Dehydration (severe)

ETAT Module 5

Adapted from Emergency Triage Assessment and Treatment (ETAT): Manual for Participants, World Health Organization, 2005
Learning Objectives

- Learn **causes** of severe dehydration in children
- Learn how to **identify** children who are severely malnourished
- Learn how to **assess** severe dehydration in children who are well-nourished
- Learn how to **treat** severe dehydration in children who are well-nourished
- Learn how to **assess** severe dehydration in children who are severely malnourished
- Learn how to **treat** severe dehydration in children who are severely malnourished
Target Audience

• All centre staff who have contact with patients should be familiar with recognizing children with severe dehydration
Review of Emergency and Priority signs

Emergency Signs
- Airway
- Breathing
- Circulation
- Coma
- Convulsion
- Dehydration (severe)

Priority Signs

3TPR
- T: tiny baby, temperature, trauma
- P: pallor, poisoning, pain
- R: respiratory distress, restless, referral

MOB
- M: malnutrition
- O: oedema
- B: burn
LEARN THE CAUSES OF SEVERE DEHYDRATION IN CHILDREN
What are the common causes of dehydration?

1. Diarrhoea
2. Vomiting
LEARN HOW TO IDENTIFY CHILDREN WHO ARE SEVERELY MALNOURISHED
Why is it important to identify children with severe malnutrition?

• Signs of severe dehydration (sunken eyes, slow skin pinch, absence of tears) are **unreliable** in a child who is **malnourished**.

• Because they have poor cardiac function, children who are malnourished can develop **heart failure** and die when they receive unnecessary fluid.
Signs of severe acute malnutrition (SAM)

- Severe wasting
- Decreased upper arm circumference
- Oedema
Severe wasting
Decreased upper arm circumference
Severe malnutrition with oedema
LEARN HOW TO ASSESS SEVERE DEHYDRATION IN CHILDREN WHO ARE WELL-NOURISHED AND THOSE WHO ARE MALNOURISHED
Assessing severe dehydration

• Only **after** the A, B, C’s have been assessed and treated can you start assessing ‘D’ for dehydration

**Emergency Signs**
- Airway
- Breathing
- Circulation
- Coma
- Convulsion
- Dehydration (severe)
Signs of severe dehydration in **well-nourished** children

- Lethargy
- Sunken eyes
- Delayed skin pinch
Classification of dehydration in children who are well-nourished

2 of the following signs:
- Lethargic or unconscious
- Sunken eyes
- Not able to drink or drinking poorly
- Skin pinch goes back very slowly

Severe dehydration

2 of the following signs:
- Restless, irritable
- Sunken eyes
- Drinks eagerly, thirsty
- Skin pinch goes back slowly

Some dehydration

Not enough signs to classify as some or severe dehydration

No dehydration

Adapted from IMCI chart book, WHO, UNICEF, page 3
Assessing severe dehydration in a child who is well-nourished

Does the child have vomiting or diarrhoea?

- NO
  - Proceed to check the 6 priority signs 3TPR, MOB

- YES
  - Assess:
    1. Is the child lethargic?
    2. Does the child have sunken eyes?
    3. Does a skin pinch take longer than 2 seconds to go back?

If 2 of the signs are positive then the patient has severe dehydration
How do you determine if the child is lethargic?

• Assess the level of consciousness using the AVPU scale
  – Alert: Child is alert
  – Voice: Child responds to voice only = lethargic
  – Pain: Child responds to pain only = coma
  – Unconscious: Child does not respond to voice or pain = coma
Lethargic children

Courtesy Rehydration Project, WHO

Courtesy Virginia Bioinformatics Institute at Virginia Tech
Child with sunken eyes

- Presence of sunken eyes in a well nourished child is a sign of dehydration.
- If you are not sure, ask the parent if the child’s eyes are more sunken than usual.

Courtesy Rehydration Project, WHO
Sunken eyes

courtesy of E. Molyneux
Assessing Skin pinch

• Skin pinch test
  – Pinch the skin on one side of the belly button and see how long it takes to return to normal.
  – If it takes more than 2 seconds then the child is dehydrated.

Courtesy Virginia Bioinformatics Institute at Virginia Tech
Delayed skin pinch

courtesy of E. Molyneux
Other signs for assessing dehydration

• Tears
  – Ask the parent if the child is producing tears when they are crying.
  – Decreased or absent tears is a very important sign of severe dehydration in children who are well nourished.

• Dry mouth
  – Look at the patients mouth and tongue to see if it is dry.
  – Dry tongue/mouth is a very important sign of dehydration.
Summary: Assessing severe dehydration in a well-nourished child

• **Ask** these questions:
  – Does your child have vomiting, diarrhoea?
  – Are the child’s eyes sunken?
  – Does the child have tears when crying?

• **Look** at the patient
  – Evaluate mental status, sunken eyes, dry mouth, tears

• **Feel** for signs of dehydration
  – Skin pinch test
LEARN HOW TO TREAT DEHYDRATION IN CHILDREN WHO ARE WELL-NOURISHED
Treating severe dehydration

• Before treating severe dehydration it is very important to ask:
  – Is the child well-nourished or severely malnourished?

• The treatment of severe dehydration for children with severe malnutrition is different from the treatment of those who are well-nourished.
Treating dehydration in a child who is well-nourished

2 of the following signs:
Lethargic or unconscious
Sunken eyes
Not able to drink or drinking poorly
Skin pinch goes back very slowly

Severe dehydration
If child has no other priority sign:
Give fluid per Plan C *

2 of the following signs:
Restless, irritable
Sunken eyes
Drinks eagerly, thirsty
Skin pinch goes back slowly

Some dehydration
Give fluid, zinc supplement and food for some dehydration (Plan B)*

Not enough signs to classify as some or severe dehydration

No dehydration
Give fluid, zinc supplements and food to treat diarrhoea at home (Plan A)

*If child has other priority signs (respiratory distress, shock, convulsion, etc) then refer URGENTLY to hospital with mother giving frequent sips of ORS on the way. Advice mother to continue breastfeeding.

Adapted from IMCI chart book, WHO, UNICEF, page 3
Treating severe dehydration in a child who is well-nourished

• General principles:
  – There are 2 phases of hydration:
    • Initial hydration
    • Ongoing hydration
  – Use Plan C
  – Give the child a large volume of fluid quickly and then rehydrate the child.
Plan C: for well-nourished children with severe dehydration

Can you give IV fluids immediately?
- Yes
  - Begin Ringer's lactate:
    - For ≤12 months:
      - Initial bolus: 30mL/kg over 1 hour
      - Maintenance: 70mL/kg over 5 hours
    - For > 12 months:
      - Initial bolus: 30mL/kg over 30 min
      - Maintenance: 70mL/kg over 2 1/2 hours
  - Is IV treatment nearby (w/in 30 min)?
    - Yes
      - Refer urgently to hospital
      - Give ORS by mouth in route (5mL/kg/hour)
    - No
      - Are you trained to use a nasogastric tube OR can the child drink?
        - Yes
          - Start ORS by NG tube or mouth
          - Give 20mL/kg/hour for 6 hours
          - For vomiting or gastric distention, give fluid more slowly.
          - Reassess every hour.
          - If hydration status is not improving, send for IV therapy.
          - After 6 hours, re-classify degree of dehydration and chose appropriate plan (A,B, or C) for continued therapy.
        - No
          - Refer urgently to hospital for IV or NG treatment
LEARN HOW TO ASSESS SEVERE DEHYDRATION IN CHILDREN WHO ARE SEVERELY MALNOURISHED
How are severely malnourished children different?

- Children may appear to be severely dehydrated who are not.
  - Lethargy may be related to malnutrition
  - Eyes may be sunken because of decreased fat behind the eyes
  - Skin pinch may be delayed because there is less fat and muscle under the skin
- They may then receive fluid that they do not need and can develop heart failure.
Symptoms and signs of severe dehydration in children with severe malnutrition

- History of fluid loss from vomiting and/or diarrhoea AND
- Recent change in mental status (i.e., less responsive) AND
- Recent (hours or days) development of sunken eyes or delayed skin pinch OR
- Recent (hours or days) change in appearance of eyes and skin
Summary: Assessing severe dehydration in a child with severe malnutrition

- Symptoms and signs of severe dehydration are the same as those for well nourished children but must include a history of volume loss and change in physical appearance.
  - Ask these questions:
    - Has the child had vomiting and/or diarrhoea?
    - Is the child more lethargic than usual?
    - Are the eyes more sunken than usual?
  - Look at the child:
    - Evaluate mental status, sunken eyes, dry mouth, tears
  - Feel for signs of dehydration (skin pinch)
LEARN HOW TO TREAT DEHYDRATION IN CHILDREN WHO ARE SEVERELY MALNOURISHED
Treating dehydration in a child who is **malnourished**

- Do NOT give IV fluids unless the child is in shock.
- Use ReSoMal (orally or by nasogastric tube)
  - For the first 2 hours, give 5 mL/kg every 30 minutes (total 20 mL/kg over 2 hours).
  - For the next 4-10 hours, give 5-10 mL/kg/hour
- Treat blood glucose <3 mmol/L (55 mg/dL).
Treatment of severe dehydration: summary

Does the child have severe malnutrition?

Yes

Is the child in shock?

Yes

See treatment of shock job aids

No

Does the child have severe malnutrition?

No

Is the child in shock?

Yes

See treatment of shock job aids

No

Yes

• Do NOT IV fluids
• Give ReSoMal
  • 5 mL/kg every 30 min for first 2 hours
  • Then 5-10 mL/kg/hour for the next 4 to 10 hours
  • Give more ReSoMal if the child wants more or has large losses (vomit or stool)
• Check blood glucose. Treat if <3mmol/L (see hypoglycemia job aid)

No

Yes

• Use Plan C
• Begin Ringer's lactate:
  • For ≤12 months:
    • Initial bolus: 30mL/kg over 1 hour
    • Maintenance: 70mL/kg over 5 hours
  • For > 12 months:
    • Initial bolus: 30mL/kg over 30 min
    • Maintenance: 70mL/kg over 2 1/2 hours
• Assess every 1-2 hours
• If signs of dehydration are NOT improving
  • Give fluid more rapidly
  • Inform senior staff
• As soon as the child can drink
  • Give ORS in addition to drip at 5 mL/kg/hour
### Summary: treatment of severe dehydration

<table>
<thead>
<tr>
<th>If the child has <strong>NO</strong> severe malnutrition</th>
<th>If the child <strong>HAS</strong> severe malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Does the child have shock?</strong></td>
<td><strong>Does the child have shock?</strong></td>
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<tr>
<td>If <strong>YES</strong></td>
<td>If <strong>YES</strong></td>
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<tr>
<td>- See TREATMENT OF SHOCK (Table 3)</td>
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</tr>
<tr>
<td>in Module 3: Circulation</td>
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</tr>
<tr>
<td>If <strong>NO</strong></td>
<td>If <strong>NO</strong></td>
</tr>
<tr>
<td>- Give Ringer's lactate</td>
<td>- Do not give IV fluids</td>
</tr>
<tr>
<td>- For infants:</td>
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<tr>
<td>- 30 ml/kg in the first hour</td>
<td>For all children:</td>
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<tr>
<td>- 70 ml/kg in the next 5 hours</td>
<td>- Give ReSoMal 5ml/kg every 30 minutes for the first 2 hours</td>
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<tr>
<td>- For children &gt; 1 year of age:</td>
<td>- Then 5-10ml/kg/hour for the next 4-10 hours</td>
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<tr>
<td>- 30 ml/kg in the first 30 minutes</td>
<td>- Give more ReSoMal if child wants more or large stool loss or vomiting</td>
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<tr>
<td>- 70 ml/kg in the next 2.5 hours</td>
<td>- Check blood glucose</td>
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<tr>
<td>- Assess the child every 1-2 hours</td>
<td>- Treat if &lt;3mmol/l (see Module 3)</td>
</tr>
<tr>
<td>If the signs of dehydration are not</td>
<td>For further treatment see inpatient</td>
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<tr>
<td>improving:</td>
<td>guidelines</td>
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<tr>
<td>- give fluid more rapidly</td>
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<td>- inform doctor or senior staff</td>
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<tr>
<td>As soon as the child can drink:</td>
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<tr>
<td>- give oral fluids in addition to the</td>
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<tr>
<td>drip</td>
<td></td>
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<tr>
<td>- give ORS 5 ml/kg every hour</td>
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</tbody>
</table>

ETAT manual for participants, page 47
Dehydration Management Skills

How to insert a nasogastric tube
How to insert a nasogastric (NG) tube

- Measure distance from nose to stomach.
- Carefully insert the tube through the nose to the measured distance.
- To confirm placement, inject 5 mL of air into tube and listen for the sound of air over the stomach.

ETAT manual for participants, page 63
Complications of NG tube placement

• The tube can pass into the trachea or lungs.
  – Child may develop respiratory distress, an abnormal cry, or cyanosis.
  – Remove tube immediately

• Trauma to the nose (bleeding)
Summary

• Now you know the causes of severe dehydration
  – Vomiting, diarrhoea
Summary

• Now you know how to assess severe dehydration in children who are well-nourished
  – Ask parents questions and evaluate child’s mental status, sunken eyes, tear production, mouth and pinch test

• Now you know how to treat severe dehydration in children who are well-nourished
  – Use Plan C with 2 phases of rehydration:
    • Initial rehydration: Quickly give fluid to the child using an IV/IO
    • Ongoing rehydration: IV fluids and/or ORS
Severe dehydration in **well-nourished** children: overview of assessment and management

D  
Severe Dehydration

Any 2 positive signs
- Lethargy
- Sunken eyes
- Very slow skin pinch

Manage
- Start IV and
- Begin giving fluids rapidly following Plan C
Summary

• Now you know that severe dehydration is difficult to assess in children who are severely malnourished
  – Ask parents questions about acute volume loss
  – Ask about recent change in appearance

• Now you know how to treat severe dehydration in children who are severely malnourished
  – Do NOT give IV fluid (unless in shock!)
  – Use ReSoMal (oral or nasogastric)
  – Give fluid more slowly
Severe dehydration in **severely malnourished** children: overview of assessment and management

**D**
Severe Dehydration

**History of volume loss**
Change in appearance
- Sunken eyes
- Slow skin pinch

**Manage**
- Do not give IV fluids
- Give ReSoMal (oral or nasogastric)