

SIMPLY... Fluids

Dr William Dooley



Plan

- Resuscitation
- Routine Maintenance
- Replacement
- Redistribution
- **Reassessment**

- Common Errors
- Some Calculations

- Why does it matter?



Assessment

?ORAL vs. IVF

- **History**

Limited intake
Co-morbidities

High losses
Symptoms e.g. thirst

- **Examination**

A-

B- RR >20/min

C- SBP <100mmHg HR >90 bpm

CR >2secs

Cold peripherally

JVP

D- **UO < 0.5 ml/kg/hr**

E – Dry mucosae

- **Investigation**

Bedside: Wt (IBW)

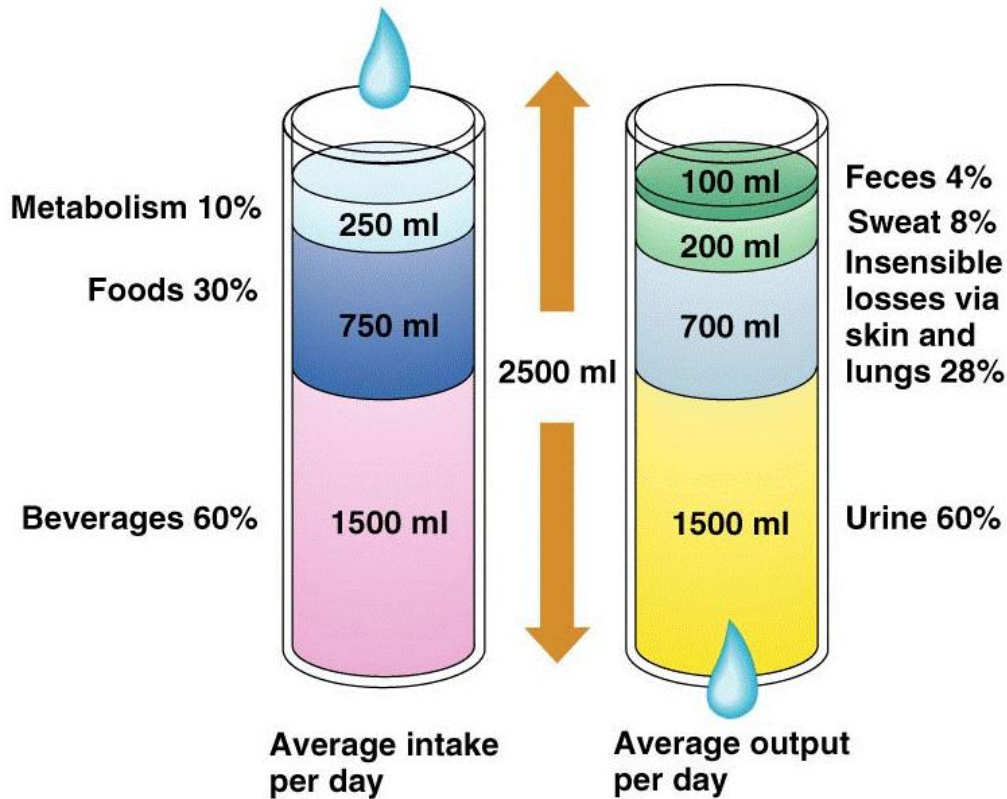
Fluid Balance

Bloods: FBC/U+E

Imaging: CXR



Fluid balance



1 24 Hour Fluid Balance Chart The Leeds Teaching Hospitals NHS Trust
01:00hrs - 24:00hrs

WPG562

Patient's Name JAMES JONES Notes _____
 Ward 83 _____
 Consultant BIRT _____
 Date of Birth 01/01/78 Unit No 666661

Date/Time	Intake (in mls.)				Output (in mls.)				
	Oral	Enteral Feed/NG Feed	Parenteral		Urine	Aspirate/Suction	Other		Running Total
		IV	Blood Product						
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
00									
Total									

(RETURNED) FROM THICATIE
 83 35
 83 20
 CANNULA FILL OUT 20
 15
 10
 15
 12
 15

Total Intake mls. Total Output mls.

Type of fluid and rate

- Crystalloids

Clear fluids- water+electrolytes

- 0.9% Normal Saline
- Dextrose
- Hartmann's

	0.9% Normal saline	Hartmann	5% glucose
Na	154 mmol	131 mmol	0
K	0	5 mmol	0
Cl	154 mmol	111 mmol	0
Osmol	303 mosm/l	279 mosm/l	253 mosm/l
Other	nil	Lactate 29 Calcium 2	Glucose 50g/l

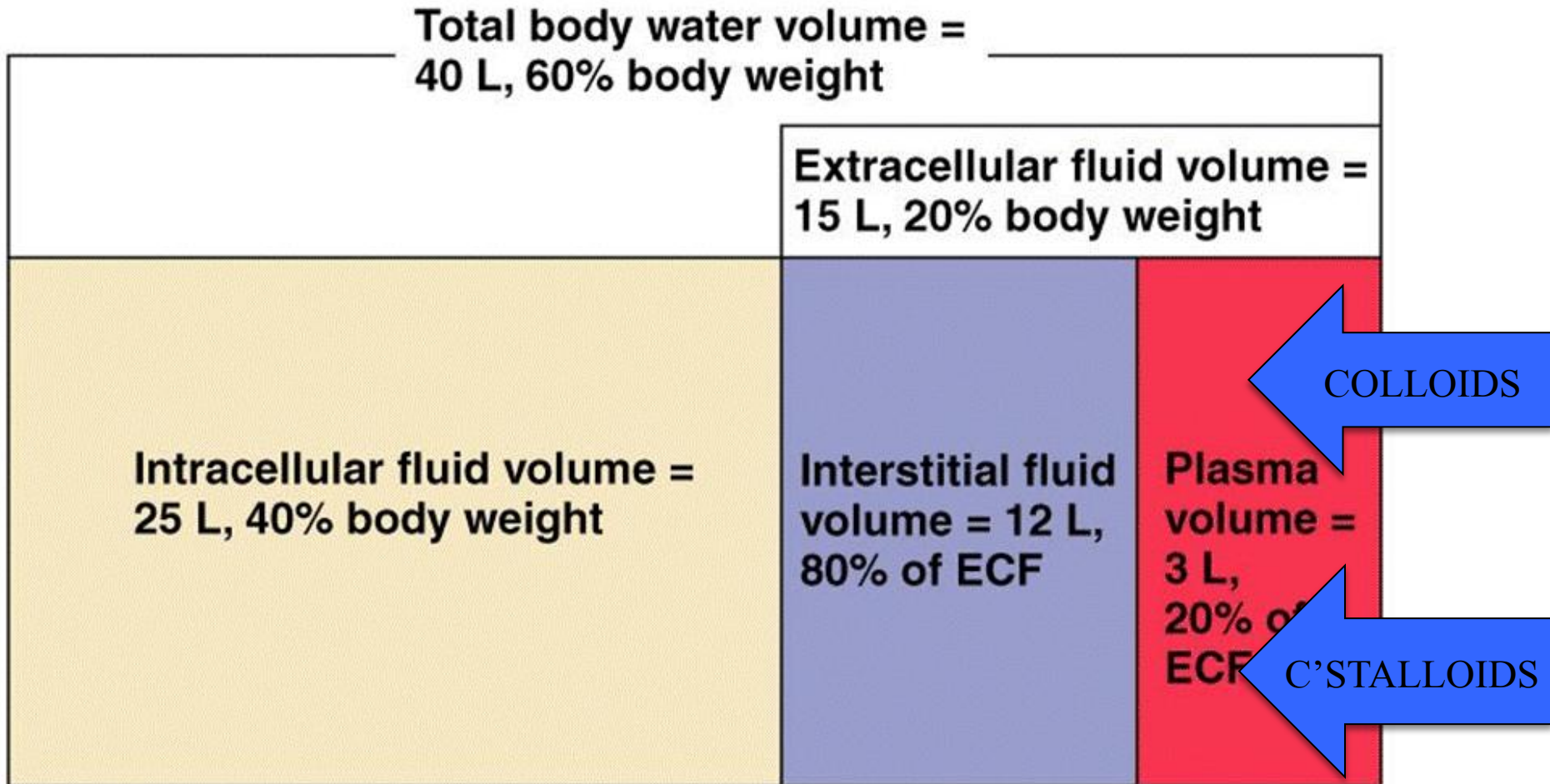
- Colloids

Gelatinous- particles suspended in solution

- Volplex
- Gelofusion
- Blood



Fluid compartments



Resuscitation

Assess-ABCDE

IF NO OVERLOAD SIGNS...

*** FLUID CHALLENGE ***

500mls Crystalloid

Reassess

Further 250-500mls bolus until 2L given

REASSESS



Replacement and Redistribution

COMPLEX ISSUES → Senior input

- Oedema/Sepsis
- Renal/liver/cardiac failure
- Post op retention/redistribution
- Malnourished/re-feeding...

Maintenance Requirements

- Fluid: 25-30 ml/kg/day
- Sodium: 1-2mmol /kg/day
- K⁺: 0.5-1mmol /kg/day

+ *Replacements*

Example... 70kg per day

- Fluid: 1750-2100ml
- Sodium: 70-140mmol
- Potassium: 35-70mmol

e.g. 1 salt + 2 sweet

	0.9% Normal saline	Hartmann	5% glucose
Na	154 mmol	131 mmol	0
K	0	5 mmol	0
Cl	154 mmol	111 mmol	0
Osmol	303 mosm/l	279 mosm/l	253 mosm/l
Other	nil	Lactate 29 Calcium 2	Glucose 50g/l

DOES PATIENT NEED IV FLUID???



Calculating Drip Rate

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

1 unit of blood = approx 400mls



Calculating Drip Rate

- Drip rate (drops per minute)
- Volume (ml)
- Time (*minute*)
- Drop Factor (drops per ml) or (gtt per ml)

Three different methods... use the one you're most comfortable with



1. Know the Equation

$$\text{Drip rate} = \frac{\text{Volume}}{\text{Time}} \times \text{Drop Factor}$$

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

$$\text{Drip Rate} = \frac{400\text{mls}}{240\text{mins}} \times 20 \text{ gtt/ml}$$

$$= 33 \text{ drops / min}$$

$$= 32 \text{ drops / min} \quad \text{OR} \quad 8 \text{ drops / 15 sec}$$



2. Think about the problem

- Drip rate is DROPS PER MINUTE
- This is TOTAL DROPS DIVIDED BY TIME
- TOTAL DROPS same as VOLUME x DROP FACTOR (as this is drops per ml)

What is the drip rate (drops/minute) required for a unit of blood to run over 4 hours using giving set with drop factor of 20 drops/ml?

TOTAL DROPS = VOLUME X DROP FACTOR = 400 X 20 = 8000

DRIP RATE = TOTAL DROPS / TIME = 8000 / 240 = 33 drops/min



3. Look at the units

- Drip rate (drops per minute)
- Volume (ml)
- Time (minute)
- Drop Factor (drops per ml)

$$\text{Drip rate} \left(\frac{\text{Drops}}{\text{min}} \right) = \frac{\text{Volume} \left(\frac{\text{ml}}{\text{mins}} \right) \times \text{Drop Factor} \left(\frac{\text{Drops}}{\text{ml}} \right)}$$

$$\begin{aligned} \text{Drip Rate} &= \frac{400\text{mls}}{240\text{mins}} \times 20 \text{ gtt/ml} \\ &= 33 \text{ drops / min} \end{aligned}$$

Converting drip rate to ml/hour

- What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

Transfusion Rate (Ml/hr)

Drip rate (Drops/minute)

Drop Factor (Drops/ml)

1. Know the Equation

$$\text{Transfusion Rate} = \frac{\text{Drip Rate}}{\text{Drop Factor}}$$

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20gtt/ml?

$$\begin{aligned}\text{Transfusion Rate} &= \frac{40 \times 60}{20} \\ &= 120 \text{ ml/hr}\end{aligned}$$



2. Think about the problem

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

- 20 drops per ml
- Therefore 40 drops = 2ml
- Therefore 2ml per minute

- Therefore $2 \times 60 = 120$ ml per hour

3. Look at the units

What is the transfusion rate in ml/hour of a blood transfusion being run at 40 drops/minute through a giving set with drop factor of 20 drops/ml?

Transfusion Rate (ml/hr)
Drip rate (Drops/minute)
Drop Factor (Drops/ml)

$$\text{ml/hr} = \frac{\text{drops}}{\text{hr}} \text{ divided by } \frac{\text{drops}}{\text{ml}} = \frac{\cancel{\text{drops}}}{\text{hr}} \times \frac{\text{ml}}{\cancel{\text{drops}}}$$

$$= 40 \times 60 \text{ divided by } 20$$

$$= 120 \text{ ml per hour}$$



Try these...

What is the drip rate (drops/minute) required for a 1 litre bag of saline to run over 5 hours using giving set with drop factor of 10 drops/ml?

$$\text{Drip rate} = \frac{\text{Volume}}{\text{Time}} \times \text{Drop Factor}$$

$$\text{Drip rate} = \frac{1000}{60 \times 5} \times 10 = 33 \text{ gtt/min}$$

What is the transfusion rate in ml/hour of a blood transfusion being run at 20 drops/minute through a giving set with drop factor of 15 drops/ml?

$$\text{Transfusion Rate} = \frac{\text{Drip Rate}}{\text{Drop Factor}} = \frac{20 \times 60}{15} = 80 \text{ ml/hr}$$



Simple fluid summary

- Only IV Fluid if cannot orally and STOP ASAP
- Continual reassessment
- Communication... d/w patients/involve family
- Calculations... take your time. Choose your method





The patient was placed on a fluid balance chart.


**THANK
YOU
FOR
LISTENING**

Questions...

 **SIMPLY**
FINALS