NORMAL FLUID & ELECTROLYTES

Physiology:

Tonicity: is normally maintained between 280 – 295 mosmol/L by ADH and thirst control mechanisms. Volume regulation of water is via ADH, thirst and renin-angiotensin-aldosterone system. Note that volume regulation overrides osmotic regulation.

Urine output:

The minimal urine output that maintain homeostasis varies with e.g. being 1.4ml/kg/hr at 4 weeks, 1ml/kg/hr at 6 months and 0.5ml/kg/hr at 1 year.

Compartments:

	Newborn	Infant	Adult
Total BodyWater(TBW)	75%	60%	60%
Intra Cellular Volume(ICV)	35%	35%	40%
Extra Cellular Volume(ECV)	40%	25%	20%
Blood Volume	8%	7.5%	7.5%

Measured parameters that aid assessment are

- Weight
- Haematocrit
- Serum and urinary osmolality
- Acid base balance

Body weight	Fluid requirement per day	Fluid requirement per hour
First 10kg	100ml/kg	4ml/kg
10 – 20 kg	50ml/kg	2ml/kg
> 20kg	20ml/kg	1ml/kg
Maintenance Fluid – 0.9% Normal Saline + KCL 20 mmol/l		

Actual volume of insensible loss is related to:

- Caloric content of feeds, ambient temperature, humidity of inspired air, presence of pyrexia and the quality of the skin.
- Usually between 0 and 10 ml/kg/day are lost in stools
- (may exceed 300 ml/kg/day in diarrhoea)
- Urinary losses are usually between 1-2 ml/kg/day
- (approx 30ml/kg/day)

Body Weight	Serum Na mmol/kg/day	Serum K mmol/kg/day
First 10kg	2-4	1.5-2.5
Second 10kg	1-2	0.5-1.5
Subsequent kg	0.5-1	0.2-0.7

- How to calculate the percentage of dehydration
    - Percentage dehydration x weight x 10
    - Percentage dehydration means the number of grams of fluid lost per 100 gm of body weight.
    - Percentage x 10 converts this volume into ml/kg

- Shock occurs as a result of rapid loss of 20ml/kg from the intravascular space. If the intravascular volume is maintained, clinical dehydration is only evident after losses > 25ml/kg of total body water.

- It is possible to be **shocked and not dehydrated**, dehydrated and not shocked, or dehydrated and shocked

Composition of common IV fluids

	0.9% N Saline	**Hartmans**	**5% dextrose**	**½ NS**
Na+ mmol/l	150	130		75
K+mmol/l		4 – 5		
Cl-mmol/l	150	109		75
Ca+		3		
Lactate		28		
Dextrose g/l			50	
Osm mosm/l	300	274	278	150
pH	4.0 – 7.0	5.0 – 7.0	3.5 – 6.5	4.0 – 7.0