

OSCE Express Fluid Calculations (additional cases)

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Basic Information

The following slides show the following:

1. Daily Electrolyte Requirements
2. Available Fluids
3. Electrolyte Components of Fluids

According to OSCE information provided by UoL**

- *Daily requirements are:*
 - *25–30 mL/kg/day of water*
 - *1 mmol/kg/day of potassium, sodium and chloride*
 - *50–100 g/day of glucose (to limit starvation ketosis)*

Three bags of each of the following are available for use:

- Hartmann's 1L
- 0.9% NaCl 500 mL
- 0.9% NaCl 500 mL with 20 mmol KCl
- 0.9% NaCl 1L
- 0.9% NaCl 1L with either 20mmol OR 40 mmol KCl

- Dextrose saline 500 mL
- Dextrose saline 500 mL with 20 mmol KCl
- Dextrose Saline 1L
- Dextrose Saline 1L with either 20 mmol KCl OR 40 mmol KCl

- 5% Dextrose 500 mL
- 5% Dextrose 500 mL with 20 mmol KCl
- 5% Dextrose 1L
- 5% Dextrose 1L with either 20 mmol KCl OR 40mmol KCl

	[Na ⁺] (mmol/L)	[K ⁺] (mmol/L)	[Cl ⁻] (mmol/L)	Glucose (g/L)
0.9% sodium chloride	154		154	
4% dextrose / 0.18% sodium chloride (dextrose saline)	31		31	40
5% dextrose				50
Hartmann's solution	131	5	111	

CASE 1

You are asked to review a patient 12 hours post-op who reports feeling too weak to eat and drink.

She is a 70-year-old lady who had a hysterectomy under General Anesthesia. She is usually active by gardening and taking light walks of up to 30ms without rest but has found recovering from the surgery, which went on 1 hour longer than anticipated, to be very tiring.

Her Early Warning Score and Recent Blood Results are displayed in the following slides.

She weighs 45kg

On clinical examination there is tenderness around the surgical site. She is not clinically dehydrated.

EARLY WARNING SCORE

Parameter	Value
Respiration Rate	15
Heart Rate	68
Systolic Blood Pressure	136
Temperature	36.9
AVPU	Alert

Her EWS Score would be 0.

The EWS chart should be used to assess for any signs of clinical shock.

It would be worth communicating this to your examiner

Early signs of shock include Tachycardia and a drop in Systolic Blood Pressure

Recent Kidney Function Tests

	Today	Pre-op	Reference range
Sodium	136	141	(135-145 mmol/L)
Potassium	3.9	3.8	(3.5-5.0 mmol/L)
Chloride	102	101	(95-105 mmol/L)
Urea	6.5	3.0	(2.5-6.7 mmol/L)
Creatinine	110	92	(70—120 μ mol/L)

All Electrolytes are within range.

Urea and Creatinine can be used to monitor possible AKIs secondary to dehydration.

FLUID BALANCE CHART

Inputs		Outputs	
Drinking	800ml	Urine	500ml
		Bowels	100ml
		Insensible	800ml
Total	800ml	Total	1400ml
BALANCE = -ve 600ml			

TASK:

Prescribe a Fluid Regimen for this patient over the next 24hrs assuming she will not be Eating and Drinking over this period.

24Hr Requirements for this patient:

Volume - $(45\text{kg} \times 30\text{ml}) + 600\text{ml} = 1950\text{ml}$

Sodium - $45 \times 1\text{mmol} = 45\text{mmol}$

Potassium - $45 \times 1\text{mmol} = 45\text{mmol}$

Chloride - $45 \times 1\text{mmol} = 45\text{mmol}$

Glucose - 50-100g

PRESCRIPTION

Fluid	Volume	Time	Content			
			Sodium	Potassium	Chloride	Glucose
4% Dextrose/0.18% Sodium Chloride + 40mmol Potassium Chloride	1000ml	12 hours	31	40	31	40
4% Dextrose / 0.18% Sodium Chloride + 20mmol Potassium Chloride	1000ml	12hours	31	20	31	40
TOTAL	2000ml	24hrs	62	60	62	80

CASE 2

You are asked to review a patient 16 hours post-op who nursing staff have reported to be too drowsy to drink adequate amounts of fluid.

He is a 39-year-old man who sustained a traumatic femoral shaft fracture following a traffic incident. He has no significant past medical history. The surgery went according to plan and review of the surgical notes reveal an intensive analgesia regimen prescribed by the Pain Specialist Team. He is currently on IV Opioids to control the pain. This prescription has already been reviewed by the Pain Team this morning with no concerns other than the side effect of drowsiness. There are no signs on examination that point towards an overdose. His Early Warning Score and Recent Blood Results are displayed in the following slides.

He weighs 89kg.

On clinical examination there is tenderness around the surgical site. He is not clinically dehydrated. His pupils are equal and reactive to light.

EARLY WARNING SCORE

Parameter	Value
Respiration Rate	18
Heart Rate	77
Systolic Blood Pressure	115
Temperature	37.2
AVPU	Alert

His EWS Score would be 0.

The EWS chart should be used to assess for any signs of clinical shock.

It would be worth communicating this to your examiner

Early signs of shock include Tachycardia and a drop in Systolic Blood Pressure

Recent Kidney Function Tests

	Today	Pre-op	Reference range
Sodium	138	144	(135-145 mmol/L)
Potassium	4.7	4.8	(3.5-5.0 mmol/L)
Chloride	102	98	(95-105 mmol/L)
Urea	5.3	6.0	(2.5-6.7 mmol/L)
Creatinine	85	110	(70—120 μ mol/L)

All Electrolytes are within range.

Urea and Creatinine can be used to monitor possible AKIs secondary to dehydration.

FLUID BALANCE CHART

Inputs		Outputs	
Drinking	400ml	Urine	600ml
		Bowels	0ml
		Insensible	0ml
Total	400ml	Total	600ml
BALANCE = -ve 200ml			

TASK:

Prescribe a Fluid Regimen for this patient over the next 24hrs assuming he will not be Eating and Drinking over this period.

24Hr Requirements for this patient:

Volume - $(89\text{kg} \times 30\text{ml}) + 200\text{ml} = 2870\text{ml}$

Sodium - $89 \times 1\text{mmol} = 89\text{mmol}$

Potassium - $89 \times 1\text{mmol} = 89\text{mmol}$

Chloride - $89 \times 1\text{mmol} = 89\text{mmol}$

Glucose - 50-100g

PRESCRIPTION

Fluid	Volume	Time	Content			
			Sodium	Potassium	Chloride	Glucose
4% Dextrose/0.18% Sodium Chloride + 40mmol Potassium Chloride	1000ml	8 hours	31	40	31	40
4% Dextrose / 0.18% Sodium Chloride + 40mmol Potassium Chloride	1000ml	8 hours	31	40	31	40
4% Dextrose / 0.18% Sodium Chloride + 20mmol Potassium Chloride	1000ml	8 hours	31	20	31	40
TOTAL	3000ml	24hrs	93	100	93	120

After writing your prescription, it is important to show the total contents of your 24hour prescription