*Fahims's*

# AIDS TO PAEDIATRICS

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# Paediatrics

# FLUID CALCULATIONS

| Age | (ml/Kg/Day) |
|---|---|
| $D_1$ | 60 |
| $D_2$ | 80 |
| $D_3$ | 100 |
| $D_4$ | 120 |
| $D_5$ | 140 |
| $D_{6-7}$ | 150 |
| Upto 9 months | 150-160 |
| upto 12 months | 120-150 |
| upto 2 yrs | 100-120 |
| upto 4 yrs | 90-100 |
| upto 8 yrs | 70-90 |
| upto 12 yrs | 60-70 |

+20 ml if Preterm

We can write the order as follows:

Inf. 10% DA (.....ml)
IV $\frac{ml}{25}$@µd/min stat & daily

## According to Weight

100ml/Kg for 1st 10Kg+
50ml/Kg for next 10Kg+
20ml/Kg for rest

## Types of Fluid

| | |
|---|---|
| $D_{1-2}$ | 10% DA |
| $D_3$-1 year | 5%-10% DA in 0.225% NS |
| 1-10 yrs | 5% dextrose in 0.45% NS e.g. Libott-S Jr |
| >10 yrs | 5-10% DA in 0.9% NaCl (DNS) |

## If we plan to give the fluid daily:

10 drops/min = 1 Litre/ day
1 µdrops/min = 25 ml/day





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# BLOOD AND BLOOD PRODUCT TRANSFUSION

We need to remember that blood products are immunologically active. So, when a transfusion is made it may be complicated by acute, chronic immune reactions, or transmission of infection. So, blood or blood product transfusion is avoided if possible.

**Whole blood:** 20ml/Kg = 1 unit, over 2-4 hours
in cases of
- acute blood loss (loss of >25% blood volume, >15ml/Kg considering total blood volume of 60ml/dL)
- neonatal sepsis
- DIC

**Packed RBC:** 10-15ml/Kg (usually 10ml/Kg). If >15ml/Kg is required, use separate aliquots should be used.

**Indication and level:**

**In Neonates:**

Baby on mechanical ventilation – Hb <13g/dL or PCV <40%
Baby on CPAP: Hb <11g/dL or PCV <35%
Baby on supplemental oxygen (>21%): Hb <8g/dL or PCV <25%
Post-surgical state, poor weight gain, unexplained persistent tachycardia – Hb <10g/dL or PCV <30%
Stable: Hb <7g/dL or PCV <20%

**In infants and young children:**

Perioperatively- maintain Hb ≥7g/dL
Iron deficiency anemia – only if there is impending heart failure. And must be given very slowly.

**Expected rise:** for 1 unit of pRBC with 70% Hct- 3gm/dL (Neonatology Protocol, BSMMU)
In <50Kg patients: 10-15ml/Kg RBCs will increase Hb levels between 2 and 3gm/dL.

**Fresh Frozen Plasma:** Frozen within 18 hours of collection. It contains albumin, immunoglobulins and clotting factors.

**Dose:** 10-20ml (15ml/Kg). Larger volume is preferred to avoid repeated exposure.

**Type:** Same ABO group of recipients or of AB blood group (plasma contain neither anti-A nor anti B antibody).

**Indication:**

- Vitamin K deficiency bleeding (Hemorrhagic Disease of Newborn – HDN)
- DIC
- Inherited clotting factor deficiency (Hemophilia, vWD)

- Before performing invasive procedure in presence of coagulopathy

In patient <50Kg, 10-20ml FFP should increase most coagulation factors by 15-20% (Philips 6e, p705)

**Platelet concentrate:**

Thrombocytopenia <150,000/cmm; severe thrombocytopenia <50,000/cmm

**Neonate:**

- Count <30,000/cmm – transfuse all neonates
- Count 30000 to 50000/cmm - consider transfusion in
- Clinically unstable
  - Concurrent coagulopathy
  - Newborn <1000gm and <1 week of age
  - Platelet count falling and likely to fall below 30000.
  - Previous major bleeding (IVH grade 3-4)
  - Requiring surgery or exchange transfusion
- Count >50,000 to 99,000/cmm: transfuse only if there is active bleeding.

**Children:**

- ITP: No treatment is needed until platelet count is less than 20000/cmm. Platelet is transfused only if there is major bleeding.
- Leukemia
- Aplastic anemia

**Type:** ABO identical or compatible

**Dose:** 10-20ml/Kg. Predicted rise is about 20,000 to 60,000/cmm

5-10ml/Kg dose should increase platelet count by 50,000-100,000/cmm (Philips 6e, p706)





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# ACUTE WATERY DIARRHEA

Remember: Management of SAM with Diarrhoea is different. Please see Diarrhoea management in SAM in here.

**With some dehydration:**

Ideally should be treated in ORT with ORS with **75ml/Kg in 4 hours** & then reassessed. But we use modified treatment protocol as follows:

℞ on admission on *date* at *time*

1. Diet: Normal (BF+CF) [**Feeding advice:** Fat and food/drinks with simple sugar to be avoided]
2. Inf. Cholera Saline 75ml/kg in 8-10 hours.
   IV @ $\frac{75\times wt}{hours}$ µd/min stat
3. Inj. Ciprofloxacin (200mg/100ml)/Ciprocin/Neofloxin/Aprocin *[10mg/Kg/dose BD]*
   5×wt ml IV stat & 12 hourly
   *OR*
   Susp. Azithromycin (200mg/5ml)/Zimax/Zithrox *[10mg/Kg/dose once daily]*
   10mg/Kg PO stat & once daily *[Nelson 21ed: 12mg/Kg/dose on $D_1$, 6mg/Kg/dose $D_2$, $D_3$]*
   OR
   Susp. Nitazoxanide (100mg/5ml)/Zox/Zoana
   $Year_{1\text{-}3}$: 1 tsf PO BD for 3 days;
   $Year_{4\text{-}11}$: 2 tsf PO BD for 3 days
4. Syp. Zinc (10mg/5ml)/Zesup/Nid/Xinc/Pep-e *[2mg/Kg/day]*
   < 6 months- 10mg/day; > 6 months- 20mg/day
   ½ tsf PO BD; 1 tsf PO BD
5. ORS
   < 2 years- 50-100ml
   > 2 years- 100-200ml after each purging

If **vomiting** present:

6. Syp. Ondansetron (4mg/5ml) /Emistate/Anset/Ofran
   0.2mg/Kg (0.25ml/Kg) PO 8 hourly
   Or,
   Inj. Ondansetron (8mg/4ml)
   0.1ml/Kg IV stat & 8 hourly

[or, single sublingual oral dissolvable tablet, 4mg = 4-11Y & 8mg = >11Y. Zofra ODT, Onaseron ODT]

If there is **abdominal distension**:

7. Syp. Potassium (7.6 mmol/5 ml)/KT/Electro K [2-4 mmol/Kg/D]

If around 5Kg, 1/2 tsf PO BD; If around 10Kg, 1 tsf PO BD

If there is **abdominal pain:**

Tiemonium methylsulphate Tab. 50mg, Syp. 10mg/5ml, Inj. 5mg/2ml [6mg/Kg/day TDS]
Algin/Norvis/Onium/Viset/Visral
Syp. Algin (10mg/5ml)
2 tsf PO TDS; or,

Inj. Algin (5mg/2ml)
1 amp. IV stat TDS

If there is **Perianal excoriation:**

De Rash Cream (Zinc oxide 40%)
Apply locally TDS over perianal region

**With severe dehydration**

Inf. Cholera Saline 100ml/Kg

| Age of the Child | First, give 30ml/Kg over | Then, 70ml/Kg over |
|---|---|---|
| < 12 months | 1 hour | 5 hours |
| ≥ 12 months | ½ hour | 2½ hours |

Example: For a 10Kg boy, aged > 1 yr;

Inf. Cholera saline 300ml
IV@ $\frac{300}{0.5\times4}$ =150 drops/min (@running) over 30 min,
Then 700ml, IV @ 70drops/min over 2½ hours

Rest: same.





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# Notes

## Suspected *E. histolytica* infection:

**Feature:** 90% asymptomatic. acute dysentery, nondysenteric diarrheas, chronic amoemic colitis.

**Treatment:**

**Asymptomatic:**
**Diloxanide Furoate** 20mg/Kg/day in 3 divided doses for 10day. [Tab. Diloxide 500mg, Susp. Dilanide 250mg/5ml]

**Intestinal amebiasis or hepatic abscess:**
**Metronidazole** 30-40mg/Kg/Day in 3 divided dose for 10 days
**Tinidazole** 50-60mg/Kg, single dose for 3 days [Tab. T-zol 500mg, Tab. T-zol 1gm, Tab. Tinizol DS 1gm]
Followed by:
Diloxanide Furoate 20mg/Kg/day in 3 divided doses for 10day. [Tab. Diloxide 500mg, Susp. Dilanide 250mg/5ml]

## Suspected *Giardia intestinalis* infection:

**Feature:**
**Metronidazole** 30-40mg/Kg/Day in 3 divided dose for 10 days
**Tinidazole** 50-60mg/Kg, single dose for 3 days [Tab. T-zol 500mg, Tab. T-zol 1gm, Tab. Tinizol DS 1gm]
**Susp. Nitazoxanide** (100mg/5ml)/Zox; Tab. Nitazoxanide 500mg
Year$_{1-3}$: 1 tsf (=100mg) PO BD for 3 days.
Year$_{4-11}$: 2 tsf(=200mg) PO BD for 3 days

**Remember:** Antibiotic therapy in diarrhoea caused by **enterohemorrhagic E Coli, Shigella Dysenteriae type 1 (O57:H7), salmonella, campylobacter** may lead to **HUS (Hemolytic Uremic Syndrome)** characterized by microangiopathic hemolytic anemia, thrombocytopenia and acute renal insufficiency- one of the common cause of AKI in young children in Bangladesh. (MR Khan 5th p.209).

Here, onset usually preceeded by gastroenteritis, or RTI (less common). After 5-10 days, sudden onset of severe pallor, weakness nad oliguria occurs. Signs: severe anemia, dehydration, edema, petechiae, hepatosplenomegaly, and hypertension.

**Acute Gastroenteritis (AGE):** diarrhoea + vomiting ± abdominal pain ± fever

**Dysentery:** Frequent small stools containing visible blood, accompanied by fever, tenesmus and abdominal pain.
**Prolonged Diarrhea**: 7-13 days
**Persistent diarrhea:** lasting 14 days or more
**Bloody diarrhea:** large volume bloody stool with less systemic illness

**Features of dehydration with Na+ deficit/excess**

| **Parameters** | **Isonatremic Dehydration** (proportionate loss of water and sodium) | **Hyponatremic dehydration** (loss of sodium in excess of water) | **Hypernatremic dehydration** (loss of water in excess of sodium) |
|---|---|---|---|
| ECF vol | Markedly Decreased | Severely decreased | Decreased |
| ICF vol | Maintained | Increased | Decreased |
| **Physical signs** | | | |
| Skin color | Gray | Gray | Gray |
| Temp. | Cold | Cold | Cold or hot |
| Turgor | Poor | Very poor | Fair |
| Feel | Dry | Clammy | Thickened, doughy |
| Mucous membrane | Dry | Slightly moist | Parched |
| Eyeball | Sunken soft | Sunken and soft | Sunken |
| Fontanel | Sunken | Sunken | Sunken |
| Psyche | Lethargic | Coma | Hyperirritable |
| Pulse | Rapid | Rapid | Moderately rapid |
| BP | Low | Very low | Moderately low |





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# HYPONATREMIA ($NA^+$ <135 MMOL/L)

℞ on admission on *date* at *time*

**Fluid management of hyponatremia**

**In asymptomatic or chronic hyponatremia:** Do not correction more than 0.5-1mmol/L/hr or 10-12mmol/L per day.

- Encourage ORS intake
- Cholera saline or normal saline if needed e.g., patient with diarrhoea.

Sodium level in different fluids
5% DNS ----------154mmol/L
Normal saline ----------154mmol/L
Libott-S Junior----------77mmol/L
Electrodex-10----------42mmol/L
0.3% Normal saline -----51mmol/L
Hartman's ----------131mmol/L
Cholera Saline ----------134mmol/L

**In acute symptomatic (severly lethargic or having convulsion or severe hyponatremia/<120mmol/L):**

**Formula** = body weight (Kg) × 0.6 × (135[desired $Na^+$ level]-Serum $Na^+$[mmol/L]) + maintenance (2-3mmol/Kg/day) for 2 days

**Step 1:** Calculate $Na^+$ deficit = body weight (Kg) × 0.6 × (135[desired $Na^+$ level]-Serum $Na^+$[mmol/L])

For example,
If weight = 8 Kg, $Na^+$ = 115mmol/L; age = 1 year;
$Na^+$ deficit = 8 × 0.6 × (135-115) = 96mmol

**Step 2:** Add maintenance $Na^+$ requirement (2-3mmol/Kg/day for 2 days)

96mmol + 2×8×2 (= 32mmol)= 128mmol (to be given over 2 days) = 64mmol/day

**Step 3:** Calculate total fluid requirement over 2 days

8 × 100ml = 800ml/day

**Step 4:** Select IV fluid type based on calculated $Na^+$ concentration

64mmol in 800ml = $\frac{64}{0.8}$ = 80mmol/L;

We should choose Inf. Libott-S Junior as it has 77mmol/L $Na^+$

**Step 5:** Calculate rate of IV infusion

Order:

Infusion Libott S Junior (800ml)

IV @ 32μdrops/min stat & daily for 2 days (upto xx/xx/20xx)

# HYPERNATREMIA ($NA^+$ >145 MMOL/L)

**Immediate Management:**

- Restore **intravascular volume** (IVV) &
- Send for **investigations** (s. electrolyte, s. calcium, CBC, S. creatinine)
- **Inf. Normal Saline 20ml/Kg**- stat over 20 minutes, repeat if needed until IVV restored. (↑BP, ↓RR, ↓HR, ↓CRT, better urine output, more alert)

**Routine Management:**

**Total water deficit** =body wt ×0.6× $\frac{(current\ Na-145)}{145}$ , divide it by number of days for correction.

**Number of days** = $\frac{current\ sodium\ level-145}{12}$ days.

**Choice of fluid:** Inf. D5+ $\frac{1}{2}$NS. (**Libott-S Junior**)

**Inf. D5 + $\frac{1}{4}$ NS**, if insensible loss is high (fever, tachypnea) **(Baby Saline)**

Administer the fluid at constant rate.

**Amount of IV fluid:**

**D1:** Maintenance + Ongoing loss + (deficit – bolus given).

**D2 & onwards:** Maintenance + Ongoing loss + Deficit

***If possible, correct ongoing loss orally, & omit it from IVF amount.***

Add KCl, 20mEq/L in IV fluid (1 ml = 2 mEq)

If urine output and serum creatinine levels are normal

There may be **hypocalcaemia** and **hyperglycemia**, but usually does not require treatment

**Monitor:**

S. electrolyte: At least daily.

Vital signs: Pulse, blood pressure

Intake output: fluid balance, urine output

Physical examination: weight, clinical signs of depletion or overload

## Note

**Acute hyponatremia**

**Clinical features (most commonly present with dehydration)**

Most of the body tissue somehow copes with the cell swelling but the brain cells are badly affected leading to cerebral edema. Therefore, symptoms are primarily neurologic and their severity is dependent upon the rapidity of onset and decrease in sodium concentration.

**Initially** (Na+ decrease starting), asymptomatic or complain nausea and malaise

**Later**, headache, lethargy, confusion and obtundation (less than full alertness). Cramps and muscle weakness may ocasionally be seen.

**Later** (usually when Na+ <120mmol/L)- hyperexcitability, agitation, muscle twitching, irritability, decreased reflexes, seizures and coma. Sometimes, hypothermia and Cheyne-Stokes respiration.

(**Cheyne–Stokes** respiration is an abnormal pattern of breathing characterized by progressively deeper, and sometimes faster, breathing followed by a gradual decrease that results in a temporary stop in breathing called an apnea. The pattern repeats, with each cycle usually taking 30 seconds to 2 minutes.)

**Chronic hypernatremia:** May remain asymptomatic even at serum $Na^+$ <110mmol/L. Symptoms may be lethargy, confusion, stupor and coma.





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# HYPOKALEMIA ($K^+$ <3.5 MMOL/L) (1)

Both hypokalemia and hyperkalemia affect heart rhythm. ECG can help determining the effects. **Hypokalemia ECG change:** T wave depression> Flat T wave > ST depresion > U wave > Ventricular fibrillation

**Hyperkalemia ECG change:** Peaked T wave < ST depression < Wide QRS complex < Absent P wave and ventricular fibrillation

K+ deficit = (Desired -existing K+ levels)×body weight×0.3

Easy way to correct hypokalemia:

| Serum K+ level (mmol/L) | Amount to be added in 100ml IV fluid (Inj. KCl) |
|---|---|
| 3.5-4.5 | 1 ml = 2 mmol |
| 3.0-3.5 | 1.5 ml = 3 mmol |
| 2.5-3.0 | 2 ml = 4 mmol |
| 2.0-2.5 | 3 ml = 6 mmol |
| <2.0 | KCl drip 0.5-1mmol/Kg/hour under close cardiac monitoring |

**Important notes:**

- Oral correction should be continued after acute management for 5-7 days
- IV correction is avoided if possible
- IV correction can not be given if there is renal failure
- Concomitant hypcalcemia and acidosis management must be delayed untill hypokalemia correction is complete

**Common causes of hypokalemia**:

- PEM
- Diarrhoea, nasogastric loss, persistent vomiting
- Long term use of diuretics (thiazides), laxatives, steroids, digoxin, amphotericin B, mineralocorticoids
- Intrinsic renal disease e.g. Bartter syndrome
- Cushing syndrome, DKA





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# HYPERKALEMIA ($K^+$ >5.5 MMOL/L)

**Mild hyperkalemia (>5.5-6mmol/L):**

Restrict extra potassium intake through food/fruit/fluid

**Moderate to severe hyperkalemia (>6mmol/L)**

| | |
|---|---|
| **Inj. Calcium gluconate (10%)**<br>0.5-1ml/Kg IV slowly over 5-10 minutes | For myocardial cell membrane stabilization |
| **Insulin (short acting)/ Actrapid/Maxsulin R**<br>0.1U/Kg IV in 10% DA@5ml/Kg over 30minutes | Redistribution of ECF K+ in to ICF |
| **Sulbutamol nebulization** (1ml resp. soln. = 5mg)/Windel<br>Dose: 2.5mg in <25Kg, 5mg in >25Kg mixed with normal saline (3ml) stat | |
| **Inj. Sodium Bicarbonate(7.5%)** 1ml=0.9mmol=0.9mEq<br>1-2mmol/Kg IV over 10-15 minutes | |
| **Sodium polystyrene sulfonate resin** (Kayexalate)<br>Give orally in 1-18month olds, rectally in neonate<br>125-250mg/Kg (max. 15g) in 15-30ml 70% sorbitol, for 3-4 days<br>Rectal: 125-250mg/Kg, dilute each gram resin in 5-10ml methylecellulose or water, repeated as necessary, every 6-8 hourly | Enhance elinination through gut |
| **Renal replacement therapy** in refractory cases<br>▪ Peritoneal dialysis<br>▪ Haemodialysis | Other ways |

Common causes of hyperkalemia:

- Haemolysis, rhabdomyolysis
- Renal failure e.g. acute or chronic
- Mineralocorticoid deficiency, Addison's disease





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# PNEUMONIA

**Nebulized Salbutamol:**
0.15-0.3mg/Kg/Dose;
1 nebule(3ml)= 2.5mg;
1 ml respirator solution= 5mg

℞ on admission on *date* at *time*

1. NPO till F/O if RR ↑↑.
2. $O_2$ inhalation stat & SOS.
3. Nebulization with Windel Plus/Sulprex (0.04% IB+ 0.12% Salb) - stat & 6 hourly.
4. Appropriate infusion if on NPO order.

5. **Inj. Ceftazidime/Tazid** (250mg/5ml) *[100mg/Kg/D 12 hourly.]*
   1ml/Kg IV stat & 12 hourly
   +
   **Inj. Gentamicin/Gentin (20mg/2ml)** *[2.5mg/Kg 12 hourly]*
   0.25ml/Kg IV stat & 12 hourly

   or (if age >3 mo)
   **Inj. Ceftriaxone/ Ceftron (1gm/10ml)** *[50-100mg/Kg/D daily]*
   0.5-1ml/Kg IV stat & daily
6. **Syp. Paracetamol /Ace/Napa/Renova( 120mg/5ml )**
   1 tsf/8 Kg PO 6 hourly.
7. **Syp. Zinc/Zesup/Pep-2/Nid/Xinc**10mg/5ml
   1 tsf PO 2 hourly for 7 days
8. **Solo/Norsol Nasal Drop**- 3-4 drops in each nostril 6 hourly.

   If there is lesion in CXR, add:
   **Inj. Flucloxacillin/Fluclox/Phylopen (500mg/5ml )** *[25mg/Kg 6 hourly]*
   0.25ml/Kg IV stat & 6 hourly

   If nebulization is not possible, add:
   **Syp. Brodil 2mg/5ml/ Sultolin** (Square), **Bronkolax** (Beximco) *[0.1mg/Kg 8 hourly]*
   $\frac{0.25ml \times wt}{5}$ tsf PO 8 hourly

[Note: Nebulize child if wheeze present and tachycardia, fever absent. Remember main treatment of pneumonia is antibiotic]

**Recurrent pneumonia**- ≥2 episodes in a single year or ≥ 3 episode ever, with radiologic clearing between occurrences.

DDs: TB, Foreign body aspiration, GERD, Ciliary dysfunction (primary ciliary dyskinesia, Kartagener Syndrome), Cystic fibrosis, sickle cell disease.





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# BRONCHIOLITIS

In Pediatrics, we give treatment of pneumonia to all babies coming with fever, cough, and respiratory distress. We perform CBC, CXR. If these indicates bronchiolitis, we modify treatment (ensure oxygen, start feeding if possible and discharge early).

If we are confident that baby has bronchiolitis, we give following treatment.

℞ on admission on *date* at *time*

1. NPO till F/O if RR ↑↑.
2. NP and OP suction - SOS
3. Humidified $O_2$ inhalation stat & SOS. Target saturation >90%
4. Nebulization with Windel Plus/Sulprex (0.04% IB+ 0.12% Salb) stat & 6 hourly.

   Alternative drugs: 3% NaCl/Normal saline/Salbutamol/Budesonide.
5. Inf. 10% BS or Inf. Libott-S Jnr if on NPO order.
6. Inj. Ceftriaxone (1gm/10ml) *[50-100mg/Kg/day 12 hourly]*
   0.5-1ml/Kg IV stat & daily

7. Inj. Dexa 5mg/1ml (severe cases): *[0.08-0.3mg/Kg/day 6-12 hourly]*
   (0.016-0.6)ml/Kg IV stat & 6-12 hourly

8. Supportive treatment

a. Propped up position
b. Normal Feeding
c. Cleaning nose with Normal Saline drop (3-4 drops in each nostril 6 hourly)
d. Bathing with lukewarm water.

[Remember main management of bronchiolitis is supportive (humidified oxygen, maintenance of hydration, maintenance of nutrition etc.)
Highest risk of further respiratory compromise is in 1st 72h after onset of cough & dyspnea.]

**Note**

Corticosteroid (oral/inhaled), albuterol, other bronchodilator, racemic epinephrine, hypertonic saline etc. are largely proven to be ineffective.

**Ribavirin**, antiviral agent targeting RSV, not currently recommended because it is costly, difficult to administer and has minimal effect on the disease.

**Palivizumab** – decreased risk of hospitalization with RSV infection. But it is costly and cannot prevent bronchiolitis caused by other viruses. May be considered in patient suffering from neuromuscular disease and immunosuppressed person.

Fifty percent (50%) children never wheeze in their childhood. Another 50% have 3 patterns of wheezing:

- **Transient early wheezing** (20%) – born with lower lung function which improves gradually resulting in resolution by the age of 3 years.
- **Persistent wheezing** (14%) – declining lung function before and beyond age of 3 years
- **Late onset wheezing** (15%) – wheezing episodes begins after 3 years of age

**Prevention of bronchiolitis:** Meticulous hand hygiene.

# HEART FAILURE

Cardinal features of heartfailure in children: tachycardia, tachypnea, cardiomegaly and hepatomegaly.

1. Propped up position
2. Bed rest and restriction of activities
3. Salt restriction
4. Maintenance of body temperature
5. NPO till F/O if RR ↑↑. If distress is mild give breast feeding or NG tube feeding
6. Humidified $O_2$ inhalation stat & SOS. Target saturation >90%
7. Inf. 10% BS or Inf. Libott-S Jnr if on NPO order. (fluid restriction of 30%)
8. Inj. Ceftriaxone (1gm/10ml) *[50-100mg/Kg/day 12 hourly]*
   0.5-1ml/Kg IV stat & daily
9. Inj. Lasix (20mg/2ml)
   0.1× wt ml IV stat & daily at morning
10. Tab. Captopril/Cardopril 25mg/Acetor(Drug Int)/Captril(Alco) [0.25-6mg/Kg/day in 2-4 dose]
    **0+¼+¼** (starting dose if wt is 50K, then titrate)
11. Digoxin (Inj. Digoxin 0.25mg/ml 2ml ampule, Tab. Digoxin 0.25mg, Syp. Digoxin 0.25mg/5ml)

    [For a 5 Kg child, TDD (IV)= 0.03×5= 0.15mg = 0.15÷0.25= 0.6ml = 60 U (in insulin syringe 1ml = 100U). We can **write order** as follows-
    Inj. Digoxin (0.25mg/ml)
    30U IV stat, 8 hours later
    15U IV stat, 8 hours later, then
    15U IV BD]

12. Please maintain pulse-digoxin chart (date, time, pulse, signature)

## Digitalization(2)

**Routine digitalization** PO within 24 hour. Calculate total digitalization dose (TDD) 0.04mg×wt in Kg. Give ½ the dose stat. ¼ **of TDD** 8 hours later, ¼ of TDD of the dose another 8 hours later. Continue ¼ of TDD 12 hourly, starting from 12 hours after full digitalization.

**Rapid digitalization:** Intravenous. For infants and childrens with frank heart failures. Dose: 0.03mg/Kg. Perform ECG, (before loading and maintenance dose to get the baseline rhythm and PR interval), S. electrolytes, and S. calcium level.

**Slow digitalization:** For chronic congestive HF who does not want to be hospitalized. Start and continue ¼ of TDD 12 hourly, starting from 12 hours after full digitalization.

**Digoxin toxicity:**

**Extracardiac manifestations:**

- Anorexia, nausea, vomiting, diarrhoea
- Altered color vision
  - ✓ chromatopsia – green/yellow
  - ✓ Blurred vision – photopsia

**Cardiac manifestations:**

- Bradycardia: the following rates are often taken as a guide to digoxin toxicity:
  - ✓ Infants: below 100/min
  - ✓ Young infants: below 80/min
  - ✓ Older children: below 60/min
- Dysrhythmia: Multiple ventricular ectopics, ventricular bigeminy, paroxysmal atrial tachycardia, ventricular tachycardia, ventricular fibrillation

**ECG changes with digoxin toxicity:**

- Prolongation of PR interval
- Profound sinus bradycardia or sinuatrial block
- Supraventricular arrhythmias
- Ventricular arrhythmia

**Following potentiates digitalis toxicity:**

- ✓ Hypokalemia
- ✓ Hypomagnesemia
- ✓ Hypercalcemia
- ✓ Myocarditis and Prematurity

**Treatment of Digoxin Toxicity:**

- Stop digoxin, start continuous ECG monitoring
- Check urea, electrolytes, and plasma digoxin level
- Correct hypokalemia and/or dehydration
- Correct bradycardia by using atropine and/or pacing
- Treat atrial tachycardia with beta-blocker
- Treat ventricular tachycardia with lignocaine
- Use antidote digoxin immune fab.

# BRONCHIAL ASTHMA (1–3)

Diagnose as: **mild/moderate/severe** acute exacerbation of **intermittent/mild persistent/moderate persistent/severe persistent asthma**

| | Daytime Symptoms | Nighttime Symptoms | $FEV_1$ or PEF |
|---|---|---|---|
| Intermittent | Asymptomatic.<br>≤ 2 days/week<br>&<br>Normal PEF between attacks | ≤ 2 times in a month | >80% Predicted<br>Variability <20% |
| Mild Persistent | > 2 days in a week, but not daily<br>< 2 times in a day | > 2 times in a month, but not weekly | ≥80% Predicted<br>Variability <20 - 30% |
| Moderate Persistent | Daily attacks<br>Affect Activity | > 1 attack/ week, but not nightly | >60 - <80% Predicted<br>Variability >30% |
| Severe Persistent | Throughout the day | Often every night | ≤60% Predicted<br>Variability >30% |

**Classification of acute exacerbation of asthma:**

| | C/F | Mild<br>Go To Rx | Moderate<br>Go To Rx | Severe<br>Go To Rx | Life threatening |
|---|---|---|---|---|---|
| Symptoms | Breathless during | Walking | Talking | Resting | Mute |
| | Talks in- | sentences | Phrases | Words | Silent |
| | Consciousness | Alert | Agitated | Agitated | Drowsy or confused |
| Signs | Body position | Can lie down | Prefers sitting | Sits upright | Unable to recline |
| | Resp. Rate | <25/min | 25-30/min | >30/min | >30/min |
| | Accessory muscle use | No | Yes | Prominent | Paradoxical |
| | Wheeze | + | ++ | +++/silent | absent |

| | | | | | |
|---|---|---|---|---|---|
| | Pulse Rate | <100/min | 100-120/min | >120/min | Bradycardia |
| | Pulsus paradoxus | Absent | Absent | Present | Absence: suggests resp. Muscle fatigue |
| Functional assessment | PEF/FEV1 predicted/personal best | ≥ 70% | 40-69% | <40% | <25% |
| | $PaO_2$ (on air, mmHg) | Normal | ≥ 60 | <60; possible cyanosis | <60; possible cyanosis |
| | $PCO_2$(mmHg) | <42 | <42 | ≥42 | ≥42 |
| | $SpO_2$(on air) | >95% | 90-95% | <90% | <90% |

**Identify the step for the new case:**

| Criteria | Score | |
|---|---|---|
| | Yes | No |
| Do you have dyspnea every day? | 1 | 0 |
| Do you have nocturnal attack of dyspnea more than two times per month? | 1 | 0 |
| Have you suffered from dyspnea, which were severe enough to necessitate steroid tablets, nebulize therapy and aminophylline injection | 1 | 0 |
| Do you have persistent dyspnea for last six months or more or are you taking steroid tablets for one year or more | 3 | 0 |
| Is patient's baseline (during asymptomatic stage) PEFR<60% of predicted value? (not applicable for <5ys) | 1 | 0 |

| **Score** | **Corresponding step** |
|---|---|
| Score 0 | Step 1 |
| Score 1 | Step 2 |
| Score 2 | Step 3 |
| Score 3-4 | Step 4 |





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| Score 5-7 | Step 5 |
|---|---|

## Mild attack (can be treated at home)

1. Reassurance
2. **Salbutamol = Windel plus/ Sulprex** (salbutamol+ ipratropium bromide)

   Metered Dose Inhaler (MDI) 100µg/puff or

   Nebulize with respirator solution 0.03ml/Kg + 3 ml Normal saline – 6 hourly/

   Nebulize with nebule (1 nebule = 2.5mg) <5yr 0.5ml/dose >5yr 1ml/dose

3. **Syp. Levosalbutamol/ Brizy/ Brodil Levo/ Levostar (1mg/5ml)**

   6-11yrs, 1 tst TDS;

   >12 yrs, 1-2 tsf TDS

**Or, orally at home, give-**

## Moderate attack (at home)

1. Reassurance
2. **Salbutamol = Windel plus/ Sulprex** (salbutamol+ ipratropium bromide)

3. **Syp. Levosalbutamol/ Brizy/ Brodil Levo/ Levostar (1mg/5ml)**

   6-11yrs, 1 tst TDS;

   >12 yrs, 1-2 tsf TDS

   Metered Dose Inhaler (MDI) 100µg/puff or

   Nebulize with respirator solution 0.03ml/Kg + 3 ml Normal saline – 6 hourly/
   Nebulize with nebule (1 nebule = 2.5mg) <5yr 0.5ml/dose >5yr 1ml/dose

**Or, orally at home, give-**

4. Syp. Prednisolone /Cortan/ Precodil/ Deltasone (5mg/5ml)
   1-2mg/Kg/day PO TDS---------- 5 days

# Severe Acute Asthma

℞ on admission on *date* at *time*

1. **NPO till F/O if unable to feed & allow feeding as soon as possible**
2. **Nebulized sulbutamol/Windel/Sultolin**
   0.03-0.06ml/Kg+ 3 ml normal saline every 20 min for 3 times or continuously
   *[0.15-0.3mg/Kg/dose]*
3. **Propped Up Position.**
4. **$O_2$ inhalation 4-6 L/min stat and continue**
5. **Inf. Libott S junior (....ml)**
   IV @$\frac{ml}{25}$µd/min stat & daily
6. **Inj. Ceftriaxone (1gm/10ml)**
   0.5-1ml/kg IV stat & once daily
7. **Inj. Hydrocortisone/Cotson (100mg/2ml)** *[3-4mg/kg 4-6 hourly]*
   0.1ml/Kg IV 6 hourly
   or
   **Syp. Prednisolone/Precodil (5mg/5ml) or (15mg/5ml)/Cortan/Deltasone** *[2mg/Kg/day]*
   $\frac{0.04\times wt}{5ml}$ tsf PO in 2-3 divided dose

   [Use oral tablet if possible, **tab. cortan/pred/deltason** 10mg/20mg, single morning dose, after meal, for 5-7 days as rescue therapy]
8. **Inj. Omeprazole (40mg/10ml)**
   0.2ml/Kg IV stat & once daily

If no improvement:
Add **Ipratropium bromide** (250mcg/ml respirator solution) i.e. use Windel Plus/Sulprex

If no improvement:
Add nebulized **Budesonide** (Budicort Nebuliser Suspension 0.5 0.5mg/2ml) = RESPULES

**Order:**
Nebulise with Budicort 0.5 (1-2ml + 2ml normal saline)- stat & 12 hourly

If no improvement:
Add Inj. **Aminophylline** (125mg/5ml)

In Neonate, (for apnea of prematurity or bronchospasm), loading dose: 6mg/Kg (0.24ml/Kg); maintenance dose: 2.5-3mg/Kg/dose (0.1ml/Kg/dose) 12 hourly

**Order:**
Inj. Filin (125mg/5ml)
0.24ml/Kg IV stat & 0.1ml/Kg IV 12 hourly, or

Inj. Filin (125mg/5ml)
0.5ml in each 100 IV fluid

If no improvement-
Nebulization with **Adrenaline** (1:1000), $MgSO_4$

**Order**:
Nebulize with inj. Adrenalin (1:1000) 1ml + 2 ml normal saline – stat & 12 hourly

In refractory cases: Mechanical ventilation & ICU support.

# STATUS EPILEPTICUS(4)

SE is defined as continuous seizure activity or recurrent seizure activity without regaining consciousness lasting >5 mins.

**4 SEQUENTIAL STEPS:**

A. Maintenance of airway, breathing and circulation (ABC)
B. Control of convulsion

Inj. Diazepam 10mg (0.5mg/Kg) - PR stat (Inj. Sedil 10mg/2ml ampule)

↓

Repeat dose PR diazepam after 10 mins.

↓

IV Phenytoin* drip 20mg/Kg (Max 1500mg/24hrs) (Inj. Fosfen 150mg/2ml=100mg Phenytoin ampule) @rate ≤1mg/Kg/min (Max 50mg/min) or over 20 mins

↓

Inj. Phenobarbitone 20mg/Kg (Max 1g)@rate ≤ 1mg/Kg/min (inj. Barbit/Berdinal 200mg/1ml ampule) (max 100mg/min) or over 20 mins.

↓

Inj. Midazolam 0.2mg/Kg boluses (Max. 2mg/Kg) (Inj. Dormicum/Dormitol 15mg/3mol ampule) then 0.05-2mg/Kg/hr

Increase every 15 mins up to 2mg/Kg/hr

**Alternatively:** IV Load with 0.03ml/Kg (0.15mg/Kg) followed by 1µg/Kg/min continuous infusion (see samle calculation below)

↓

Inj. Propofol/Intubation under GA

[**Midazolam: Sample calculation** for a 7Kg baby with status epilepticus

0.03×7=0.21ml (**loading dose**);

7×24×60µgm in 24 hours = 10,080 µgm in 24 hours = 10.08mg in 24 hours = 2.016 ml in 24 hours. (**Maintenance dose**)

If the baby receives, 600ml IV Fluid in 24 hours, then divide by 6 to find out how much to give in each 100 ml fluid (here, 2.016÷6 = ) 0.336ml.

[**Nice to know**, we should calculate total amount of midazolam in 500ml bag i.e., 1.68ml (=0.336×5) in a 500ml bag. So, put 1.68ml in a 500ml IVF bag and label it properly. Then give it to parent/nurse to use it to refill the microburet set.

**Write the order:**

Inj. Dormicum (15mg/3ml)
0.21 ml IV stat & then
0.336ml in each 100ml IV Fluid]

* Give IV glucose, Sodibicarb, anti-edema measures (e.g. corticosteroid & mannitol)

If **acidosis** suspected (deep, rapid respiration, peripheral vasodilation, vascular collapse, shock)

Inj. Sodium bicarbonate 7.5%/Sodib/Sodium Bi Carbonate/ **Tablet = 600mg**

If **cerebral edema** is suspected (nausea, vomiting, loss of consciousness, difficulty speaking etc)

- ✓ Inj. Mannitol/Osmosol 20(20%) (50ml)
  1.25-5ml/Kg IV $\frac{1.25-5\times wt}{0.5}$ d/min over 30min; may be repeated every 4-6 hourly
- ✓ Inj. Frusemide/Lasix (20mg/2ml)
  0.1-0.2ml/Kg IV stat;
  Or
- ✓ Tab. Acetazolamide/Acemox 250mg *[8-30mg/Kg/day]*
  ½ to 2 tablet in divided doses

C. Search the cause
D. Prevention of further convulsion





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# EPILEPSY

**Few important Definitions:**(4)

**Epilepsy** is considered present when two or more unprovoked seizures occur in a time frame of longer than 24 hr.

**Seizure disorder** is a general term that is usually used to include any one of several disorders, including epilepsy, febrile seizures, and, possibly, single seizures and symptomatic seizures secondary to metabolic, infectious, or other etiologies (e.g., hypocalcemia, meningitis).

An **epileptic syndrome** is a disorder that manifests as one or more specific seizure types and has a specific age of onset and a specific prognosis.

An **epileptic encephalopathy** is an epilepsy syndrome in which there is a severe EEG abnormality that is thought to result in cognitive and other impairments.

**Developmental encephalopathy** denotes a disorder in which the underlying etiology (e.g., a specific gene mutation) contributes to a developmental delay independently of the patient's seizure burden and/or EEG abnormalities.

**Minimum work-up of first afebrile seizure**(2)**:**

1. Fasting glucose,
2. Serum calcium
3. Serum magnesium
4. Serum electrolyte
5. CSF study if a infective process or subarachnoid hemorrhage is suspected

Other investigations include:

1. EEG, skull X-ray,
2. Cranial USG if fontanelle open,
3. CT/MRI if intracranial lesion suspected
4. Functional scans: Positron emission tomography (PET), Single photon emission computed tomography (SPECT) etc.

**Management of first seizure**(5):

The **first seizure is not designated epilepsy** and management approach is different. First generalized seizure may not recur in 50-60% cases. Anticonvulsant therapy is therefore not indicated for the first generalized seizure. Whether or not the patient will require AED is usually evident within the first year (80% of the recurrences occur within the first year). Predict high recurrence rate (80%) in symptomatic seizures and abnormal EEG vs 40% risk with normal EEG





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**AED is started after the first episode only if**(5):

1. First episode is status epilepticus
2. First episode is partial seizure – recurrence risk is high (60-80%) and may be symptomatic.
3. Myoclonic seizure, absence seizure

**Acute symptomatic seizures** (or, **provoked seizures** occur secondary to an acute problem affecting brain excitability, such as an electrolyte imbalance) lead to epilepsy in 10-15%. AED therapy dose not reduce risk of chronic epilepsy(4,5).

**Principles of anti-epileptic therapy**(2): In general, the seizure type is the primary determinant of the medications to which the patient is likely to respond, and the epilepsy syndrome determines the prognosis one could expect.

1. Confirm diagnosis of true seizures
2. Establish seizure type and epilepsy syndrome
3. Evaluate need for treatment initiation: first vs. second seizure, widely apart seizure, benign vs malignant epileptic syndromes.
4. Select AED based on seizure type and epilepsy syndromes: considerations are sprectrum, efficacy, adverse reaction, drug interaction, tolerability, compliance, age, sex, weight, lifestyle, psychiatric and other comorbidities.
5. Start monotherapy with chosen first-line drug in low dose, titrate up slowly ("start low, go slow" policy) till seizure control/maximum pharmacologic dose/maximum tolerated dose appears. (Increase slowly over weeks, depending on nature of AED and urgency of situation)
6. If seizure persists:
    a. Switch to another monotherapy (alternative first line or second line) if first drug is ineffective or poorly tolerated.
    b. Add on therapy (combination of different mechanisms of action) with a second drug if the first drug is partly effective and well-tolerated.

**Indications of long-term antiepileptic therapy**(6):

1. If first seizure suggestive of structural brain lesion
2. After two or more unprovoked seizure
3. Known epilepsy with recurrent seizure

**Long-term antiepileptic drugs not indicated**(6):

1. Transient seizure resulting from hypoglycemia or hyponatremia, and hypernatremia and other metabolic causes or intoxications
2. Single unprovoked seizure with normal neurological and EEG findings

**Choice of AED**(5)**:**

**Four conventional 1st line AED**- phenytoin, phenobarbitone, carbamazepine & valproate.

**Sodium valproate:** good choice for generalized, mixed seizures





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S/E: obesity, alopecia, hepatotoxicity (anorexia, vomiting, icterus)

**Phenytoin:** drug of choice for the community.

S/E: ataxia, nystagmus

**Carbamazepine:** choice for partial seizure

**Newer Drugs in Epilepsy:**

**Clobazam:**

Four recognized effects: anxiolytic, sedative, myorelaxant and anticonvulsant.

Used in refractory seizures, myoclonic epilepsy and hypsarrythmia.

First choice add-on drug in refractory epilepsy.

**Follow up:**

Initially after 6 wks and then 3 monthly if seizures are controlled. Check for break through seizures, drug compliance, side effects.

**When to discontinue?**

Usually, 18-24 months seizure free. Earlier in benign centrotemporal epilepsy, acute symptomatic epilepsy due to inflammatory granuloma.

**How to taper?**

-counsel parent about risk of possible relapse after tapering (30%)

- taper over 4-12 wks

- if patient is on multiple drugs, taper 1$^{st}$ drug. Wait for 1 month and then taper the next drug.

**Can we discontinue in all epilepsy?**

No. Some need lifelong therapy e.g. Juvenile myoclonic epilepsy.

**High risk of relapse in:**

1. Seizure onset during infancy
2. Seizure with epileptic syndromes e.g. Juvenile myoclonic epilepsy, Lennox Gastaut Syndrome
3. Severe and difficult to control seizures
4. Seizures due to previous serious CNS insults e.g. head trauma, structural malformations, migration defects
5. Seizure associated with severe neurodevelopmental retardation





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**How should we treat a relapse?**

Treat with same drug to which patient responded. And begin with a low therapeutic range level.

**Can we attempt to taper AED again?**

Yes, but should wait 2-3 years of seizure free period.

**Diagnosis & Choice of drugs**(2,4–6)

| Seizure type | 1st line drugs | 2nd line drugs | Add on drugs |
|---|---|---|---|
| Partial | Ox-carbamazepine<br>Phenytoin | Gabapentine<br>Lamotrigine | Phenobarbitone |
| GTCS | Valproate<br>Topiramate | Carbamazepine<br>Phenytoin | Phenobarbitone |
| Absence | Ethosuximide | Valproic Acid | Clonazepam |
| Myoclonic | Valproate<br>Levitiracetam | Topiramate | Clobazam |

| **Drug (Trade names)** | **Indications** | **Dosing intervals** | **Dose (mg/Kg/day)** |
|---|---|---|---|
| Carbamazepine (Tegretol 100, 200mg, 100mg/5ml Anleptic 100mg/5ml, Anleptic CR 200mg, Epilep 200mg, Epilep CR 200mg, Cabretol) | Simple and complex partial seizure, GTCS | tds | Begin 10mg/Kg/d, increase to 20-30mg/Kg/d |
| Clonazepam (Rivotril 0.5mg, 2mg Denixil 0.25, 0.5, 1mg, 2mg, Epitra 0.5, 1, 2 ) | Absence, myoclonic, infantile spasm, partial, akinetic, Lennox-Gastaut | bd/tds | Children <30mg, begin 0.05mg/Kg/d increase by 0.05mg/kg/wk, maximum 0.2mg/kg/d<br>>30Kg, 1.5mg/Kg/d. Max. 20mg/day |
| Ethosuximide (Serontin 250mg/5ml) | Absence seizure | tds | Begin 20mg/Kg/d and increased to maximum 40mg/Kg/d. |
| Gabapentin (Gabapen 100, 300mg Gabatin 300, Gabastar 100mg, 300mg) | **Adjunctive therapy when seizures are poorly controlled** | tds | Begin 20mg/Kg/d and increased to maximum 50mg/Kg/d |
| Lamotrigine (Lameptil 25, 50mg; Lamicet 50mg Lamitrin 25, 50mg tablet & 2, 5mg dispersible tablet) | **Adjunctive therapy when seizures are poorly controlled,** Complex partial, absence, myoclonic, clonic, tonic-clonic, Lennox-Gastaut | od/bd | 0.15mg/Kg once daily initially, gradually increasing to the maintenance dose of 1-5mg/Kg/day in 1-2 divided doses<br>-given with sodium valproate (1-5mg/Kg/day) |





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| | | | |
|---|---|---|---|
| Nitrazepam<br>Epam/Noctin/Octon 5mg tablet | Absence, myoclonic, infantile spasm | tds | Begin 0.2mg/Kg/d, increase to 1mg/Kg/d |
| Oxcarbamazepine<br>(Susp. Trileptal (300mg/5ml)<br>Tab. Leptal/Oxetol 150mg, 300mg, 600mg, Oxcarb XR 150, 300, 600mg) | Focal seizure (>2 years) | bd/tds | Start 8-10 bd; increase over 2 wks to max to 60mg/kg/day |
| Topiramate<br>(Tab. Etopira 25mg, 50mg Topimax/Topirva/Topmate) | Add-on therapy in refractory partial epilepsy and secondarily generalized seizures<br>Infantile spasm | bd | 3-9, slow titration |
| Levetiracetam<br>(Tab. Citazar 250mg, 500mg<br>Eletam oral soln (500mg/5ml)<br>Tab. Eletam 250mg, 500mg) | Focal onset (age ≥ 1 mo), tonic-clonic (age ≥ 6 years), myoclonic (age 12 ≥ yrs) | bd/tds | 20-60 |
| Vigabatrin<br>(Sabril 500mg, 500mg/sachet) | Infantile spasm, adjunctive therapy when seizures poorly controlled | od/bd | Begin 30mg/Kg/d, increases to 100mg/Kg/d |
| Phenytoin<br>(Susp. Diphedan 30mg/5ml, Tab. Sizatoin100mg<br>Tab. Xentoin 100mg<br>Tab. D-Toin 100mg<br>Inj. Fosfen 150mg/2ml) | GTCS, status epilepticus | bd | 3-9mg/Kg/d, increase by 5-10mg/Kg/Wk, usual dose 30-60mg/Kg/day, tds/qds |
| Phenobarbitone<br>(200mg/ml inj.<br>Tab. Barbit 30mg, 60mg<br>Barbit Elixir 20mg/5ml<br>Epinal/Barbit/Berdinal) | GTCS, status epilepticus | od/bd | Loading dose: 20mg/Kg IV; Maintenance: 3-5mg/Kg/d |
| Piracetam<br>(Susp. Memopil (500mg/5ml), Neurolep, Cetam,) | | tds | 50; decrease to half |





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# MENINGITIS/ENCEPHALITIS/CEREBRAL MALARIA

For patients with Fever+ Unconsciousness+ Convulsion/History of convulsion

℞ on admission on *date* at *time*

1. $O_2$ inhalation.
2. NPO till F/O
3. Infusion as appropriate, see here for details. (give $\frac{2}{3}^{rd}$ of daily maintenance)
   [Do not forget to subtract the 300ml given with inj. Jasoquine]
4. Inj. Dexa (5mg/1ml) *[0.15mg/Kg/dose 6 hourly]*
   0.03ml/Kg IV 6 hourly for total 8 doses.
   Dexamethasone should be given 15 mins before antibiotic.
5. Inj. Ceftriaxone (1gm/10ml) *[100mg/kg/day]*
   1ml/Kg IV stat & daily
   [Not recommended in neonate. May displace bilirubin from albumin and cause hyperbilirubinemia. Use Ceftazidime and Amikacin instead]

   If meningitis is the provisional diagnosis, add
   Inj. Ampicillin (500mg/5ml) *[400mg/Kg/day]*
   1ml/Kg IV stat & 6 hourly
6. Inj. Acyclovir (250mg/50ml)/Virux/Xovir/Acerux *[10mg/Kg/dose]*
   2ml/kg IV stat & 8 hourly.
7. Inj. Jasoquine (quinine) 300mg/5ml
   a. 0.34ml/Kg(20mg/Kg) IV stat in 100 ml inf. 10% DA over 4 hours (**loading dose**), then,
   b. 0.17ml/Kg (10mg/kg/dose) IV in 100 ml Inf. 10% DA over 4 hours - 8 hourly for 7 days (**maintenance dose**)
8. Inj. Barbit 200mg/1ml +9ml D/W, then
   give 20mg/Kg (or 1ml/kg IV stat &
   2.5mg/kg ($\frac{1}{8}^{th}$ of loading dose) IV BD
9. Continuous catheterization.
10. Posture change 2 hourly.
11. Eye care (Iventi E/D 1 drop in each eye 8 hourly if infection)





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[Acc to *Nelson Textbook of Pediatrics 21e*

- If meningitis is the strongest suspicion, empirical therapy should be-

  Inj. Ceftriaxone 1gm/10ml ---- 50mg/kg/dose --- BD +

  Inj. Vancomycin 500mg/10ml --- 20mg/kg/dose ----- TDS

- If Listeria monocytogens infection suspected, as in young infants (<02 months) or T-lymphocytic deficiency,

  Inj. Ampicillin (500mg/5ml) 300mg/Kg/day---- QDS

- If patient is immunocompromised and gm (-)ve bacterial meningitis is suspected, initial antibiotic may include:

  Inj. Meropenem (500mg/10ml)---- 40mg/Kg/dose TDS or

  Inj. Cefepime 500mg, 1gm, 2gm ---50mg/Kg/dose TDS

  Tetracef(Beximco)/Maxpime (Square)/Zopime(Healthcare)





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# FEBRILE CONVULSION

Age: 6 months-5 years, peak 14-18 months.

Seizure: Usually GTCS, single episode, < 5 min, with rise of temp (around 101.8°F).

No residual neurodeficit & Family History: (±).

℞ on admission on *date* at *time*

If there is active convulsion:

**Immediate Management:**
Inj. Diazepam (10mg/2ml)/Sedil
0.1×wt ml PR stat

Repeat if not controlled by 15 minutes, then give-

1. NPO till F/O
2. $O_2$ inhalation 2L/min- stat & SOS.
3. Infusion as appropriate.
4. Inj. Ceftriaxone 100mg/Kg/day/Ceftron/Traxon/Dicephin/Oricef
5. Inj. Barbit 200mg/1ml+9ml D/W, then give
   1ml/Kg IV stat & 0.125ml/Kg IV BD
6. Paracetamol Suppository 125mg/250mg/500mg

If there is any suspicion of meningitis or any atypical feature present-

7. Inj. Dexamethasone (5mg/1ml)/Dexa/oradexon
   0.03ml/Kg/dose 6 hourly for total 8 doses. (should be given 15 mins before antibiotics)

**Note**(4)

**CSF study in febrile Seizure: Indications**

1. Any doubt of meningitis/encephalitis.
2. First attack is <12 months of age.
3. Age 12-18 months associated with complex seizure/ altered sensorium.
4. If recovery is slow or undue prolongation of post-ictal sleeps.

**Prophylaxis**:

In general antiepileptic therapy (continuous/intermittent) is not recommended for children with one/more simple febrile seizure.

In case of frequently recurring FS:

**Intermittent prophylaxis** during 3 days of any febrile illness-

Oral Clonazepam 0.01mg/Kg TDS (max 1.5mg)

Oral Diazepam 0.33mg/Kg TDS

**Continuous prophylaxis**:

Oral phenobarbitone 2.5mg/Kg ---BD (Tab. 30mg, 60mg, Elixir 20mg/ml)

Oral Sodium Valproate (Tab. 200mg, Syp. 200mg/5ml)

**Risk Factors for Recurrence of Febrile Seizures***

| MAJOR | MINOR |
|---|---|
| Age < 1 yr<br>Duration of fever < 24 hr<br>Fever 38-39°C (100.4-102.2°F) | Family history of febrile seizures<br>Family history of epilepsy<br>Complex febrile seizure<br>Daycare<br>Male gender<br>Lower serum sodium at time of presentation |

**Having no risk factors carries a recurrence risk of approximately 12%; one risk factor, 25–50%; two risk factors, 50–59%; three or more risk factors, 73–100%.

**Risk Factors for Occurrence of Subsequent Epilepsy After a Febrile Seizure**

| RISK FACTOR | RISK FOR SUBSEQUENT EPILEPSY |
|---|---|
| Simple febrile seizure | 1% |
| Recurrent febrile seizures | 4% |
| Complex febrile seizures (>15 min in duration or recurrent within 24 hr) | 6% |
| Fever < 1 hr before febrile seizure | 11% |
| Family history of epilepsy | 18% |
| Complex febrile seizures (focal) | 29% |
| Neurodevelopmental abnormalities | 33% |

More than one risk factor at least in part additive.





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# NEPHROTIC SYNDROME

$$\text{BSA} = \frac{(Wt \times 4) + 7}{wt + 90}$$

Rx on admission on *date* at *time*

1. Physical Activity: as tolerated, bed rest discouraged.
2. Diet: Protein rich, salt restricted
3. Fluid: BSA×400ml + Previous day's output
4. Inj. Ceftriaxone (1gm/10ml)
   0.5-1ml/Kg IV stat & daily
5. Inj. Lasix (20mg/2ml) [only if there is gross edema causing discomfort]
   0.1× wt ml IV stat
6. Tab. Fusid Plus (20/50) *[1mg/Kg/day PO/IV]*
   1+0+0 (if weight is 20Kg)
7. Maintain intake output chart
8. Measure BSUA and record

**Advice for investigations:** *see below*

## Specific treatment

### Always start after controlling infections

Specific Rx for **Initial Attack:**
Oral Prednisolone 60mg/$M^2$/day in single for 4-6 wks. Then, give 40mg/$M^2$ as single dose in alternate days for 8 weeks- 5 months including tapering.

Specific Rx for **Relapse Case**:
Oral Prednisolone 60mg/$M^2$/day in single untill remission (BSUA nil for 3 consecutive days). Then, give 40mg/$M^2$ as single dose in alternate days for next 6 wks. Then, it is tapered over 4-8 wks.

**General Principles of management:**

- **Diet:** Protein rich diet (1.5- 2 gm/Kg, 2-2.5gm/Kg if persistent proteinuria). Not >30% from fat. No salt restriction unless there is marked edema or ascites.
- **Fluid:** Normal in mild edema. 400ml/$M^2$+ previous days output if marked edema or ascites.
- **For Edema:** Oral Frusemide (1-3mg/Kg/D) if persistent edema and weight gain of 7-10%. K-sparing diuretic (Spironolactone 2-4mg/Kg/D) if high dose or long therapy is needed. In **refractory edema**, 20% albumin 0.5-1 g/Kg over 2-4 hour followed by administration of Frusemide (1-2mg/Kg IV).
- **Antacid or $H_2$-blocker (Ranitidine** 1-5mg/Kg/day 8 hourly) for GI discomfort.
- **Calcium** supplement if treated for > 3 months with prednisolone.

- **Antibiotic**: Daily oral penicillin (50mg/Kg/D) till massive edema persist (10-14 days). If patient is febrile, ampi+genta or ceftriaxone may be started.
- **Physical Activities:** As tolerated; may attend school.

**Investigations: For Nephrotic syndrome 1st attack:**

1. Urine R/E
2. Serum albumin
3. Serum cholesterol
4. Spot urinary protein-creatinine ratio
   Urine protein (mg)/Urine creatinine (mg) ratio >2 suggests NS
5. Complete blood count
6. Blood for HBsAg, anti HCV, TPHA, VDRL
7. X-ray chest

**Investigation: For relapse cases:**

1. Urine R/E & C/S
2. X-ray chest
3. Complete blood Count

If massive edema and/or hypotension:

4. Serum albumin
5. Serum electrolyte

| Classification | Definition |
|---|---|
| Nephrotic syndrome | Edema, uPCR ≥2000 mg/g (≥200 mg/mmol), or ≥300 mg/dl, or 3+ protein on urine dipstick, hypoalbuminaemia ≤2.5 g/dl (≤25 g/l) |
| Complete remission | uPCR <200 mg/g (<20 mg/mmol) or o1+ of protein on urine dipstick for 3 consecutive days |
| Partial remission | Proteinuria reduction of 50% or greater from the presenting value and absolute uPCR between 200 and 2000 mg/g (20–200 mg/mmol) |
| No remission | Failure to reduce urine protein excretion by 50% from baseline or persistent excretion uPCR >2000 mg/g (>200 mg/mmol) |
| Initial responder | Attainment of complete remission within initial 4 weeks of corticosteroid therapy |
| Initial nonresponder/ steroid resistance | Failure to achieve complete remission after 8 weeks of corticosteroid therapy |
| Relapse | uPCR ≥2000 mg/g (≥200 mg/mmol) or ≥3+ protein on urine dipstick for 3 consecutive days |
| Infrequent relapse | One relapse within 6 months of initial response, or one to three relapses in any 12-month period |
| Frequent relapse | Two or more relapses within 6 months of initial response, or four or more relapses in any 12-month period |
| Steroid dependence | Two consecutive relapses during corticosteroid therapy, or within 14 days of ceasing therapy |
| Late nonresponder | Persistent proteinuria during 4 or more weeks of corticosteroids following one or more remissions |

uPCR= urine protein: creatinine ratio.





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# ACUTE POSTINFECTIOUS GLOMERULONEPHRITIS

℞ on admission on *date* at *time*

1. NPO till F/O- only if there is H/O convulsion with last few hours
2. **Bed rest**
3. **Diet:** protein (0.5gm/Kg/day), salt, fruit restriction
4. **Fluid:** BSA×400ml + Previous day's output
5. Tab. Pen V (250mg) /Penvik (Square)/Pen VK(Renata) *[50mg/Kg/day 6 hourly for 10 days]*
   1+1+1+1
6. Inj. Lasix (20mg/2ml)
   0.1× wt ml IV stat & daily
7. Tab. Nifidipine/Nidipin SR (20mg) *[ 0.25-0.5mg/Kg/day in 2-4 dose]*
   0+¼+¼ (starting dose if wt is 40Kg, then titrate)
   Or,
   Tab. Captopril/Cardopril 25mg/Acetor(Drug Int)/Captril(Alco) *[0.25-6mg/Kg/day in 2-4 dose]*
   0+¼+¼ (starting dose if wt is 50K, then titrate)
   Labetolol if needed see below.
8. Please maintain intake/output chart
9. Please monitor blood pressure

If **hypertensive encephalopathy** present (blurred vision, severe headache, altered mental state, nausea, vomiting, new seizure). Add-
If active convulsion,

- Inj. Sedil (10mg/2ml) *[0.5mg/Kg/dose]*
  0.1×wt(Kg) ml PR stat

Maintain with (start with if no convulsion)

- Inj. Phenobarbitione (200mg/1ml) + 9ml D/W, then *[2.5mg/Kg/dose]*
  $\frac{wt(Kg)}{8}$ ml IV stat & 12 hourly

If **Heart failure** with/without shock present (Cough, respiratory distress, orthopnea, gallop rhythm, decreased breath sound, rales, or hypoxemia), add-

- Propped up position
- $O_2$ inhalation
- Inj. Lasix (20mg/2ml) ------- [5mg/Kg is effective]
  Inj. Digoxin may be needed
- Antihypertensive if needed (see above)

[Remember when shock is corrected, hypertension may reappear]

If there is hyperkalemia, see **management of hyperkalemia**
**Investigation:**

- Urine R/E
- CBC with PBF
- Renal function:
  - Serum electrolyte
  - Serum creatinine
- Spot urinary protein: creatinine ratio (exclude Nephrotic Syndrome)
- ASO titre (evidence of Streptococcal infection)
- Serum $C_3$ level (highly suggestive if other features match with AGN clinically)

## Note

Nelson chapter 472, p2490

**National High Blood Pressure Education Program (NHBPEP):**

**Normal BP**: BP <90th percentile for age, sex, and height; or <120/<80(systolic/diastolic) mm Hg for adolescents ≥13 yr old

**Elevated BP:** BP reading ≥90th percentile and <95th percentile for age, sex, and height; or 120-129/<80 mm Hg for adolescents ≥13 yr old

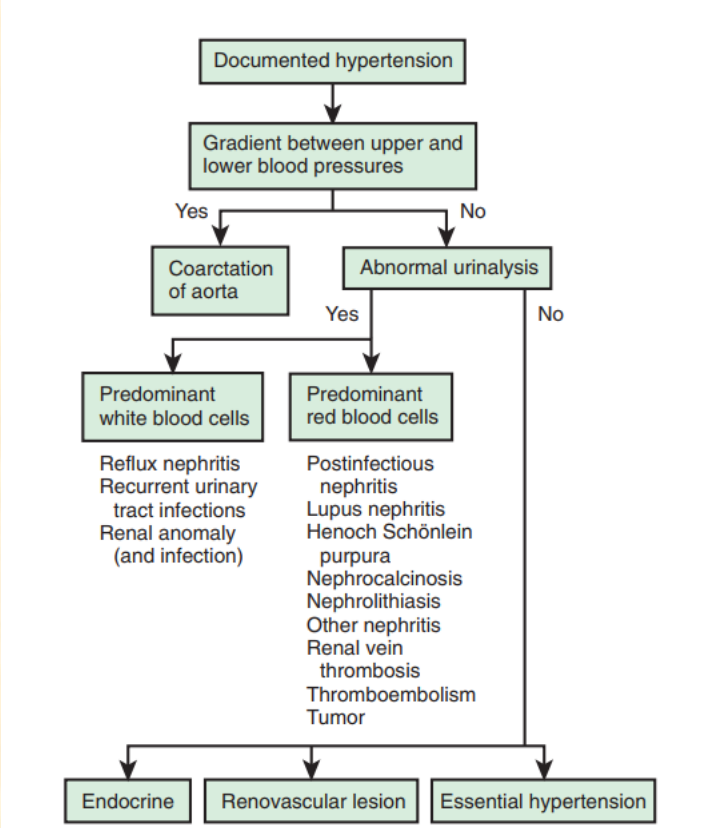
**Hypertension:** BP >95th percentile for age, sex, and height; or ≥130/80 mm Hg for adolescents ≥13 yr old. Hypertensive-level BP is further staged as follows:

**Stage 1 hypertension:** BP >95th percentile for age, sex, and height up to the 95th percentile + 11 mm Hg; or 130-139/80-89 mm Hg for adolescents ≥13 yr of age

**Stage 2 hypertension:** BP ≥95th percentile + 12 mm Hg for age, sex, and height; or >140/90 mm Hg for adolescents ≥13 yr of age.

When hypertension is the result of another disease process, it is referred to as **secondary hypertension**. When no identifiable cause can be found, it is referred to as **primary hypertension (**rare in children**)**.

**Acute severe hypertension**, sometimes referred to as *accelerated hypertension* or *hypertensive crisis*, is defined as severe hypertension (often with BP values well in excess of stage 2 hypertension) accompanied by symptoms such as headache, dizziness, or nausea/vomiting, and in more severe cases, retinopathy, encephalopathy, cardiac failure, renal injury, and seizures. **Hypertensive encephalopathy** is a manifestation of acute severe hypertension. Acute severe hypertension may also manifest with decreased vision (cortical blindness) and papilledema, congestive heart failure, or accelerated deterioration of renal function.




- Too rapid a reduction in BP may interfere with adequate organ perfusion, a stepwise reduction in pressure should be planned.
- BP should be reduced by no more than 25% of the planned reduction over the 1st 8 hr, with a gradual normalization of BPs over next 24-48 hr.
- **Drug choices** include
  - Labetalol
    Inj. 5mg/ml; 100, 200mg tablet (Labecard, Labegest – tablet and injection, Labeta – only tablet 100, 200mg)
    Loading 0.2-1mg/Kg (20mg Max.) stat,
    Maintenance: 0.4-1mg/Kg/hour (3mg/Kg max.)
    Routine dose:
  - nicardipine, and
  - sodium nitroprusside.

For patients with less severe symptoms, such as headache or nausea/vomiting,

- oral medications such as **clonidine= Clonipress 0.5mg/Noflash 0.5mg (5-10microgram/Kg/day BD/TDS)** or **isradipine** can be used if the patient can tolerate oral medications. Short-acting IV medications such as hydralazine or labetalol are acceptable if the patient cannot take oral drugs.

**Hypertensive encephalopathy** (generalized or posterior reversible encephalopathy syndrome) is suggested by the presence of headache, vomiting, temperature elevation, visual disturbances, ataxia, depressed level of consciousness, imaging abnormalities, and seizures.





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# SEVERE ACUTE MALNUTRITION (SAM)

In 6-60 months:

| Indicator | Measure | Cut-off |
|---|---|---|
| Severe Wasting | Wt-for-Height | <-3SD |
| Do | MUAC | <115mm |
| Bilateral edema | Clinical sign | |

Any one is diagnostic.

In <6 months:

- Visible wasting.
- Weight for Height Median (WHM) <70% or <-3 SD
- Bipedal edema

℞ on admission on *date* at *time*

1. **Inf. 10% DA** 50 ml PO/by NG tube or 5ml/Kg IV Stat.
2. **Feeding:** F-75 as per WHO chart. Or using homemade formula.
   11ml/Kg 2 hourly 12 feed day & night

   [Each feed contains-
   Water = ml
   Milk powder = tsf
   Sugar = tsf
   Soyabin oil = drops]

If there is edema, give 100ml/day, & protein 0.9gm/Kg/day (max.).

If no edema, you may increase upto 130ml/Kg/day & 1.5g of protein/Kg/day

see below for detail instruction in Bangla

3. **Inj. Ceftron (1gm/10ml)**
   0.5-1ml/Kg IV stat & daily
   ±
   **Inj. Gentin (20mg/2ml)** *[7.5mg/Kg/day]*
   0.75ml/Kg IV stat & once daily

4. **Syp. Potassium** (7.6 mmol/5 ml)/**KT/Electro K** *[2-4 mmol/Kg/D ]*
   If around 5Kg, $\frac{1}{2}$ tsf PO BD; If around 10Kg, 1 tsf PO BD
5. **Syp. Zinc** (10mg/5ml)/**Zesup/Nid/Xinc** *[2mg/kg/d]*
   If age <6 mo- $\frac{1}{2}$ tsf PO BD, if age >6 mo 1 tsf PO BD;
6. **Tab. Folison** (5mg)
   1 tab PO stat on $D_1$, then
   $0+\frac{1}{4}+0$
7. **Cap. Retinole Forte**(50,000 IU): *[1 cap= 0-5mo; 2 cap for 6-12 mo; 4 cap for >12mo]*
   1 cap PO stat
8. **Inj. $MgSO_4$** (2.47mg/5ml) *[0.1 ml/Kg once daily for 7 days ]*
   0.1ml/Kg IM stat & daily

9. **Syp. V-plex** *[½ tsf for <6mo; 1 tsf for 6mo-2yrs; 2 tsf >2yrs)- once daily]*
   1 tsf PO OD [do not start until diarrhoea stops]

If diarrhoea: ReSoMal (Water 850 ml + 1 pack ORS + Sugar 4 tsf + Syp. KT 3 tsf): 5ml/Kg PO/NG tube for every 30 min for 2 hours then every alternate hours for 4-10 hours.

If shock N/saline 15ml/Kg for 1 hours then assess.

**Few important points regarding management of SAM:**

**4 don'ts of SAM patient:**

1. Never give IV fluid in a case of SAM; may lead to heart failure
2. Never give diuretics; may worsen electrolyte imbalance
3. Never give iron therapy in stabilization phase; may promote bacterial infection
4. Never give high protein formula in stabilization phase, may lead to heart failure

Blood Transfusion in SAM: Be cautious regarding blood transfusion in SAM patients. Indication of BT is severe anemia with Hb% <5gm/dL. If there is respiratory distress, <7gm/dL. If indicated give BT slowly and give Inj. Lasix (20mg/2ml) 0.1ml/Kg before starting. Give whole blood 10ml/Kg or packed cell 5-7ml/Kg (if signs of heart failure is there).

## উদাহারণঃ SAM এর বাচ্চার খাবারের হিসাব

শুরুতে F75 ডায়েট দেয়া হয়। সাধারণ হিসাব ২ ঘন্টা পর পর দিলে ১১মিলি/কেজি, ৩ ঘন্টা পর পর দিলে ১৬মিলি/কেজি, এবং ৪ ঘন্টা পর পর দিলে ২২মিলি/কেজি করে দেয়া হয়। আমরা ২ ঘন্টা পর পর (১১ মিলি/কেজি) দিয়ে শুরু করি। এক্ষেত্রে মনে রাখতে হবে, প্রোটিন আমরা ০.৯ গ্রাম/কেজি/দিন দিব এবং প্রতি ১০০ মিলি দুধে ৭৫ কি.ক্যা. এনার্জি থাকে। এখন কিভাবে হিসাব করবো। উদাহারণ হিসেবে একটা ৫ কেজির বাচ্চার হিসাব করি।

শিশুকে শুরুতে আমরা ৫×১১=৫৫ মিলি খাবার ২ ঘন্টা পর পর দিব। তাহলে, পানি নিতে হবে ৫৫ মিলি। এইটুকু খাবারে ক্যালরি থাকবে ৫৫×০.৭৫ = ৪১.২৫ কি.ক্যা. । প্রথমেই আমরা খাবারে প্রোটিনের পরিমাণ হিসাব করবো। ০.৯ গ্রাম × ৫ = ৪.৫ গ্রাম প্রোটিন আমরা সারাদিনে দিতে পারব। কাজেই, ৪.৫÷১২= ০.৩৭৫ গ্রাম/ প্রতি ফিডএ দেয়া যাবে। আমরা জানি, গুড়াদুধে ১ চামচে মোটামুটি ১ গ্রাম প্রোটিন এবং ২০ কি.ক্যা. এনার্জি থাকে। এখানে আমরা $\frac{১}{৩}$ চামচ দুধ দিলে কাছাকাছি চলে আসে (০.৩৩৩ গ্রাম)। কাজেই, আমরা $\frac{১}{৩}$ চামচ গুড়াদুধ দিব (= ২০÷৩= ৬.৬৬ কি.ক্যা. এনার্জি )। বাকি ক্যালরি (৪১.২৫-৬.৬৬= ৩৪.৫৯ কি.ক্যা.) ক্যালরি আমরা চিনি (চা চামচ = ২০ কি.ক্যা.) এবং সয়াবিন তেল (১মিলি = ১৫ ফোটা = ৯ কি.ক্যা.) দিয়ে পুরণ করবো। চিনি ( বা কার্বোহাইড্রেট) প্রায় ৮৫% ( দেড় চামচ চিনি = ৩০ কি.ক্যা.) এবং প্রায় ১৫% সয়াবিন তেল (০.৫মিলি= ৮ ফোটা= ৪.৫ কি.ক্যা.) দিলে

প্রয়োজনীয় ক্যালরি নিশ্চিত হয় (৩০+৪.৫ = ৩৪.৫) । সুতরাং, প্রতি ফিডে আমরা ৫৫ মিলি পানি, $\frac{১}{৩}$ চামচ গুড়াদুধ, দেড় চামচ চিনি, ৮ ফোটা সয়াবিন তেল দিয়ে খাবার বানাব।

এক নজরে,

প্রতি ফিড = ৫×১১=৫৫ মিলি

ক্যালরি ৫৫×০.৭৫ = ৪১.২৫ কি.ক্যা.

সারাদিনের প্রোটিন, ০.৯ গ্রাম × ৫ = ৪.৫ গ্রাম।

সুতরাং ৪.৫÷১২= ০.৩৭৫ গ্রাম/ প্রতি ফিড = $\frac{১}{৩}$ চামচ গুড়াদুধ = ৬.৬৬ কি.ক্যা. এনার্জি।

বাকী রইলো, ৪১.২৫-৬.৬৬= ৩৪.৫৯ কি.ক্যা.

দেড় চামচ চিনি = ৩০ কি.ক্যা. [ বাকি রইলো ৪.৫৯ কি.ক্যা.]

সয়াবিন তেল, ৮ ফোটা (= ৪.৫ কি.ক্যা.)।

বিঃ দ্রঃ একবারে নিখুত করার প্রয়োজন নাই। মাপগুলো কাছাকাছি থাকলেই হবে। খাবার কিভাবে বানাতে হবে এটা মাকেও শিখিয়ে দিতে হবে। হিসাব বেশি জটিল করলে মাকে বোঝানো সম্ভব হবে না। তবে, প্রোটিনের পরিমাণ যেন বেশি না হয় সেদিকে নজর রাখতে হবে (এজন্যেই প্রোটিনের হিসাবটা সবার আগে করা হয়)।





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# OPC POISONING

First Aids:

- ABC(Airway, Breathing, Circulation)
- **Prevention of further exposure** by removing clothes, washing of body with soap water or gastric lavage as appropriate.

℞ on admission on *date* at *time*

1. **NG suction** if patient arrived before 2 hours
2. NPO till F/O
3. **Inf. baby saline/ED-10/libott S junior** (.....ml)
   IV @ $\frac{ml}{25}$ µd/min stat & daily
4. **Inj. Atropine 0.6mg/ml-**
   0.05mg/Kg IV stat ( 1amp/12Kg)
   then 0.02-0.05mg/Kg (½-1amp/12Kg) every 10-30 minutes till atropinization (max. 2-5mg).
5. **Inj. Pralidoxime (1000mg/20ml)/ Pradox (Beacon), Pralidox (Incepta), Pralidot (Globe):**
   25-50mg/Kg over 15-30 minutes. May be repeated after 1-2 hours.
6. **Inj. Ceftriaxone** (1gm/10ml)
   0.5-1ml/Kg IV stat & once daily.
7. **Inj. Omeprazole 40mg/vial**
   0.6-0.7mg/Kg/D IV/PO daily
8. **Continuous Catheterization:** (specially in male)

Keep atropinized for 2-3 days. Then reduce gradually.

**Signs of Atropinization:** High body temperature, Fully dilated pupil, tachycardia/pulse >70/min, dry mouth, retention of urine
**Treatment of Atropine Toxicity:** Inj. Diazepam 10mg/2ml- 0.05-0.3mg/Kg/dose may repeat every 30 min (max. total dose 5-10mg) (0.01ml-0.06ml/Kg)

# KEROSENE POISONGING

℞ on admission on *date* at *time*

[Note: Do not give NG suction. Do not induce vomiting]

1. **NPO till F/O**
2. **$O_2$ inhalation** stat & SOS
3. **Inf. baby saline/ED-10/libott S junior** (.....ml)
   IV @ ml/25 µd/min stat & daily [Give 30% less than required amount.]
4. **Inj. Ceftriaxine (1gm/10ml)**
   0.5-1ml/Kg IV stat & daily
5. **Paracetamol Suppository** (60/125/250/500mg)
   1 stick P/R SOS if fever

If chest/abdominal pain/irritability:

6. **Inj. Omeprazole (40mg/10ml)**
   0.2ml/Kg IV stat & once daily
7. **Inj. Tiemonium methylesulphate/Algin/Norvis /Onium/Visral/Xelcom (5mg/2ml)**
   1 amp. IV stat & TDS

**Principles of management**:

- **Asymptomatic patients:** Admit for 24 hours and discharge if no symptom appears.
- Evaluate & maintain ventilatory status of the patient:
  - Oxygen for all patient.
  - Intubation & ventilatory support if needed.
- Prevent further exposure- remove clothes, wash with copious water.
- Routine use of Antibiotic is not recommended. Occurence of secondery infection is readily detected by re-appearance of fever on 3rd-5th days.
- Nutritional support.
- Corticosteroid, activated charcoal, cathartics, mineral oil & olive oil have no beneficial effect.

**Complications:**

a. **Immediate:** Pneumothorax, subcutaneous emphysema, empyema, Pneumatocele (developes in recovery phase & may take 6-9 months) & secondery infection with bacteria or virus.
b. **Long Term:** Persistent cough or frequent respiratory infection & increased risk for developing chronic lung disease.

**Investigation:**

- **X-ray chest:** pneumonitis in 62-89% cases. As early as 30 min & as late as 6-12 hours.
  i. Grade 0: Normal X-ray.
  ii. Grade 1: Minimal unilateral perihilar infiltration.
  iii. Grade 2: Bilateral infiltration.
  iv. Grade 3: Confluent fluffy shadows on one or both sides.
  v. Grade 4: Extensive bilateral infiltration with consolidation &/or pleural effusion.
- **Pulse Oxymetry:** oxygen saturation.
- **TC-WBC:** Leukocytosis.

# POISONOUS SNAKE BITE

First Aid

01. Reassurance
02. Immobilization of biten limb (with splint and sling)
    a. If bite is in the lower limb, donot allow to walk
    b. If bite is in the upper limb, do not allow to move it.

[Ideally pressure immobilization method (by simple crepe bandage or any long strips of clothes (গামছা, লুংগি, ওরনা ইত্যাদি) can be helpful.]

03. Transfer quickly to nearest health facility where treatment is available (anti snake venom, ICU etc.)

**[**Assess the vital parameters e.g. respiration, cyanosis, pulse, BP, CRT etc]

**Relevant investigation:**

1. 20-minute whole blood clotting test (to exclude presence of Hemotoxin) **bedside test**
2. ECG
3. CBC

**Required for sea snake which releases myotoxin/nephrotoxin:**

4. Blood urea, s. creatinine (to check for AKI)
5. S. CPK (to exclude presence of myotoxin manifested by severe bodyache)

℞ on admission on *date* at *time*

1. NPO till F/O
2. Infusion (just to keep the channel open)

3. Inj. TT
1 amp IM stat

4. Inj. TIG
1 amp IM stat

5. Inj. Polyvalent antivenom (if indicated)
IV @ 10 drops/min for 10 min then, @ 50drops for the rest if no reaction occurs

**For neurotoxic signs:**
Inj. Atropine 0.6mg/ml (600µg/ml) 15 µgm /Kg IV, then

Inj. Neostigmine 0.5mg/ml (500µgm/ml) SC 50-100 µgm/Kg 4 hourly, until neurotoxic features are overcome.

If **coagulopathy** present:
Fresh blood transfusion
Care of the bitten part-

- Wash with antiseptic solution/soap
- Debridement and skin grafting if needed

[**Indication of antivenom:**

1. Neurotoxic signs
    a. Generalized muscle weakness e.g. lethargy, ptosis; paralysis of eye ball muscles
    b. broken neck sign
    c. Difficulties in speech
    d. Difficulties in opening of mouth/protrusion of tongue
    e. Shallow respiration)
2. Rapid extension of local swelling
3. Acute renal failure
4. Acute circulatory failure
5. Bleeding abnormality
6. Hemoglobinuria/ myoglobinuria

**Prepare antivenom:** 10 vials, irrespective of age and sex. Dilute each vial with 10 ml D/W (=100ml) + 100ml IV fluid e.g., DA/DNS/NS. (=200ml)]

**Before initiating antivenom, prophylactic subcutaneous adrenaline (dose- adult 0.25 ml of 0.1% solution and in children 0.005 mg/kg) should be given to the victim.**

**Inj. Adrin/Adrenalin (1mg/ml= 1:1000)**





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# TUBERCULOSIS(7,8)

## Definitions: contact

**Contact**: Any person who has been exposed to an index case.

**Index Case:** Index case is the initially identified person of any age with new or recurrent TB in a specific household or other comparable setting in which others may have been exposed. An index case is the person on whom a contact investigation is centered but is not necessarily the source.

**Close contact:** A person who is **not in the household** but who shared an enclosed space, such as a social gathering place, workplace, or facility, with the index case for extended daytime periods **during the 3 months before the start of the current treatment episode.**

**Household contact:** A person who shared the **same enclosed living space** as the index case for **one or more nights or for frequent or extended daytime period** during the 3 months before the start of current treatment episode.

## Revised definitions of tb in children

**Presumptive TB:** a patient who presents with the symptoms or signs suggestive of TB (previously known as TB Suspect).

**Bacteriologically confirmed case:** is a patient from whom a biological specimen is positive byWHO-approved rapid diagnostics (eg. Xpert-MTB/RIF), smear microscopy or culture.

**Clinically diagnosed TB case:** is a patient who does not fulfill the criteria of bacteriological confirmation or smear not done; but diagnosed as active TB by a clinician and decided (BOX-iv) to have a full course of anti-TB treatment.

These cases are diagnosed as active TB on the basis of X-ray abnormalities or suggestive histology or extrapulmonary cases without bacteriological confirmation.

| Status/Settings | TB cases | Regimen | |
|---|---|---|---|
| | | Intensive Phase (IP) | Continuous Phase (CP) |
| Low HIV Prevalence and Low INH Resistance | ▪ Smear negative pulmonary TB<br>▪ TB lymph node (intrathoracic and peripheral) | 2(HRZ) | 4(HR) |
| | ▪ Smear positive pulmonary TB<br>▪ Extensive pulmonary disease, Severe EPTB (except TBM and Osteoarticular) | 2(HRZE) | 4(HR) |
| Any status/settings | TB meningitis<br>Osteoarticular TB | 2(HRZE) | 10(HR) |

*For children with TB meningitis and osteo-articular tuberculosis, treatment may be extended up to 12 months based on clinical judgment.





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***INH resistance is 35.8% among previously treated cases in Bangladesh (DRS-2011)
NB: Where treatment failure is in doubt, DR-TB should be considered and managed accordingly.

**Pyridoxine**

Pyridoxine should be given along with isoniazid in HIV infected and severely malnourished children to prevent isoniazid associated neuropathy. A dose of 12.5 mg/day is recommended for children 5 to 11 years of age, and 25 mg/day for children ≥12 years.

Pyridoxine is not used in general treatment initiation plan , but if any child after treatment, shows symptoms of neuropathy, then it is recommended to include.

**Corticosteroids**

Corticosteroids may be used for the management of some complicated forms of TB (See box).

Indications for oral steroids in children with TB:

01. CNS TB including TB meningitis
02. TB pericarditis (reduces the risk of restrictive pericarditis)
03. Adrenal TB

In cases of advanced TB meningitis, corticosteroids have been shown to improve survival and decrease morbidity, and thus are recommended in all cases of TB meningitis. As rifampicin is a powerful inducer of prednisolone metabolism hence high dose of prednisolone is required28. Sudden withdrawal can cause serious side effects such as adrenal crisis.

**Dose:** Pednisolone- 2-4 mg /kg/day (max. 60mg) for 4 weeks; - then tapered over 1-2 weeks.

**Follow Up:** Monthly basis for the 1st 3 months. Sputum positive cases should be followed up at the end of month 2, 5, 6.

Recommended daily dose of 1st line anti-TB drugs for children:

| **Drugs** | |
|---|---|
| Isoniazid (H) 10 (7-15) [maximum 300mg] | Isoniazid (H) 10 (7-15) [maximum 300mg] |
| Rifampicin (R) 15 (10-20) [maximum 600mg] | Rifampicin (R) 15 (10-20) [maximum 600mg] |
| Pyrazinamide (Z) 35 (30-40) [maximum 2000mg] | Pyrazinamide (Z) 35 (30-40) [maximum 2000mg] |
| Ethambutol (E) 20 (15-25) [maximum 1200mg] | Ethambutol (E) 20 (15-25) [maximum 1200mg] |

Formulations available

| FDC tablet | Current FDC | Previous FDC |
|---|---|---|
| 3 | R75, H50, Z150 | R60, H30, Z150 |
| 2 | R75, H50 | R60, H30 |





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**Dosage in children:**

| Weight Bands (Kg) | Number of tablets | | |
|---|---|---|---|
| | Intensive Phase (IP) | | Continuation Phase (CP) |
| | RHZ(mg) | E(mg) | RH (mg) |
| | 75/50/150 per tablet | 100 per tablet | 75/50 per tablet |
| 2-3.9 | ½ | ½ | ½ |
| 4-7 | 1 | 1 | 1 |
| 8-11 | 2 | 2 | 2 |
| 12-15 | 3 | 3 | 3 |
| 16-24 | 4 | 4 | 4 |
| 25+ | Adult dosage and preparations | | |

| **Weight Bands (Kg)** | **Tab. Levofloxacin 250mg** |
|---|---|
| 5-6 | ½ tablet/day |
| 7-9 | ¾ tablet/day |
| 10-15 | 1-1½ tablet/day |
| 16-23 | 1½-2 tablet/day |
| 24-30 | 2-2½ tablet/day |
| 31+ | Follow adult schedule (up to 1.5g/day) |

**Adult Regimens:**

**Standardized treatment regimen for each diagnostic category (adults)**

| TB diagnostic category | Type of Patient | Treatment regimen | |
|---|---|---|---|
| | | Intensive phase (Daily) | Continuation Phase (Daily) |
| New Cases (never been treated for TB or have taken ATT for < 1 month) | Bacteriologically positive PTB patients | 2 (HRZE) | 4 (HR) |
| | Bacteriologically negative PTB patients | | |
| | Extra-pulmonary TB* | | |
| | TB/HIV co-infected | | |
| Previously Treated Cases (received ≥ 1 month of ATT in the past) ** | If no resistance to TB drugs (both H and R sensitive P and EP TB Cases) | 6 HRZE | |
| | Clinically diagnosed PTB | 6 HRZE | |
| | Complicated EP cases (TB meningitis, Neurological TB, Bone TB, non-resolving lymph node) | 12 HRZE-Lfx | |
| | If Rif susceptible and INH resistant or unknown in bacteriologically confirmed PTB & EP-TB | 6 (H)REZ- Lfx | |

** Treatment for certain EP TB may be prolonged till 12 months if non-resolving lymph nodes at 6 months; 12 months in case of CNS, TB meningitis, bone TB etc.*

**Dosage for adults:**

| weight (kg) | Intensive Phase | Continuation Phase | INH Resistant | |
|---|---|---|---|---|
| | 4FDC daily (first 2 months) | 2FDC daily (next 4 months) | 4FDC (6 month) | Levofloxacin (Lfx) 250 mg (6 month) |
| 30-37 | 2 Tablets | 2 Tablets | 2 Tablets | 2 Tablets |
| 38-54 | 3 Tablets | 3 Tablets | 3 Tablets | 3 Tablets |
| 55-70 | 4 Tablets | 4 Tablets | 4 Tablets | 4 Tablets |
| > 70 | 5 Tablets | 5 Tablets | 5 Tablets | 5 Tablets |

# TREATMENT OF MDR-TB:

**Target groups for DR TB and First-line DST:**

If available, rapid DST will be offered to all presumptive TB cases. If not following groups will be prioritized for DST (Presumptive DR TB):

- All previously treated (Retreatment) cases at diagnosis
  - ✓ Failure of Cat-1 and retreatment regimen
  - ✓ Relapse
  - ✓ Treatment after loss to follow-up
- Non-converter
- Close contacts of DRTB patients with symptoms
- HIV infected person, with or without TB S/S
- Bacteriologically negative PTB turning positive at 2 months or EPTB patients showing deterioration or no signs of clinical improvement, despite treatment as per NTP guidelines.

**Mono resistant TB:** where mono resistance to **isoniazid** is known or suspected the is-

**6** (H)RZE-Lfx

For patients with more extensive disease, consideration should be given to prolonging the treatment to minimum of **9 months**.

Mono resistant to Rifampicin cases should be treated using MDR-TB regimen

**Treatment of MDR-TB:** MDR-TB are treated in a similar way to adults with MDR-TB. One practical difference is that confirmation and DST may not be possible, so that empirical treatment is often required for children with suspected MDR-TB.





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**Treatment Regimen:**

**<3 years:**
FLQ-R: Lzd-Cfz-Cs; add one of **Dlm, PAS or Eto** additional drugs if needed.
FLQ-S: Lfx-Lzd-Cfz-Cs additional drugs if needed **Dlm, PAS** and **Eto**

**<6 years:**
FLQ-R: **Lzd-Cfz-Cs-Dlm**; add one of **PAS** or **Eto** additional drugs if needed.
FLQ-S: **Lfx-Lzd-Cfz-Cs** additional drugs if needed **Dlm, PAS**

**>6 years:**
FLQ-R: **Bdq-Lzd-Cfz-Cs;** additional drugs if needed **Dlm** and **PAS**
FLQ-S: **Bdq-Lfx-Lzd-Cfz** additional drugs if needed **Cs** and **Dlm**

**Weight band for Hr-TB:**

| Weight bands | Number of Tables | | |
|---|---|---|---|
| | 6 (H) RZ + E + Lfx | | |
| | RHZ (75/50/150) | E (100) | Lfx(100) |
| 4-7 kg | 1 | 1 | 1 |
| 8-11 Kg | 2 | 2 | 2 |
| 12-15 Kg | 3 | 3 | 3 |
| 16-24 Kg | 4 | 4 | 4 |
| 25+ Kg | Use adult dosages and preparations (up to 1.5g/day) | | |





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# LIVER FAILURE

Treatment depends on patients condition. If patient is unable to eat/feed, has malena (bleeding from varices) give following treatment. Discuss with the midlevel doctor if there is any confusion.

℞ on admission on *date* at *time*

1. NPO till F/O
2. **NG tube suction** to empty to stomach (may contain blood)
3. **Inf. Electrodex-10 (X ml)** [Give 30% less than required maintenance fluid]
   IV@ $\frac{X}{100}$ ×4µdrops/min daily
4. **Inj. Cefotaxime (500mg/10ml)**
   1ml/Kg IV stat & 8 hourly
5. **Inj. Metronidazole (500mg/100ml)**
   1.5ml/Kg IV stat & 8 hourly
6. **Inj. $K_1$ MM 10mg**
   1 ampule IV stat & daily for 3 days
7. **Inj. Omeprazole (40mg/10ml)/Seclo/OP/Omep/Losectil**
   0.25ml/Kg IV stat & once daily
8. **Tab. Rifaximin/Rifagut 200mg**
   10-15mg/Kg/day in 12yrs/12+;
   higher dose in younger children
9. **Syp. Lactulose /Avolac/Osmolax**
   1-2ml/Kg PO or by NG 2-4 hourly

Until loose stool is produced, then titrate to keep stool semisolid

If patient is stable= conscious, oriented, no hematemesis/malena, no abdominal pain, then start feeding and reduce or stop IV fluid.

**Add diet- Protein** restricted/no protein based on stage of encephalopathy + **fat** – restricted + **Carb:** Normal/ keep the patient euglycemic

## For cerebral edema/raised ICP:

**Clinical Features:**
Change of consciousness
Depressed respiration
Worsening headache
Bradycardia
Apnea
Pupillary changes
Posturing, and
Seizure

**Treatment of cerebral edema**
Elevation of head of the bed
Fluid Restriction

- Inj. Mannitol/Osmosol 20(20%) (50ml) or
  1.25-5ml/Kg IV $\frac{1.25-5\times wt}{0.5}$ d/min over 30min;
  may be repeated every 4-6 hourly
- Inj. Frusemide/Lasix (20mg/2ml) or
  0.1-0.2ml/Kg IV stat;
- Tab. Acetazolamide/Acemox 250mg *[8-30mg/Kg/day]*
  ½ to 2 tablet in divided doses

**For coagulopathy**:

Inj. K1 MM (for all patient, see above)

+/-

Whole blood transfusion (20ml/Kg)/Fresh Frozen Plasma (15ml/Kg)

Platelet Transfusion (to maintatin PLC > 50,000/cmm)





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# DIABETIC KETOACIDOSIS

Send for RBS, S. electrolyte, Urine for ketone bodies, venous BG analysis, $HbA_{1C}$, ABG analysis

And start **TREATMENT OF DIABETIC KETOACIDOSIS** as follows:

℞ on admission on *date* at *time*

Assumed weight 20Kg

- ✓ NPO till further order
- ✓ O2 inhalation – SOS
- ✓ Start infusion as follows(9):

Channel 1

- ✓ Inf. Normal Saline 100ml + Inj. Actrapid (100U/ml) 0.24ml, then IV@4microdrops/min stat and daily

$\frac{(dose \times wt) \times hour}{U/ml}$ ml/day

$\frac{(0.05 \times 20) \times 24}{U/ml}$ ml/day $== \frac{1 \times 24}{100}$ ml/day

$= 0.24$ml/day

Channel 2

- ✓ Inf. Normal Saline 200ml
  IV@50drops/min stat over 1 hour
  Then,
  Inf. Normal Saline 130ml
  IV@32drops/min in every hour until BG <16.67mmol/L
  +
  Inf. KT (20mmol/10ml) [start after bous is finished]
  2amp in each litre of IV fluid

  [then,
  Inf. Libott S Junior 130ml
  IV@32drops/min in every hour until BG <11.111mmol/L, then
  Inf. Normal Saline 65ml + Inf. 25% DA 65ml (=130ml)
  IV@32drops/min in every hour until resolution of DKA]

$\frac{(85 \times 20) + (10 \times 100 + 10 \times 50) - 200\ (bolus)}{23}$

$= \frac{1700 + 1500 - 200}{23}$

*= 130ml/hour*

*=32drops/min ≈30drops/min*

- ✓ Inf. Ceftriaxone (1gm/10ml)
  0.5-1ml/Kg IV stat and once daily

- ✓ Inj. Omeprazole (40mg/10ml)
  0.2ml/Kg IV stat & once daily

- ✓ Please maintain intake output chart
- ✓ Continuous catheterization

---

1st hour:

CHANNEL 1: Insulin drip at 0.05 to 0.10 Units/Kg/Hr





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[We should calculate the amount of insulin and add it to 100ml normal saline. We should use infusion pump. Alternatively, we can use microburet set (insulin+100ml normal saline). Then, continue @4µdrop/min.]

CHANNEL 2: ***Bolus***10-20ml/Kg/hour IV bolus of 0.9% NaCl or LR (repeat if needed)

(Until BG <16.67mmol/L & HR, RR, BP- improves, then switch to Inf. Libott S Junior; when falls below 11.11mmol/L switch to )

2nd hour to until DKA resolution (total CO2 >15mEq/L, pH >7.3, S. $Na^+$ stable between 135-145mEq/L, no emesis, conscious, alert)

CHANNEL 1: Insulin drip at 0.05 to 0.10 Units/Kg/Hr

CHANNEL 2: Inf. Libott S Junior (0.45% NaCl+ 5% glucose) + (Inj. KPhos 20mEq/L+ KAc 20mEq/L, **we generally use KCl**)

IV rate (ml/hour) = $\frac{85ml \times Wt\ (Kg) + maintenance\ fluid - bolus}{23\ hour}$

NB. This is the rate per hour. Time to full correction is not fixed.

Potassium chloride (Inj. KCl, KT, Electro K) is easily available. Each 10ml ampule contains 2 mmol=mEq of KCl/1ml. 1 amp = 10ml

---

**Post Acidosis Management**

Switch to long-acting S/C insulin (Glargine = Lantus = Larsulin) after oral feeding is tolerated.

Basal bolus regimen is recommended. A slow-onset, long-duration background is given insulin once/twice. And a rapid acting insulin is given before meals to provide carbohydrate coverage and correct hyperglycemia.

0.05-1IU/Kg/day twice daily; 2/3rd before breakfast and 1/3rd before dinner.

Stop IV drip 30min after the patient receives meal and S/C insulin

- ✓ Dietary advise:
  - **Number**: 3 meal, 2 snacks.
  - **Calorie requirement:** 1000 Kcal at 1 yr + 100Kcal/year until puberty
  - **Composition**: 60% Carbohydrate + 30% fat + 10% protein; more dietary fibre and less animal fat
- ✓ Exercise is encouraged
- ✓ Patient and family education

# Neonatology

# CRITERIA OF A NORMAL BABY(1)

- Birth weight: 2500 to <4000gm
- Length: Around 50 cm
- OFC: 35±2 cm
- Color: Pink, but mild peripheral cyanosis may be present after birth
- Breathing: spontaneous, regular and rate is 30-60/min
- Heart rate: 100-160/min
- Axillary temp: 97.5°F – 99°F
- Pass stool by 24 hours
- Pass urine by 48 hours
- Sleep: around 18 hours a day
- Primitive reflexes: Good & stable
- No congenital anomaly
- Baby is active

# ADMISSION CRITERIA OF NEWBORN (10)

- May vary according to institutional policy.
- Birth weight: <1800gm
- Gestational age <34 weeks
- Major congenital anomalies
- Babies with asphyxia (needing bag and mask ventilation)
- Babies with breathing difficulties
- Suspected early onset neonatal sepsis
- Neonatal jaundice requiring phototherapy or exchange transfusion
- Infant of Diabetic Mother who need IV glucose infusion
- Postoperative Newborn
- Newborn referred from other centers





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# CHOICE OF ANTIBIOTICS IN NEONATOLOGY(1)

| | |
|---|---|
| 1st line | Ampicillin + Gentamicin |
| 2nd line | Ceftazidime + Amikacin |
| 3rd line | Meropenem, Ciprofloxacin, Vancomycin, Cefepime, Clarithromycin, Netilmicin, Imipenem, Piperacillin + Tazobactam, Colistin |
| In suspected meningitis | Cefotaxime+ Amikacin or<br>Meropenem + Amikacin |

In Department of Neonatology, Mymensingh Medical College Hospital, we use **Ceftazidime** + **Amikacin** as first line drugs (based on local infection pattern and their sensitivity)

Ceftriaxone is avoided in neonatal period

Oral drugs are not absorbed properly in newborns and their use is discouraged.





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# PERINATAL ASPHYXIA

There are a lot of features of perinatal asphyxia. But we are most concerned with hypoxic ischemic encephalopathy (*HIE*) for its association with both short- and long-term poor prognosis.

HIE has 3 stages (*Sarnat & Sarnat* staging) which can be differentiated by several features. Extensive list can be found in textbook. Practically we look for History of delayed crying (*HIE stage I*) with convulsion (*HIE Stage II*) or with shock or organ failure (*HIE stage III*).

We can write **TREATMENT OF PERINATAL ASPHYXIA** as follows:

℞ on admission on *date* at *time*

- ✓ NPO till F/O
- ✓ O2 inhalation stat & SOS
- ✓ Inf. 10% DA/Libott-10 (……ml)
  IV @$\frac{ml}{25}$ µd/min stat & daily
- ✓ Inj. Ceftazidime (250mg/5ml)/Tazid/Cefazid
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs

If there is convulsion/ history of convulsion, give:

- ✓ Inj. Barbit 200mg/1ml + 9ml D/W, then
  1ml/Kg IV stat & then, $\frac{wt}{8}$ ml IV 12 hourly

# NEONATAL SEPSIS

Write **TREATMENT OF NEONATAL SEPSIS** as follows:

℞ on admission on *date* at *time*

- ✓ NPO till F/O if there is fast breathing, cyanosis, lethargy, convusion etc.
- ✓ $O_2$ inhalation stat & SOS
- ✓ Inf. 10% DA/Libott-10 (……ml) [change fluid according to age. See Fluid]
  IV @$\frac{ml}{25}$ µd/min stat & daily
- ✓ Inj. Ceftazidime (250mg/5ml)/Tazid/Cefazid
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. $K_1$MM/Konakion 2mg (if not received after birth)
  1 ampule IV stat
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs

# NEONATAL JAUNDICE

Write **TREATMENT OF NEONATAL JAUNDICE** as follows:

℞ on admission on *date* at *time*

- ✓ NPO till F/O
- ✓ $O_2$ inhalation stat & SOS
- ✓ Inf. 10% DA/Libott-10 (……ml) [change fluid according to age. See Fluid]
  IV @$\frac{ml}{25}$ µd/min stat & daily
- ✓ Inj. Ceftazidime (250mg/5ml)/Tazid/Cefazid
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat
- ✓ Start phototherapy ± Prepare for exchange transfusion
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs

[Check for Rh incompatibility or ABO incompatibility. Send for **Blood grouping & Rh typing, S. bilirubin (Total, Direct, Indirect)**]

First, we need to determine if jaundice is physiological or pathological. If in doubt, we should always check.

## Physiological jaundice:(1)

- Appears on 2nd -3rd day of life.
- Reaches its peak by 5th – 6th day
- Declines by 7th – 8th day of age (term) & 10th -11th day (preterm)

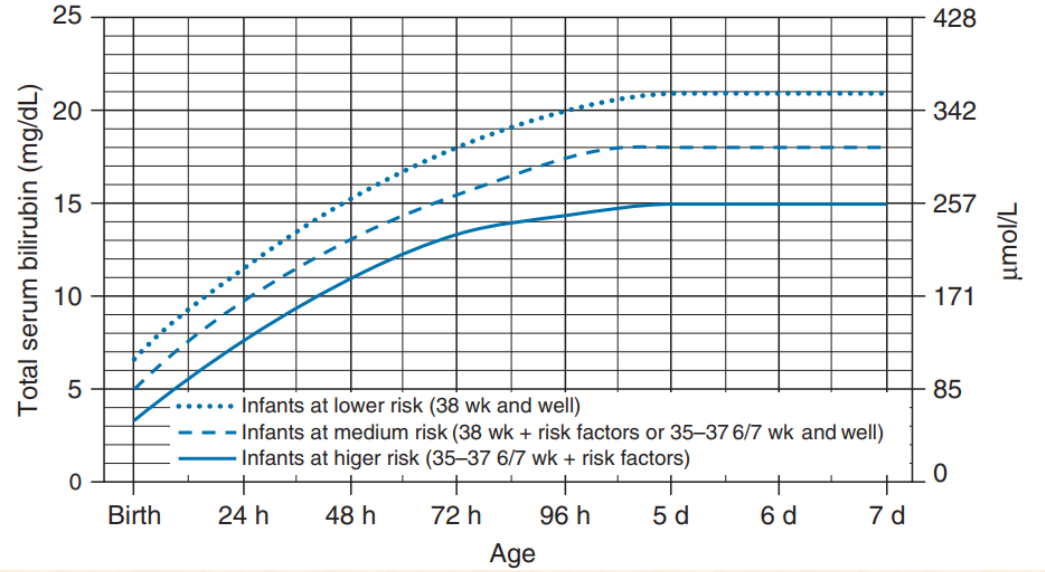
## Pathological jaundice:(1)

- Appears on the 1st day of life
- Lasts longer than 14 days in term & 21 days in preterm babies.
- Rate of rise of serum bilirubin of > 0.5mg/dl/hour or ≥10mg/dl/day
- Jaundice with signs of sepsis/sickness
- Jaundice extended up to palms and soles
- Jaundice with pale stool & yellow urine

## General Guideline with level of total bilirubin (10)

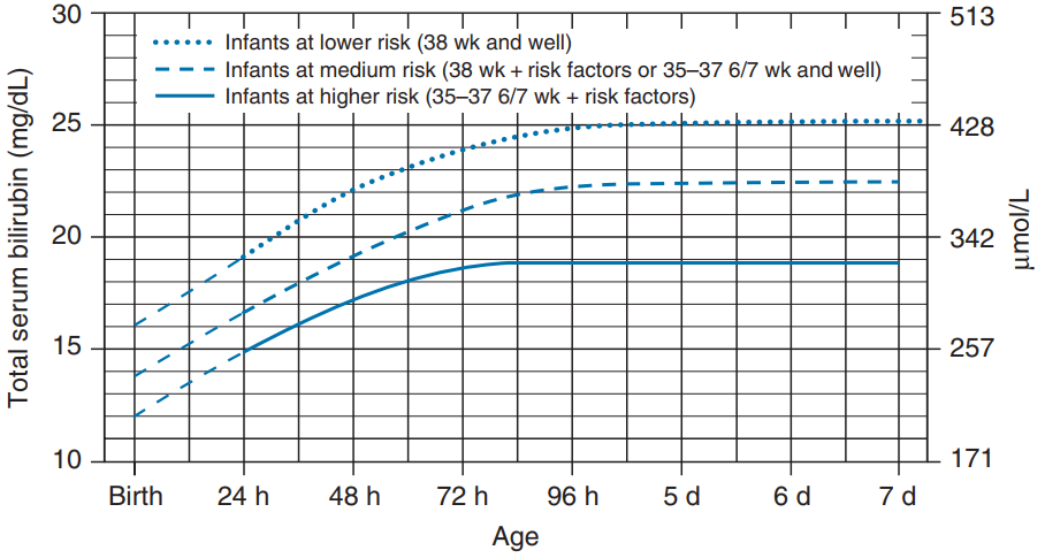
| Area of body | Level of bilirubin |
|---|---|
| Face | 4-6mg/dL |
| Chest, upper abdomen | 8-10mg/dL |
| Lower abdomen, thighs | 12-14mg/dL |
| Arms, lower legs | 15-18mg/dL |
| Palms, soles | ≥20mg/dL |

## Guidelines for phototherapy in hospitalized infants of ≥35 weeks' gestation.(11)




- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.
- Risk factors–isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or albumin <3.0 g/dL (if measured).
- For well infants 35–37 6/7 wk can adjust TSB levels for intervention around the medium risk line. It is an option to intervene at lower TSB levels for infants closer to 35 wks and at higher TSB levels for those closer to 37 6/7 wk.
- It is an option to provide conventional phototherapy in hospital or at home at TSB levels 2–3 mg/dL (35–50 mmol/L) below those shown, but home phototherapy should not be used in any infant with risk factors.

## Guidelines for exchange transfusion in infants ≥35 weeks' gestation.(11)




- The dashed lines for the first 24 h indicate uncertainty due to a wide range of clinical circumstances and a range of responses to phototherapy.
- Immediate exchange transfusion is recommended if infant shows signs of acute bilirubin encephalopathy (hypertonia, arching, retrocollis, opisthotonos, fever, high-pitched cry) or if TSB is 5 mg/dL (85 µmol/L) above these lines.
- Risk factors: isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis.
- Measure serum albumin and calculate B/A ratio (see legend).
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.

**Exchange Transfusion:** Decide based on above charts. If confused, following general rules can be used.

**Indication:**(2)

- Cord Hb 10g/dL or less
- Cord bilirubin 5mg/dL or more
- Unconjugated serum bilirubin of >10mg/dL within 24 hours or rate of rise >0.5mg/dL/hr.
- Exchange lower bilirubin levels in presence of perinatal risk factors (PNA, respiratory distress, sepsis, hypothermia etc.)
- Unconjugated serum bilirubin of 20mg/dL or more in term baby.
- In preterm baby, serum bilirubin of >1mg/100gm of weight of the infant (i.e. 10mg/dL for 1000gm and 15mg/dL for 1500gm and so on).

**Amount of blood needed:**

Twice the amount of blood volume of baby = (85×2) × weight in Kg

**Type of blood needed:**

| Incompatibility | Type of blood |
|---|---|
| Rh incompatibility | Rh negative and same ABO group as the infant; crossmatched with baby's serum<br>O(-)ve blood is commonly used |
| ABO incompatibility | Group O with same Rhesus group ( positive or negative) |

**Tests to be sent:**

Pre-transfusion: Hb%, serum bilirubin (direct, indirect, total)

Post-transfusion: Hb%, serum bilirubin (direct, indirect, total), serum calcium





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# PRETERM LOW BIRTH WEIGHT

Write **TREATMENT OF PRETERM LOW BIRTH WEIGHT** as follows:

℞ on admission on *date* at *time*

- ✓ NPO till F/O
- ✓ $O_2$ inhalation stat & SOS
- ✓ Inf. 10% DA/Libott-10 (……ml) [change fluid according to age. See Fluid]
  IV @$\frac{ml}{25}$ µd/min stat & daily
- ✓ Inj. Ceftazidime (250mg/5ml)/Tazid/Cefazid
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs

[Note: In case of Preterm Extremely Low Birthweight(ELBW) babies, start with Infusion 5% DA]

Supplements on discharge for preterm infants <35 wks and/or <1500g(10)

1. Multivitamin Pediatric Drops/V-plex drop- 5 drops OD from 2 wks of age and/or when full feeds have been achieved; continue after discharge till 6 months of age
2. Tab. Folic Acid 5mg: Dose 50µgm/day (¼ tab)- every alternate day for 6 months
3. Iron/Compiron (1ml=15 drops=50mg; 1 drop= 3.3mg)
   a. 1 drop OD (~2mg/Kg/day) at 4 wks of age for 2 wks, then
   b. 1 drop BD (~4mg/Kg/day) for 2 wks, then
   c. 2 drops BD (~ 5-6mg/Kg/day) at 1.8 Kg and continue till 6 months of age

# NEONATAL TETANUS

Consider neonatal tetanus when – baby is well for 1st 2 days of life. Then develop feeding difficulty i.e. cannot suckle and there is facial grimacing (rhesus sardonicus), stiffness and backward bending of the body (opisthotonos) on stimulation. Check for history of: lack of tetanus vaccination of mother, poor umbilical cord care (use of unsterile blade, application of dirt/cow dung etc.)

Write **TREATMENT OF NEONATAL TETANUS** as follows:

℞ on admission on *date* at *time*

- ✓ NPO till F/O
- ✓ O2 inhalation stat & SOS
- ✓ Inf. 10% DA/Libott-10 (……ml) [change fluid according to age. See Fluid]
  IV @$\frac{ml}{25}$ µd/min stat & daily
- ✓ Inj. Benzyl Penicillin (500,000IU/5ml)
  Wt×0.25 ml IV stat and 6 hourly (if penicillin is not available/allergen give metronidazole)
- ✓ Inj. Metronidazole/Filmet/Amodis (500mg/100ml)
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. TT/Vaxitet (Incepta)/TT vax(popular) 40IU/0.5ml
  1 amp IM stat on anterolateral aspect of right thigh
- ✓ Inj. Human TIG /Tetagum-P (CSL Behring)/Protet-IG (incepta) (250mg/ml)
  1 amp IM stat on anterolateral aspect of left thigh
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat
- ✓ Inj. Diazepam 10mg/2ml/ Sedil
  0.1ml/Kg/day in IV fluid continuously

  [For example, if a 3 day old, term, 3Kg baby is receiving 200ml IV fluid daily(3kg×100ml = 300ml – 90ml (300ml×30%) = 210ml ≈ 200ml)
  So, total dose = (0.1×3 = 0.3ml)÷ 2 (to find out amount for each 100ml) = 0.15ml
  We can write order as:
  Inj. Diazepam (10mg/2ml)
  0.15ml in 100ml IV fluid continuously]
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs
- ✓ Keep the baby in isolation room.

# INFANT OF DIABETIC MOTHER(10)

Write **TREATMENT OF INFANT OF DIABETIC MOTHER** as follows:

℞ on admission on *date* at *time*

- ✓ Exclusive Breastfeeding
- ✓ $O_2$ inhalation - SOS
- ✓ Inf. 10% DA/Libott-10 (……ml) [change fluid according to age. See Fluid]
  IV @$\frac{ml}{25}$ µd/min stat & daily [May not be needed if sufficient BF possible]
  **[Monitor blood glucose 4 hourly]**
- ✓ Inj. Ceftazidime (250mg/5ml)/Tazid/Cefazid
  1 ml/Kg IV stat & 12 hourly
- ✓ Inj. Amikacin (100mg/2ml)/Kacin + 8ml D/W (so, 1ml=10mg), then
  $0.75 \times wt(Kg)\ ml$ IV stat & 12 hourly after passage of first urine
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat
- ✓ Please keep the baby warm
- ✓ Please monitor the vital signs

[Monitor blood sugar in regular interval. Can be discharged after blood sugar level is stable (usually by 72 hours)]

Infusion rate (mg/Kg/min) = $\frac{IV\ rate\left(\frac{ml}{\frac{Kg}{day}}\right)\times\%\ of\ dextrose}{144}$





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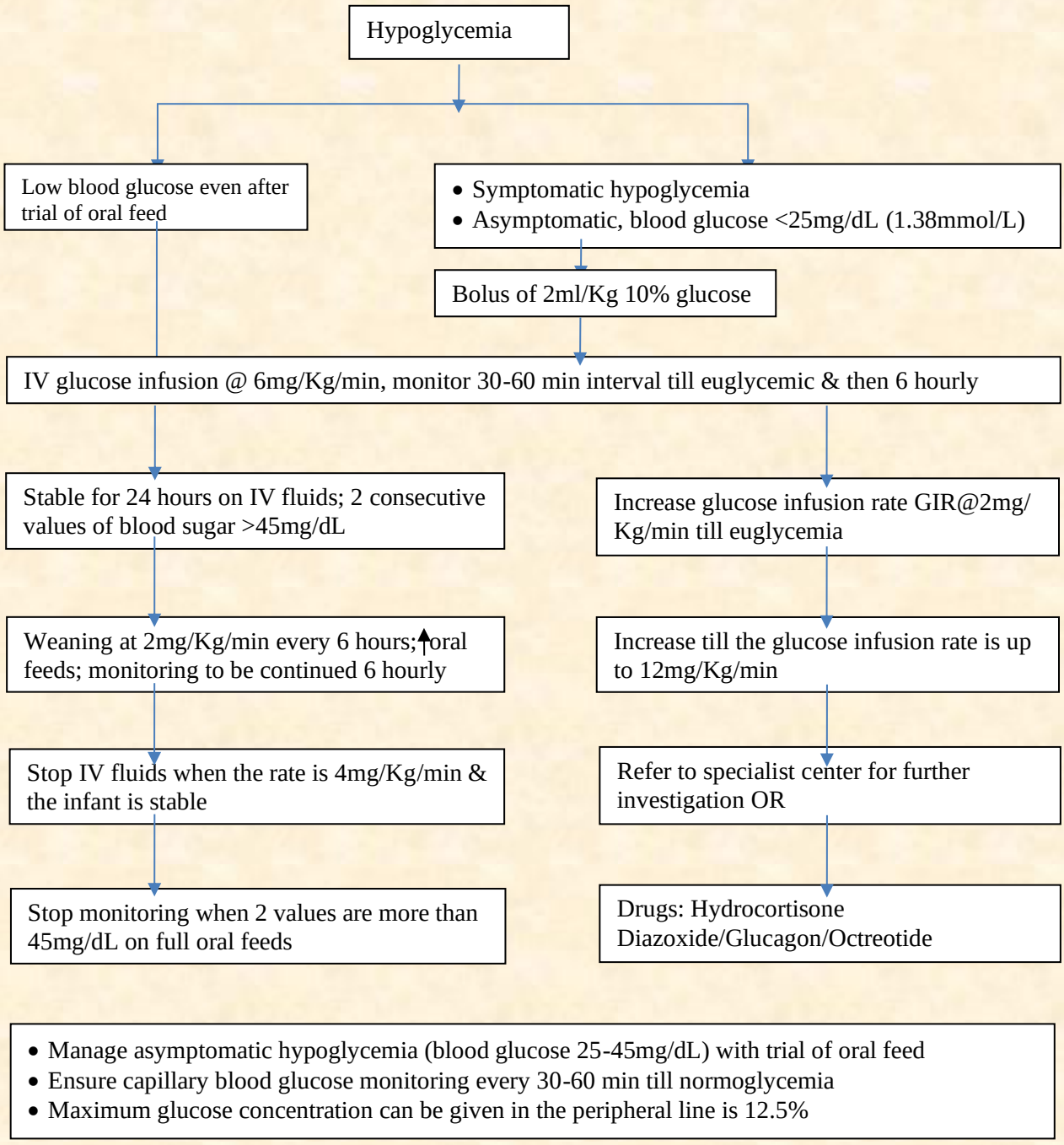
## Management of Hypoglycemia (<2.6mmol/L or 45mg/dL, acc to WHO)




- Manage asymptomatic hypoglycemia (blood glucose 25-45mg/dL) with trial of oral feed
- Ensure capillary blood glucose monitoring every 30-60 min till normoglycemia
- Maximum glucose concentration can be given in the peripheral line is 12.5%

Indication of IV glucose infusion:

- Symptomatic hypoglycemia
- Blood glucose value <1.7mmol/L

- Inability to tolerate oral feeding (vomiting) or contraindication for oral feed
- Persistent hypoglycemia despite adequate feed

Indication of IV bolus glucose:

- Symptomatic hypoglycemia
- Blood glucose <1.4mmol/L





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# INFANT OF $HB_sAg$ (+)VE MOTHER

Write **TREATMENT OF A BABY OF HBsAg (+)ve MOTHER** as follows:

℞ on admission on *date* at *time*

- ✓ Inj. Hepatitis B Vaccine/Engerix B/ Hepa B
  0.5ml IM on anterolateral aspect of left thigh
- ✓ Inj. Hepatitis B Ig (Hepabig)
  0.5ml IM stat on anterolateral aspect right thigh
- ✓ Inj. $K_1$MM/Konakion 2mg
  1 ampule IV stat or orally

[Administer the drugs and discharge the baby]

[Breastfeeding can be continued after vaccination. Ask the parent to complete EPI vaccination schedule. Check HBsAg and Anti-HBs status at 9 month of age. If -

- HBsAg Negative, Anti HBs >10mIU/ml - Immune from Hepatitis B
- HBsAg Negative, Anti HBs <10mIU/ml – revaccinate for hepatitis B
- HBsAg Positive, Anti HBs negative, refer to pediatric gastroenterologist

In preterm infants weighing <2000gm, this initial dose of vaccine should be counted as zero dose(0 dose) and should receive 3 doses of vaccine starting at 30 days of age.





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# Outdoor Managements

**WILL BE AVAILABLE IN FUTURE VERSIONS**





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# Commonly used drugs

**WILL BE AVAILABLE IN FUTURE VERSIONS**





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# The End

- Any suggestion and/or correction will be highly appreciated.
- You can send any feedback to drfahim38@gmail.com
- If you think any topic should be included in this document, i will be happy to do that.

# THANK YOU