidosis eg. poor tissue perfusion

Skin – pale or mottled skin indicates poor perfusion

Mental status – agitation, then drowsiness, then unconsciousness

Urine output - <2ml/kg/hour in infants <1ml/kg/hour in a child <30ml/hour in pregnancy indicates inadequate renal perfusion

On uterus can lead to fetal compromise

### Cardiac failure

#### Features suggesting cardiac cause of respiratory inadequacy

Cyanosis, not corrected with oxygen therapy  
Tachycardia out of proportion to respiratory distress  
Raised jugular venous pressure  
Gallop rhythm  
Enlarged liver  
Absent femoral pulses in an infant or child  
Basal lung crepitations

#### Primary assessment of Disability

Always assess and treat **A**irway, **B**reathing and **C**irculatory problems before undertaking neurological assessment.

#### Neurological function

*Conscious level:* AVPU

<b>A</b>	<b>ALERT</b>
<b>V</b>	<b>responds to VOICE</b>
<b>P</b>	<b>responds to PAIN</b>
<b>U</b>	<b>UNRESPONSIVE</b>

If the patient does not respond to voice it is important that assessment of the response to pain is undertaken. A painful central stimulus can be delivered by sternal pressure, by supra-orbital ridge pressure or by pulling frontal hair. A patient who is unresponsive or who only responds to pain has a significant degree of coma.

### ***Posture***

Many patients who are suffering from a serious illness in any system are hypotonic. Stiff posturing, such as that shown by decorticate (flexed arms, extended legs) or decerebrate (extended arms, extended legs), are signs of serious brain dysfunction. *These postures can be mistaken for the tonic phase of a convulsion.* Alternatively a painful stimulus may be necessary to elicit these postures.

Severe extension of the neck due to upper airway obstruction can mimic the opisthotonus that occurs with meningeal irritation. A stiff neck and full fontanel in infants are signs which suggest meningitis.

### ***Pupils***

Many drugs and cerebral lesions have effects on pupil size and reactions. However, the most important pupillary signs to seek are dilatation, unreactivity, and inequality, which indicate possible serious brain disorders.

Check blood glucose. **Hypoglycaemia (less than 2.5 mmol/litre (45mg/dl) can cause unconsciousness**

**Raised Intracranial Pressure may cause Hyperventilation**  
Slow sighing respirations  
Apnoea  
Hypertension  
Bradycardia

### **Respiratory effects of central neurological failure**

The presence of any abnormal respiratory pattern in a patient with coma suggests mid- or hind-brain dysfunction.

### **Circulatory effects of central neurological failure**

Systemic hypertension with sinus bradycardia (Cushing's response) indicates compression of the medulla oblongata caused by herniation of the cerebellar tonsils through the foramen magnum. *This is a late and pre-terminal sign.*

### ***Assessment by Exposure***

Although not part of the primary assessment, the examination of the seriously ill patient will involve examination for markers of illness that will help provide specific emergency treatment.

### ***Temperature***

A fever suggests an infection as the cause of the illness, but may also be the result of prolonged convulsions or shivering.

*Rash*

Examination is made for rashes, such as urticaria in allergic reactions, purpura, petechiae and bruising in septicaemia, child abuse or partner violence, or maculo-papular and erythematous rashes in allergic reactions and some forms of sepsis.

**Summary**

The whole assessment should take less than a minute.

**Summary: rapid clinical assessment of an infant, child or pregnant mother**

**Airway and Breathing**

Effort of breathing: Respiratory rate/rhythm: Stridor/wheeze: Auscultation: Skin colour

**Circulation**

Heart rate: Pulse volume: Capillary refill: Skin temperature

**Disability**

Mental status/conscious level: Posture: Pupils: Blood glucose

Only when airway, breathing and circulation problems have been recognised and treated should definitive management of underlying condition proceed.

During treatment, **reassessment of ABCD at frequent intervals** will be necessary to assess progress and detect deterioration.

## The structured approach to the seriously ill infant, child or mother

- Primary assessment
- Resuscitation
- Secondary assessment and looking for key features
- Emergency treatment
- Stabilisation and transfer to definitive care

*Primary assessment* and *resuscitation* involve management of the vital ABC functions and assessment of disability (CNS function). This assessment and stabilisation occurs before any illness-specific diagnostic assessment or treatment takes place. Once the patient's vital functions are supported, secondary assessment and emergency treatment begins. Illness-specific pathophysiology is sought and emergency treatments are instituted. During the secondary assessment vital signs should be checked frequently to detect any change in the patient's condition. If there is deterioration then primary assessment and resuscitation should be repeated.

### PRIMARY ASSESSMENT AND RESUSCITATION

In a severely ill patient a rapid examination of vital functions is required. The physical signs described above are used in an ABC approach. This primary assessment and any necessary resuscitation must be completed before the more detailed secondary assessment is performed.

#### Airway

##### *Primary assessment*

Assess that the airway is open by:

- *looking* for chest and/or abdominal movement
- *listening* for breath sounds
- *feeling* for expired air.

Vocalisations, such as crying or talking, indicate ventilation and some degree of airway opening. If there is obvious spontaneous ventilation, look for other signs which may suggest upper airway obstruction:

- presence of stridor
- evidence of recession.

If there is no evidence of air movement then chin lift or jaw thrust manoeuvres should be carried out. **Reassess the airway after any airway-opening manoeuvres.**

If there continues to be no evidence of air movement then airway opening can be assessed by performing an airway-opening maneuver while giving rescue breaths.

##### *Resuscitation*

If the airway is not patent, then this can be secured by:

- a chin lift or jaw thrust
- the use of an airway adjunct such as oropharyngeal or nasopharyngeal airway
- tracheal intubation (call for anaesthetist if available)

#### Breathing

##### *Primary assessment*

An open airway does not ensure adequate ventilation. The latter requires an intact respiratory centre and adequate pulmonary function augmented by coordinated movement of the diaphragm and chest wall. The adequacy of breathing can be assessed as described above.

##### *Resuscitation*

Give high-flow oxygen (flow rate 15 l/min) through a

non-rebreathing mask with a reservoir bag to any patient with respiratory difficulty or hypoxia.

In the patient with inadequate breathing this should be supported with bag– valve–mask ventilation or intubation and intermittent positive pressure ventilation (if this is available).

## Circulation

### *Primary assessment*

The assessment of circulation has been described above and is more difficult to assess than breathing. Individual measurements must not be over-interpreted.

### *Resuscitation*

Give high-flow oxygen to every patient with an inadequate circulation (shock). This will be through either a non-rebreathing mask with a reservoir bag (or an endotracheal tube if intubation has been necessary).

Venous or intraosseous access should be gained and an immediate infusion of crystalloid, colloid or blood as appropriate (20 ml/kg in a child and 500ml to 1 litre in an adult) given. Urgent blood samples may be taken at this point.

## FOR A CHILD WEIGHT CAN BE CALCULATED AS FOLLOWS:

### Estimate of Weight

- Infant = up to 12 months old
- Birth weight - doubles by 5 months
- triples by 1 year
- quadruples by 2 years

After 12 months, the formula can be applied, but needs to be modified according to whether the child is small or large compared with the average

$$\text{Weight (Kg)} = 2 \times (\text{age in years} + 4)$$

## Disability (neurological evaluation)

### *Primary assessment*

Both hypoxia and shock can cause a decrease in conscious level. Any problem with ABC must be addressed before assuming that a decrease in conscious level is due to a primary neurological problem. The rapid assessment of central neurological failure has been described above. In addition, any patient with a decreased conscious level or convulsions must have an initial glucose stick test performed.

### *Resuscitation*

Consider intubation (if this is safely available) to stabilise the airway in any patient with a conscious level recorded as P or U (only responding to painful stimuli or unresponsive).

Treat hypoglycaemia ([less than 2.5 mmol/litre \(45mg/dl\)](#)) with 5 ml/kg of 10% dextrose after having taken blood for glucose measurement (ideally by both stick tests and in the laboratory).

Intravenous/intraosseous lorazepam, buccal midazolam or rectal diazepam should be given for prolonged or recurrent fits (see section 10 and 12).

## SECONDARY ASSESSMENT AND EMERGENCY TREATMENT

The secondary assessment takes place once vital functions have been assessed and the initial treatment of those vital functions has been started. It includes a medical history, a clinical examination and specific investigations. It differs from a standard medical history and examination in that it is designed to establish which emergency treatments might benefit the patient. Time is

limited and a focused approach is essential. At the end of secondary assessment, the practitioner should have a better understanding of the illness affecting the patient and may have formulated a differential diagnosis. Emergency treatments will be appropriate at this stage – either to treat specific conditions (such as asthma) or processes (such as raised intracranial pressure). The establishment of a definite diagnosis is part of definitive care.

The history often provides the vital clues that help the practitioner identify the disease process and provide the appropriate emergency care. In the case of infants and children the history is often obtained from an accompanying parent, although a history should be sought from the child if possible. Do not forget to ask the first responder about the patient’s initial condition and about treatments and response to treatments that have already been given.

Some patients will present with an acute exacerbation/complication of a known condition such as pregnancy, asthma or epilepsy. Such information is helpful in focusing attention on the appropriate system but the practitioner should be wary of dismissing new pathologies in such patients. The structured approach prevents this problem. Unlike trauma (which is dealt with later), illness affects systems rather than anatomical areas. The secondary assessment must reflect this and the history of the complaint should be sought with special attention to the presenting system or systems involved. After the presenting system has been dealt with, all other systems should be assessed and any additional emergency treatments commenced as appropriate.

The secondary assessment is not intended to complete the diagnostic process, but rather is intended to identify any problems that require emergency treatment.

The following gives an outline of a structured approach in the first hour of emergency management. It is not exhaustive but addresses the majority of emergency conditions that are amenable to specific emergency treatments in this time period.

The symptoms, signs and treatments relevant to each emergency condition are elaborated in the relevant chapters that follow.

**Airway and Breathing**  
*Secondary assessment*

Common symptoms	Signs	Emergency investigations
Breathlessness Coryza Tachypnoea Choking Cough Abdominal pain Chest pain Apnoea Feeding difficulties Hoarseness	Bubbly noises in throat Cyanosis Recession Noisy breathing – grunting, stridor Drooling and inability to drink Wheeze Tracheal shift Abnormal percussion note Crepitations on auscultation Acidotic breathing	O2 saturation Blood culture if infection suspect Chest X-ray (selective)

*Emergency treatment*

- If “bubbly” noises are heard the airway is full of secretions. These may require clearance by suction.

- If in a pre-school child there is a harsh stridor associated with a barking cough and severe respiratory distress upper airway obstruction due to severe croup should be suspected. Give the child oral prednisolone and nebulised adrenaline (5 ml of 1:1000 nebulised in oxygen).
- If there is a quiet stridor and drooling in a sick-looking child consider epiglottitis or tracheitis. Intubation is likely to be urgently required, preferably by an anaesthetist. Do not put the airway at risk by unpleasant or frightening interventions. Give intravenous antibiotics. Surgical airway may be needed so contact a surgeon.
- With a sudden onset and significant history of inhalation consider a laryngeal foreign body. If the "choking" protocol has been unsuccessful the patient may require laryngoscopy. Do not put the airway at risk by unpleasant or frightening interventions but contact an anaesthetist/ENT surgeon urgently. However in extreme, life threatening cases immediate direct laryngoscopy to remove a visible foreign body with Magill's forceps may be necessary.
- Stridor following ingestion/injection of a known allergen suggests anaphylaxis. Patients in whom this is likely should receive IM adrenaline (*10 microgram/kg for a child* and 1mg for an adult).
- Patients with a history of asthma or with wheeze, significant respiratory distress, and/or hypoxia should receive inhaled *salbutamol* and oxygen. Infants with wheeze and respiratory distress are likely to have bronchiolitis and require oxygen.
- In acidotic breathing take blood glucose. Treat diabetic ketoacidosis with IV 0.9% saline and insulin (sections 10 and 12).

**Circulation**

*Secondary assessment*

Common symptoms	Signs	Emergency investigations
Haemorrhage Breathlessness Palpitations Feeding difficulties Abdominal pain Chest pain Apnoea Feeding difficulties Hoarseness Drowsiness	Tachycardia or bradycardia Abnormal pulse volume or rhythm Abnormal skin perfusion or colour Haemorrhage or hidden haemorrhage Severe malnutrition Fever Hypo- or hypertension Cyanosis Pallor Enlarged liver Lung crepitations Poor urine output Cardiac murmur Peripheral oedema Raised jugular venous pressure Low muscle tone Dehydration Purpuric rash	O2 saturation Blood culture if infection suspect Chest X-ray (selective) ECG (selective) HB Urea and electrolytes (if available) Clotting studies (if available) Malarial parasites

*Emergency treatment*

- Further boluses of fluid should be considered in shocked patients who have not had a sustained improvement to the first bolus given at resuscitation. However in trauma, where there is uncontrolled bleeding, early surgical intervention has priority and too much IV fluids may be harmful.
- Consider inotropes, intubation and central venous pressure monitoring if available.
- Consider IV broad spectrum antibiotics in shocked patients with no obvious fluid loss as sepsis is likely.
- If a patient has a cardiac arrhythmia the appropriate protocol should be followed.
- If anaphylaxis is suspected give IM adrenaline 10 micrograms/kg in a child, or 1mg in a mother, in addition to fluid boluses.

- Targeted treatment for obstetric emergencies known to cause shock (may include urgent surgery).
- Surgical advice and intervention for certain gastro-intestinal emergencies.

The following symptoms and signs may suggest intra-abdominal emergencies: vomiting, abdominal pain, abdominal tenderness, rectal bleeding, abdominal mass.

**Disability (neurological)**

*Secondary assessment*

Common symptoms	Signs	Emergency investigations
Headache Drowsiness Vomiting Change in behavior Visual disturbance	Altered or change in conscious level Convulsions Bradycardia Altered pupil size and reactivity Abnormal postures Meningism Fever Papilloedema or retinal haemorrhage Altered deep tendon reflexes Hypertension	Blood glucose O2 saturation Blood culture if infection suspect HB Urea and electrolytes (if available) Malarial parasites

*Emergency treatment*

If hypoglycaemia (less than 2.5 mmol/litre (45mg/dl) is possible, treat urgently.

- If convulsions persist treat as in Sections 10 and 12.
- If evidence of raised intracranial pressure (decreasing conscious level, abnormal posturing and/or abnormal ocular motor reflexes) then the child should undergo:
  - Bag valve mask ventilations if apnoea or slow or poor breathing
  - Nursing with head in-line and 20–30 degree head-up position (to help cerebral venous drainage)
    - IV infusion with mannitol 250 to 500 mg/kg over 15 minutes, and repeated as needed
    - Consider dexamethasone 500 microgram/kg twice daily (for oedema surrounding a space occupying lesion)
- In a child with a depressed conscious level or convulsions consider meningitis/encephalitis. Give antibiotics and acyclovir as appropriate.
- In drowsiness with sighing respirations check blood glucose. Think of salicylate poisoning. Treat diabetic ketoacidosis with IV 0.9% saline and insulin.
- In unconscious patients with pin-point pupils consider opiate poisoning. A trial of naloxone should be given.

**External (exposure)**

*Secondary assessment*

Signs
Rash Purpura Swelling of lips/tongue and/or urticaria Fever

*Emergency treatment*

- In a child with circulatory or neurological symptoms and signs a purpuric rash suggests septicaemia/meningitis or Dengue haemorrhagic fever. The patient should receive IV broad spectrum antibiotics preceded by a blood culture.
- In a patient with respiratory or circulatory difficulty the presence of an urticarial rash or angio-oedema suggests anaphylaxis. Give adrenaline **IM** (10 microgram/kg for a child or 1mg for a mother).

### Further history

#### *Developmental and social history*

Particularly in a small child or infant knowledge of the child's developmental progress and immunisation status may be useful. The family circumstances may also be helpful, sometimes prompting parents to remember other details of the family's medical history.

#### *Drugs and allergies*

Any medication that the patient is currently, or has been, on should be recorded. In addition ask about any medication in the home that a child might have had access to if poisoning is a possibility. A history of allergies should be sought.

### SUMMARY

The structured approach to the seriously ill patient outlined here allows the practitioner to focus on the appropriate level of diagnosis and treatment during the first hour of care. Primary assessment and resuscitation are concerned with the maintenance of vital functions, while secondary assessment and emergency treatment allow more specific urgent therapies to be started. This latter phase of care requires a system-by-system approach and this minimises the chances of significant conditions being missed.

#### **SECTION 8 QUIZ 1**

- 1. When undertaking assessments during emergencies the following statements are true**
  - a) resuscitation occurs at the same time
  - b) airway patency is assessed by looking, listening and feeling
  - c) reassessments occur at frequent intervals
- 2. When assessing and providing emergency treatment for the airway, which of the following may be required**
  - a. oxygen
  - b. suction
  - c. oropharyngeal airway
  - d. gastric tube

**ANSWERS:**

**1. abc 2. abc**

**SECTION 8 QUIZ 2**

- 1) When assessing and providing emergency treatment for breathing the following are correct maximum healthy respiratory rates
  - a) 60/minute if aged 1 - 5 years
  - b) 50/minute if aged 1 month - 1 year
  
- 2) Which of the following are some signs of serious breathing abnormalities
  - a) gasping
  - b) grunting
  
- 3) A soft inspiratory stridor cannot be due to severe upper airway obstruction
  - a) true
  - b) false
  
- 4) Which of the following are true statements: in respiratory failure increased effort of breathing may not occur
  - a) when exhausted
  - b) when central respiratory depression
  - c) in neuromuscular disease

**ANSWERS:**

1. b 2. ab 3. b (in the most severe obstruction stridor may be difficult to hear) 4. abc

**SECTION 8 QUIZ 3**

1. When assessing the patient for circulatory failure the following statements are true
  - a. bradycardia is more serious than tachycardia
  - b. capillary refill time is not a specific marker of shock and may be increased by a cold environment or during the development of fever
  - c. hypotension is an early sign of circulatory failure in children and in pregnancy
  
2. The following are normal values for systolic blood pressure
  - a.  $80 + (4 \times \text{age in years})$
  - b. 90 - 120mm Hg in pregnancy
  - c. 70 - 90 mm Hg in infancy
  
3. When measuring BP, the cuff should cover more than 80% of the length of the upper arm and the bladder more than one third of the arm's circumference
  - a. true
  - b. false

**ANSWERS**

1. ab 2. bc 3. b

**SECTION 8 QUIZ 4**

- 1) Which of the following are values for urine output which might indicate under perfusion of the kidneys as a result of circulatory failure?
- a) < 4 ml/kg/hour in infancy
  - b) < 1 ml/kg/hour in a child
  - c) < 30 ml/hour in pregnancy
- 2) Which of the following are signs of cardiac failure?
- a) Raised JVP
  - b) enlarged liver
  - c) crepitations in the upper zones of the lungs
  - d) gallop rhythm

**ANSWERS:**

1. bc 2. abd

**SECTION 8 QUIZ 5**

- 1) Fill in the following table with respect to the assessment of conscious levels
- a) A-----
  - b) V-----
  - c) P-----
  - d) U-----
- 2) Raised intracranial pressure usually causes
- a) both hyperventilation and slow sighing respiration
  - b) apnoea
  - c) tachycardia
  - d) hypertension

**ANSWERS:**

1. a) Alert b) responding to Voice c) responding to Pain d) Unresponsive

2. abd