OUTPOST NURSING

PEDIATRICS

DEHYDRATION AND FLUID REPLACEMENT

In order to rehydrate a dehydrated child, you need to determine the following:

How much fluid to give
How fast to give the fluid
What fluid(s) to use

How much fluid to give (i.e. replacement fluids)

The amount needed for replacement fluids equals:

- The volume of fluids which the child has lost through dehydration (deficit fluids)

PLUS

- The volume of fluids which the child would normally require over the period of time in which rehydration is taking place

i.e. Replacement fluids = Deficit fluids & Maintenance fluids

Replacement fluids are calculated as follows:

A. If you know how much the child weighed before he became ill:

- Determine how much weight he has lost and convert this into c.c. (1 kg. = 1000c.c.) This figure is the fluid deficit.

- Add the appropriate maintenance fluids for the child's weight. (See table of normal daily fluid requirements at end of handout). This will give you the amount of replacement fluids required. Remember to calculate the maintenance fluids by the child's weight before he became ill.

B. If you do not know how much the child weighed before he became ill:

- Estimate the degree of dehydration subjectively as follows:

Mild or 5% dehydration
Mouth and tongue are dry. Child should not need parenteral fluids if fluid loss can be stopped and child can drink.

Moderate or 10% dehydration
Mouth is drier. Skin is dry and "wrinkled". Eyes appear somewhat sunken and child looks as if he has lost weight. Fontanel is depressed. Tears are absent. Child is responsive. Parenteral fluids are required.

Severe or 15% dehydration
Eyes are markedly sunken. BP is low. Child responds poorly. Skin feels "doughy", and turgor is decreased. Parenteral fluids are always required. There are likely to be many electrolyte problems.

- Figure fluid deficit as follows:

  5% dehydration
  The present weight will be 95% of the child's weight before he became ill. Figure how much he weighed before becoming ill by dividing his present weight by 19 and then multiplying by 20. Figure how much weight he has lost and convert to c.c. (1 kg = 1000 c.c.) This is the fluid deficit.

  10% dehydration
  The present weight will be 90% of the child's weight before he became ill. Figure how much he weighed before becoming ill by dividing his present weight by 9 and then multiplying by 10. As above, figure how much weight he has lost and convert to c.c. to arrive to his fluid deficit.

  15% dehydration
  The present weight will be 85% of the child's weight before he became ill. Figure how much he weighed before becoming ill by dividing his present weight by 17 and then multiplying by 20. As above, figure how much weight he has lost and convert to c.c. to arrive to his fluid deficit.

- Add the deficit fluids and the appropriate maintenance fluids (calculated by child's weight before he became ill) to arrive at the replacement fluids.

The Severity of Pediatric Dehydration

Clinical Findings	Mild Dehydration	Moderate Dehydration	Severe Dehydration
Weight Loss	Up to 5%	5% - 9%	Over 10%
Estimated Fluid Loss	Up to 50 ml/kg	50 – 90 ml/kg	Over 100 ml/kg
Behaviour	Normal	Irritable	Hyperirritable to lethargic
Thirst	Slight	Moderate	Intense
Mucous Membranes	Moist	Dry	Parched
Tears	Present	Variably present	Absent
Anterior Fontanelle	Flat	Flat to depressed	Depressed
Blood Pressure	Normal	Normal to slightly decreased	Decreased
Eyes	Normal	Normal to slightly sunken	Sunken
Urinary Specific Gravity	Slightly increased	Increased	Greatly increased
Skin Turgor	Normal capillary filling	Fair to poor capillary filling	Tenting (doughy if hypertonic)
Heart Rate	Normal	Rapid	Tachycardic

Note: A greater than 15% weight loss or an estimated fluid loss of 150 ml/kg indicates fulminant shock and requires physicians to consider sepsis as the cause.

Fluid Therapy Principles

Degree of Dehydration	Clinical Assessment	Treatment Principles
No Dehydration	♦ Diarrhea is present ♦ Normal urinary output	♦ Normal diet and breast-feeding may continue at home with fluid intake dictated by thirst. ♦ High osmolality fluids such as undiluted juices should be avoided. ♦ Maintenance oral electrolyte solution offered ad libitum.
Mild (<5%)	♦ Watery diarrhea ♦ Decreased urine output ♦ Increased thirst ♦ Slightly dry mucous membranes	♦ Assessment and treatment under close supervision are indicated. ♦ Rehydration consists of ORS or maintenance solution 10 mUkg/hr with reassessment q4h. ♦ ♦ Breast-feeding continues.
Moderate (5-10%)	♦ Abnormal skin turgor (tenting of abdominal skin lasting < 2 sec). ♦ Sunken eyes ♦ Very dry mucous membranes ♦ ♦ Depressed anterior fontanel	♦ Rehydration consisting of ORS 15-20 mUkg/hr with direct observation and reassessment q4h is indicated. ♦ If dehydration is corrected, therapy for ongoing losses and maintenance are continued as outline above. ♦ ♦ If not, treatment is repeated as indicated by clinical signs or symptoms.
Severe (>10%)	♦ Signs of moderate dehydration plus any of the following: ♦ Abnormal skin turgor (tenting of abdominal skin lasting >2 sec). ♦ Rapid weak pulse/ hypotension ♦ Rapid breathing ♦ Cold extremities ♦ Oligo-anuria ♦ ♦ Lethargy, shock, coma	♦ Blood pressure should be measured. ♦ Prompt intravenous therapy is indicated with rapid infusion of saline, plasma or colloid sufficient to replete blood volume (20 mUkg boluses given by push). ♦ Intraosseous infusion should be used if an intravenous line cannot be inserted within 90 seconds.

Investigation of Diarrhea