Malnutrition – The White Book February 2017

Severe Acute Malnutrition (SAM)

First questions in History

- Anorexia or lack of appetite (< 75% of expected food intake in 20 minutes)
- HIV status of child and parents Current medication (ART’s, CPT)
- Vomiting or diarrhoea
- Oedema (distribution, duration, onset)
- CP

Important Points in Examination

SAM-children are immune-compromised, and hence show limited or no signs of infection and inflammation.

- Assess ABC, and Blantyre Coma Score (=D) and temperature (=E)
- Weight and Height/Length, and MUAC (use WHO “MOYO” charts found in MOYO)
- Asses for “WHO danger signs” suggestive of systemic infection
- Hypothermia (common) or fever (rare)
- Pallor
- Oedema (+ up to ankle, ++ up to knee, +++ generalised oedema)
- Flaky paint dermatitis, hair texture and colour
- Oral candidiasis (look in the diaper as well)
- Liver size (many kwashiorkor children have this as ‘sign’ of SAM)
- Abdominal distension (small bowel bacterial overgrowth could present like this)
- Signs of dehydration (see below)
- HIV disease / TB: lymphadenopathy (rare in malnutrition), skin changes, Kaposi etc.
- Look for changes in the eye and/or photophobia

Relevant Investigations

- Blood Sugar (if: lethargic, irritable, low BCS, diarrhoea or vomiting, hypothermic),
- HIV testing always
- Blood Culture (always when initiating antibiotics in IN-patients)
- MP’s
- PCV
- Urinalysis (proteinuria as a cause of oedema?)
- (TB testing as done in QECH/COM currently)

Indications for Admission to Moyo ward

→ Complicated Severe Acute Malnutrition

SAM as defined as:

- Bipedal nutritional oedema present OR
- Weight/Height lower than -3SD (WHO-criteria) OR
- MUAC <11.5 in children older than 6 months

Complicated SAM: presence of “DANGER” signs, suggestive for systemic infection or significant social issues at home.
Monitoring during admission

Daily monitoring of malnourished children entails (use MOYO CCP):

- Daily temperature, respiratory rate and heart rate as a minimum
- Assess intake to estimate appetite
- Daily weight
- (Loss of) Oedema
- Stool frequency / Diarrhoea, vomiting
- Urine output

In addition sick children monitored in HDU require regular (ideally 6 hourly) assessments of:

- BCS
- Heart rate and capillary refill time
- Respiratory rate and oxygen saturation
- Fluid intake and urine output

Phases of Therapeutic feeding:

1. Stabilisation phase or Phase 1 (I)
   a. High risk for hypothermia, hypoglycaemia and infections.
   b. All children are initially put on F-75 feeds 8 times per day. See MOYO charts.
   c. If appetite is returning, child is more active and alert, complications are treated and oedema is visibly decreasing THEN change to Transition phase.

2. Transition phase (TR)
   a. Prescribe F75/RUTF (Chiponde) using the charts in MOYO
   b. Let the child eat the Chiponde first, then if it is still having appetite, give F75 to ensure sufficient caloric intake. If the child finishes the Chiponde (even after 1 day), STOP the F75.
   c. Within 2 to 3 days, ‘transition’ to Chiponde only. Stop F75. If the child finishes after 1 day on Chiponde, STOP the F75.
   d. Let the clinical condition of the child guide these decisions.
   e. Use only F100 when a child is UNABLE to chew RUTF (‘Chiponde’); in the same volume as it was given with F75.

3. Rehabilitation Phase or Phase 2 (II)
   a. When the child is finishing all the Chiponde, is losing oedema and (ideally) has started to gain weight, the child is discharged home on Chiponde only.
   b. Use the MOYO charts to ensure extra caloric intake during this final catch-up phase (200 kcal/kg/day). At this point the child is active, alert and free of complications.

4. When to move back a phase?
   a. If worsening of vomiting or diarrhoea, increasing oedema or signs of fluid overload, loss of appetite (i.e. have WHO danger signs again): move back to Phase I and review the same day.
   b. If increase of vomiting/diarrhoea on F75 consider stopping feeds and putting child on IV fluids to let the gut ‘rest’ (with either IV or ReSoMal supplementation for ongoing losses). Always discuss with senior. Those children need to be admitted in HDU and monitored closely for all vital signs. If no ReSoMal available, give ORS instead.

- Place NGT if the child finishes less than 75% of the formula milk for 2 consecutive feeds. Other reasons for inserting an NGT are reduced level of consciousness, Cerebral Palsy with...
oral intake problems, lethargy or convulsions, pneumonia with rapid breathing, painful lesions in the mouth or a cleft palate / oral deformity.

- The NGT should be removed when the child takes 75% of the day’s diet orally, or takes 2 consecutive feeds fully by mouth. While having an NGT, stimulate orally every feed unless strictly on NPO.
- If possible, continue breastfeeding (including HIV exposed children). To ensure good lactation, the mother should breastfeed before the child is fed with F75.

**Complications of Malnutrition:**

a. **Hypoglycemia (blood sugar < 3 mol/l or < 54 mg/dl)**
   - Give 5 ml/kg 10% glucose. If alert give orally or by NGT; if lethargic give IV (5ml/kg 10% glucose or 2 ml/kg of 25% glucose, or 1ml/kg of 50% glucose). Feed straight away, keep warm & dry, and consider infection.
   - Repeat a blood sugar after 30 min.
   - Feed with F75 as per MOYO feeds (avoid rebound hypoglycaemia)
   - Instruct mothers to and ensure mothers do feed at night as well
     - Check temperature and assess for infections

b. **Hypothermia (axillary temperature < 35°C)**
   - Prevent by giving blanket, and close windows
   - Cover the child including the head with a woollen hat.
   - Instruct mothers to change wet clothing and nappies promptly
   - Use a heater or lamp
   - Monitor temperature until > 35°C
   - Check glucose

c. **Shock (Differential diagnosis hypovolemic and/or septic shock)**
   Definition: AVPU = ≤P, cold peripheries, capillary refill (>3sec) AND a weak fast pulse.
   - Think “ABC”, Don’t Ever Forget Glucose (DEFG)
   - Give O₂ and broad spectrum antibiotics
   - Keep warm (see above)
   - Establish IV -or IO- access,
   - Bolus with 15 ml/kg of ½ strengths Darrow’s + 5% Dextrose or Ringers Lactate + 5 % Dextrose over 1 hr and check heart rate and respiratory rate again.
   - If the pulse rate OR respiratory rate increases, the cause of the shock is most likely sepsis. Give whole blood 10 ml/kg over 4 hours plus 1mg/kg Furosemide IV at beginning of transfusion. Continue same IV-fluids at maintenance rate while awaiting the blood. Change antibiotics to Ceftriaxone.
   - If the pulse rate and/or respiration rate decreases after the first bolus but child still remains shocked, repeat the bolus. It is more likely the child is behind in fluids/dehydrated. Then start F75. If unable to tolerate full oral feeds, continue 50% IV and 50% F75.
   - If the child is no longer in shock, give 5 ml/kg of ReSoMal every 30 min for 2 hrs and then return to 100% F75. Replace every loss (diarrhoea or vomiting) with 5 ml/kg of ReSoMal.
d. **Dehydration**

Use ReSoMal 5 ml/kg every 30 minutes for 2 hours (="ReSoMal challenge") in malnourished children (very thin evidence, if O/S: give ORS). If the child is no longer dehydrated, give 5 ml/kg per loss. Monitor carefully. Be aware of volume overload. In case of emerging oedema around eyes, taper or stop fluids.

e. **Photophobia, Xerosis, Bitot’s spots, xerophthalmia and corneal ulceration**

- Give vitamin A immediately (< 6 months 50,000 IU, 6–12 months 100,000 IU, > 12 months 200,000 IU) and repeat at day 2 and 14
- In case of ulceration and or keratomalacia:
  - Seek ophthalmological advice as soon as possible, cover the eye and keep child out of direct sunlight

### Choice of antibiotics in severely malnourished:

- All children on Moyo get a 1st and/or 2nd line antibiotic on admission
- Take a blood culture on admission and if antibiotics need to be changed

<table>
<thead>
<tr>
<th>All HIV positive children</th>
<th>Preventive ABx = Co-trimoxazole</th>
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<tbody>
<tr>
<td></td>
<td>120 mg if &lt; 5 kg BD PO,</td>
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<td></td>
<td>240 mg if &gt; 5 kg BD PO</td>
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<table>
<thead>
<tr>
<th>All Moyo patients</th>
<th>1st Line AB treatment</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Benzylpenicillin 50,000IU/kg QDS IV/IM for 2 days then oral Amoxicillin 25-40mg/kg TDS PO for 5 days (Amoxicillin: infants &lt;3 kg: 15 mg/kg/dose every 12 hours) AND Gentamicin 7.5 mg/kg OD IV/IM for 7 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Failure to respond or clinical deterioration (if child fails to lose oedema, remains anorexic, or clinically septic / sick)</th>
<th>2nd Line AB treatment</th>
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<tbody>
<tr>
<td></td>
<td>Ceftriaxone 100 mg/kg OD IV/IM for 5 to 7 days</td>
</tr>
</tbody>
</table>

### Conditions needing special antibiotic treatment

- **Extensive/infected skin lesions** Cloxacillin 25-50mg/kg/day QDS PO or Flucloxacin 25 mg/kg QDS PO
- **Infected skin lesions or Kwashiorkor dermatitis** (open sores): GV paint or a skin barrier spray.
- **Distended abdomen** suspect bacterial overgrowth of the small gut. Metronidazole 7.5-10 mg/kg PO TDS for 7 days.
- **Persistent Diarrhoea** with suspected protozoan infections of the gut. Metronidazole 10 mg/kg TDS for 7 days. Consider high dose Co-trimoxazole (60 mg/kg BD) if HIV infection.
- **Candida infection of the perineum**: removing diapers to dry the area and apply GV paint. Nystatin ointment if available (ask LEpra skin clinic if o/s in pharmacy).
- If **gram-negative sepsis** suspected then give Ciprofloxacin 15-20 mg/kg PO BD for 7 days (in NTS sepsis for 14 days)
- **Oral Candidiasis.** 1) GV-paint, 2) oral Nystatin, 3) Fluconazole 3-6 mg/kg OD PO in oesophageal/systemic Candidiasis

### Anaemia (PCV<12%):

Only transfuse children with a PCV<12% (Hb <4 g/dl or <6 g/dl and respiratory distress), and then preferably with fresh whole blood.

- If stable await senior review,
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- If unstable give a blood transfusion with whole blood (10 ml/kg in 4 hours, halfway Furosemide (1mg/kg))
- If signs of congestive cardiac failure, infuse 7ml/kg of packed cells over 3 hours
- Only give Fe therapy (3 mg elemental Fe/kg/day) on discharge

**Multidisciplinary Teams:**

Malnourished children are also "mentally malnourished". Once stabilized, they should be engaged into social interaction and play therapy. Encourage parents to make use of the play therapy room across from Moyo Ward and to converse and play a lot with their children.

- **Physiotherapy**
  Involve physiotherapy early in children with CP.
- **Nutritionist** (when available)
  Get them to help to get a full history of the child’s/family’s feeding habits at home.

**Failure to respond to treatment:**

A child that is not improving clinically, gaining oedema or not losing oedema, or is deteriorating clinically. Re-consider your diagnosis, discuss with a senior. Realise that malnourished children might show no signs of systemic infection.

No weight gain during Moyo admission?
The most common causes for not reaching the expected weight gains are:

- Inadequate dietary intake (insufficient amount of F75, F100 or Chiponde, the prescribed (night-) feeds are not given as prescribed, spillage [easily 10% of prescribed volume], vomiting, anorexia or the amount prescribed is wrong. CONSIDER NGT.
- Chronic diarrhoea, and malabsorption
- Lack of supervisory staff, exhausted guardians
- Inaccurate or faulty recording and weighing
- Your diagnosis is wrong, make a new differential diagnosis. Do physical examination!

Manage treatment failure by:

- Review the exact amount of food that the child is taking and calculate the caloric intake per day (should be > 150 kcal/kg/d).
- Treating HIV infection (the decision to start HAART should be discussed with senior staff)
- Look for underlying occult infection (TB, HIV, bacteraemia, UTI, Otitis, Thrush)
- TB infection should be suspected in any child who does not gain weight for more than 7 days on AB, who has a TB contact, or symptoms or signs suggestive of TB.

**Consider re-admission as a type of treatment failure. Involve Umodzi.**

**When to Discharge:**

Usually when the child is finishing Chiponde, no signs of infection, good appetite and gaining weight. Consider discharge in any patient entering Phase II with this.
### MOYO MILK RATIONS

(F75 at 100 kcal/kg/day in 8 feeds) (F100 at 135 kcal/kg/day in 8 feeds)

<table>
<thead>
<tr>
<th>Child's weight</th>
<th>F75 in Phase 1 at 8 feeds/day</th>
<th>TOTAL amount milk per day</th>
<th>mls/feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>From (kg)</td>
<td>To (kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5*</td>
<td>2.7</td>
<td>50</td>
<td>400</td>
</tr>
<tr>
<td>2.8*</td>
<td>2.9</td>
<td>55</td>
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<tr>
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<td>320</td>
<td>2560</td>
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<tr>
<td>40.0</td>
<td>40.9</td>
<td>350</td>
<td>2800</td>
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* Do not give F100 full strength to children less than 3 kg
<table>
<thead>
<tr>
<th>Child's weight</th>
<th>RUTF per day in MOYO at 175 kcal/kg/day</th>
<th>RUTF per 2 weeks in OTP at 200 kcal/kg/day</th>
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<tr>
<td></td>
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<tr>
<td>From (kg)</td>
<td>To (kg)</td>
<td>Sachets Chiponde</td>
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<tr>
<td>4.0</td>
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