PARENTERAL FLUID THERAPY FOR CHILDREN & YOUNG PEOPLE (AGED OVER 4 WEEKS & UNDER 16 YEARS)

Essential Monitoring, Observations & Reassessment

INITIALLY

Admission Weight.
U&E (unless child is well & for elective surgery)

Each shift
Handover and review fluid management plan.

12 Hourly -
Clinical assessment, fluid balance, glucose

24 Hourly -
Clinical reassessment.
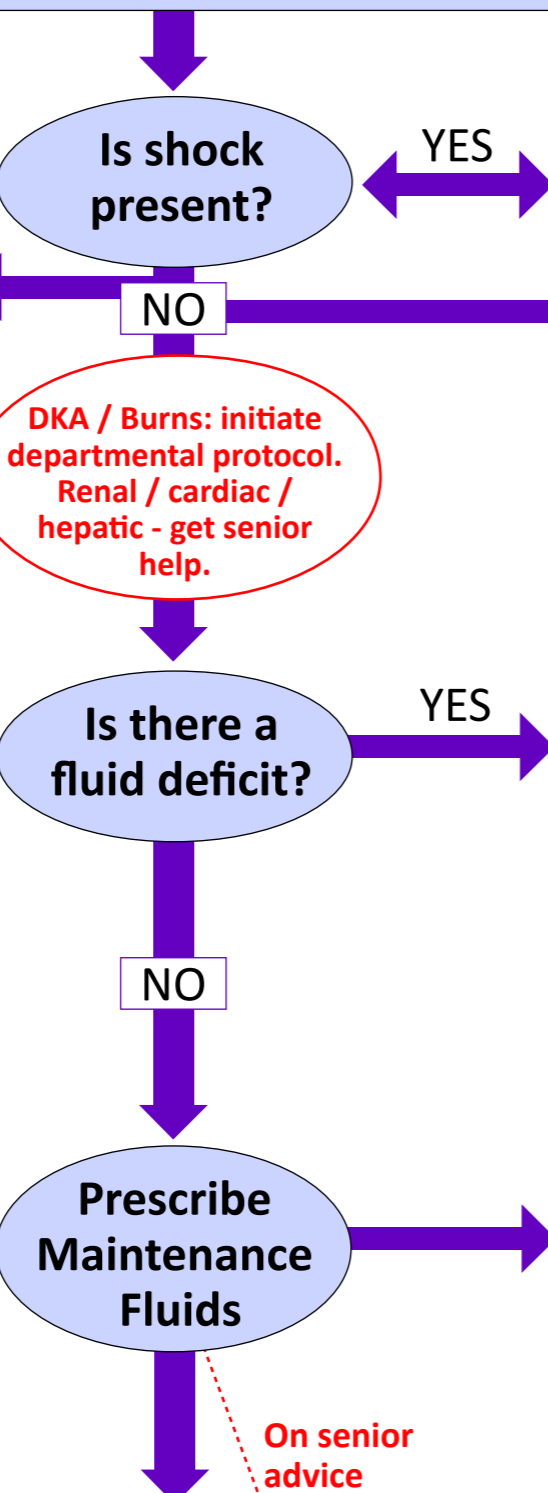U&E (more often if abnormal; 4-6hourly if Na⁺ < 130 mmol/L).
Weight and weight changes

ILL CHILDREN
Hourly - HR, RR, BP, GCS. Fluid balance (urine osmolality if volume cannot be assessed). **2 - 4 hourly** – glucose, U&E, +/- blood gas.

Enteral Intake and Medications:
Assess and record the volume and type of enteral fluids and IV medications.

If plasma Na⁺ < 130mmol/L or > 150mmol/L or plasma Na⁺ changes > 5mmol/L in 24 hours get senior help

Flowchart

Is shock present? → **YES**

NO

Can child be managed with enteral fluids? → **YES** → **PRESCRIBE ENTERAL REHYDRATION SOLUTION**

DKA / Burns: initiate departmental protocol. Renal / cardiac / hepatic - get senior help.

Is there a fluid deficit? → **YES**

NO

Prescribe Maintenance Fluids → *On senior advice*

Resuscitation — ADMINISTER FLUID BOLUS OVER LESS THAN 10 MINUTES
Give 20 ml/kg of glucose-free crystalloids that contain sodium in the range 131 - 154 mmol/L IV or Intraosseous
[10 ml/kg if history of trauma, haemorrhage or in diabetic ketoacidosis]
Reassess. Repeat bolus if needed and get senior help.

Replacement: Redistribution — ESTIMATE DEFICIT
FLUID DEFICIT = (% dehydration x kg x 10) as mls of:
Isotonic crystalloids that contain sodium in the range 131 - 154 mmol/L
The volume of fluid to be prescribed is: fluid deficit MINUS volume of any fluid bolus received
Prescribe this residual volume of deficit separately from the maintenance prescription.
Give over 48 hours.
ONGOING LOSSES: calculate at least 4 hourly. Replace with an equal volume of:
sodium chloride 0.9% (with pre-added potassium)
Change fluid type and volume according to clinical reassessment, electrolyte losses and test results

Routine Maintenance

Fluid choices:
Initially use isotonic crystalloids that contain sodium in the range of 131 - 154 mmol/L. Glucose containing fluid required in infants and young children. May also be required in older children.

Fluid Rate:
Alter fluid rate according to clinical reassessment (including changes in enteral intake). Adjust fluid type according to investigations. If sodium rises above 145 mmol/L change to sodium chloride 0.45% (with or without pre-added glucose and potassium).

COMMENCE ENTERAL FLUIDS & DISCONTINUE IV FLUIDS AS SOON AS CLINICALLY APPROPRIATE

Patients particularly at risk from hyponatraemia
- peri-operative patients
- head injuries
- gastric losses
- CNS infection
- severe sepsis
- hypotension
- intravascular volume depletion
- bronchiolitis
- gastroenteritis with dehydration
- abnormal plasma sodium and also if less than 138 mmol/L
- salt-wasting syndromes

▶ **Symptomatic Hyponatraemia - potential symptoms: nausea, vomiting, headache, irritability, altered level of consciousness, seizures or apnoea.**

Routine Maintenance [Uses Weight]
CALCULATION OF 100% RATE
(a) for first 10 kg: 4ml/kg/hr
(b) for second 10 kg: 2ml/kg/hr
(c) for each kg over 20 kg: 1ml/kg/hr
[for 100% daily maintenance add together (a) + (b) + (c)]
MAXIMUM: females 80 mls per hour; males 100mls per hour.
If risk of hyponatraemia is high consider initially reducing maintenance volume to two thirds of maintenance.

Surface Area Method
insensible losses
(300 - 400ml/m²/24 hrs)
plus
urinary output

Acute Symptomatic Hyponatraemia: raise Na⁺ by 5 - 6mmol/L in 1-2 hours using sodium chloride 2.7% IV bolus(es). Aim for max 10mmol/L rise in 5 hours

Bolus	Volume	Speed	Max	Comment
No.1	2ml/kg	10 mins	100ml	Give bolus No.2 if still symptomatic
No.2	2ml/kg	10 mins	100ml	Check U&E; Give No.3 if symptomatic
No.3	2ml/kg	10 mins	100ml	If symptomatic reconsider diagnosis

First 48 hours: 2 hourly U&E, max Na⁺ 135 mmol/L , max rise 20mmol/L

Hypokalaemia (< 3.5 mmol/L): Check for initial deficit. Maintenance fluid with pre-added potassium required. For concentration > 40mmol/L **get senior help.**
Hypoglycaemia (< 3 mmol/L). Medical Emergency: give 2 ml/kg bolus of glucose 10%. Review maintenance fluid, consult senior and recheck level after 15-30 mins. INTRA-OPERATIVE PATIENTS: consider monitoring glucose.