



■ Very important

■ Extra information

Group 1 Fasting

Q1. What is the difference between Osmotic diuresis and Water diuresis?

Osmotic diuresis: increase volume of urine, increase urine osmolarity

Water diuresis: increase volume of urine along with decrease urine osmolarity

Q2. What are the changes in his plasma?

Increase plasma osmolarity and decrease plasma volume

Q3. What is the hormonal regulation that will take place in his condition?

Increase ADH secretion from posterior pituitary gland

Q4. What is the role of ADH in his condition?

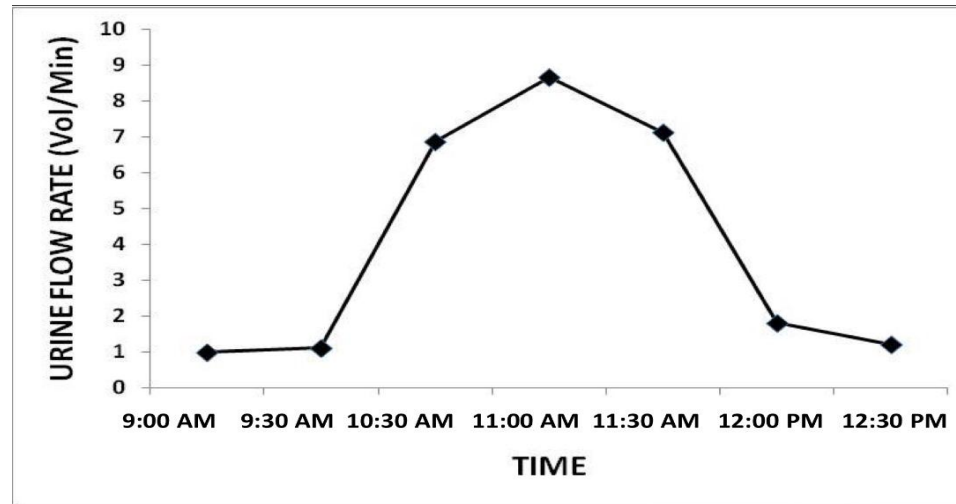
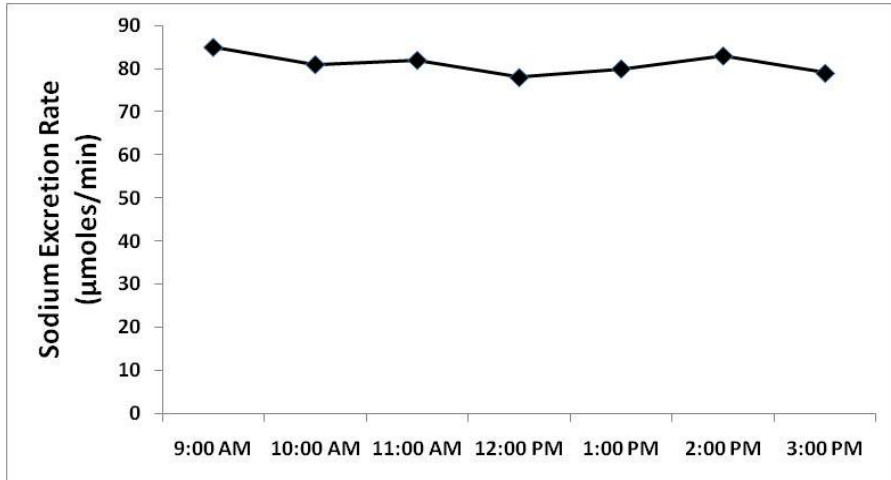
Increase permeability of H₂O in late distal convoluted tubules and collecting ducts (increase H₂O reabsorption)

Q5. What are the changes in his urine?

Increase urine osmolarity and decrease urine volume

Q6. What are the consequences in his condition?

Plasma volume and osmolarity will back to normal



Q1: when does the change in the urine volume start ?
after 30 minutes .

Q2: How much time does it take to back to normal?
3 hours

Q3: Dose the sodium excretion constant or variable ?
Constant

Q4: what is the name of this case ?
DRINKING 1 LITER OF WATER

Q5: Is it water diuresis or osmotic diuresis ?
Water diuresis

Group 2 Drank 1L of Water

Q6. What are the changes in his plasma?

Decrease plasma osmolality and Increase plasma volume

Q7. What happened if the osmolality of plasma decreased?

Inhibits osmoreceptors from anterior hypothalamus

Q8. What happened if osmoreceptors inhibited?

1. Decrease secretion of ADH 2. Inhibit Thirst center

Q9. What is the hormonal regulation that will take place in his condition?

decrease ADH secretion from posterior pituitary gland

Q10. What is the role of ADH in his condition?

Decrease permeability of H₂O in late distal convoluted tubules and collecting ducts (decrease H₂O Reabsorption)

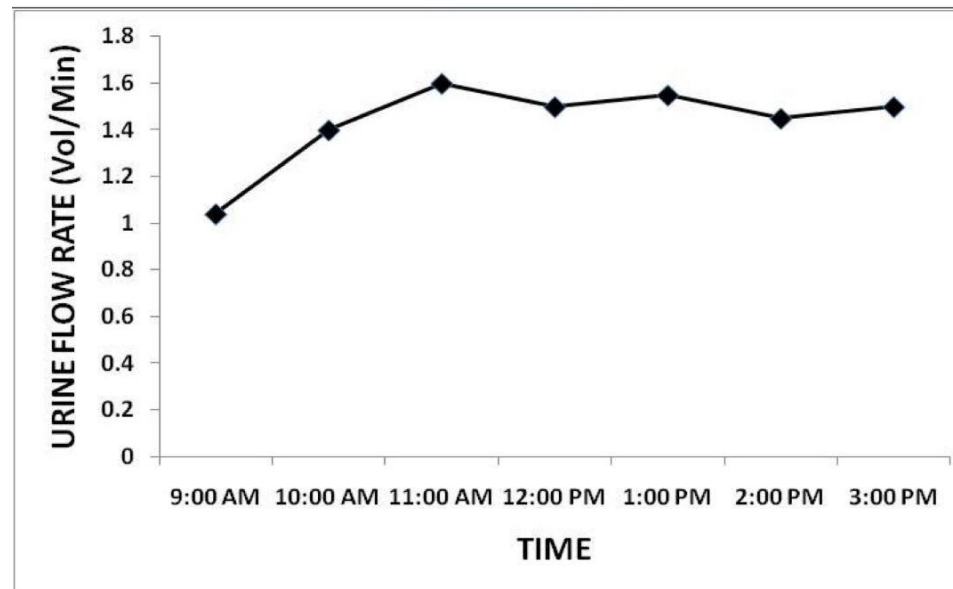
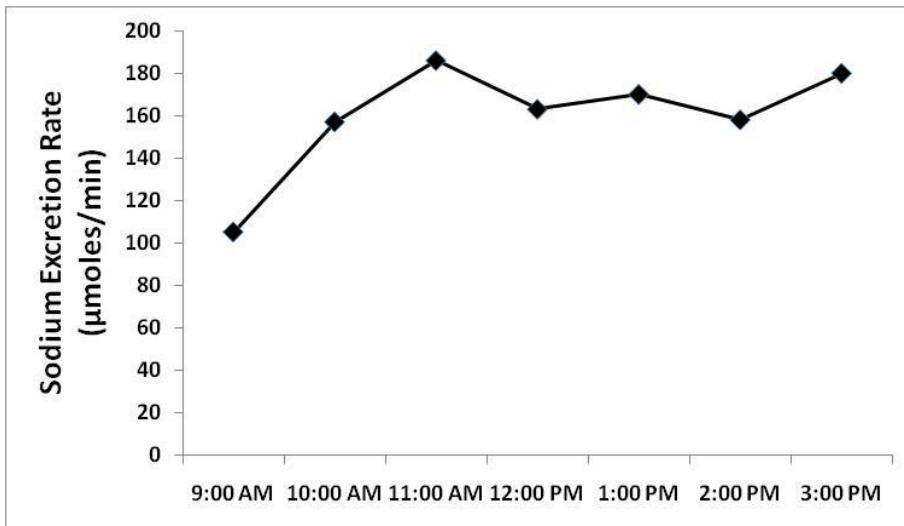
Q1: when does the change in the urine volume start ?
immediately

Q2: How much time does it take to back to normal?
24 hours

Q3: Dose the sodium excretion constant or variable ?
Variable (slightly increase)

Q4: what is the name of this case ?
Drinking 1 liter of isotonic saline

Q5: Is it water diuresis or osmotic diuresis ?
Osmotic diuresis



Group 3 1L of Saline

Q6. What is Isotonic Saline?

Solution containing 154 mmol of NaCl, equivalent to 9g of salt.

Sodium Concentration of isotonic saline is equivalent to the normal sodium concentration of plasma water

Q7. What are the changes in his plasma?

Plasma osmolarity remains the same and Increase plasma volume

Q8. What will happen if plasma volume increased?

Stimulate stretch receptors in the right atrium

Q9. What will happen if stretch receptors activated?

Secretes ANP (Atrial natriuretic peptides)

Q10. What is the role of ANP in his condition?

Increase excretion of Sodium

Q11. What are the changes in his urine?

-Urine osmolarity will increase.

-Increase urine volume (by increase water excretion)

Q12. What are the consequences in his condition?

Plasma volume ONLY will get back to normal



Group 4

Q1: when does the change in the urine volume start ?

After 1 hour

Q2: How much time does it take to back to normal?

4-6 hours

Q3: Dose the sodium excretion constant or variable ?

Variable (sharply increase)

Q4: what is the name of this case ?

Taking 1 Tablet Of Lasix

Q5: Is it water diuresis or osmotic diuresis ?

Osmotic diuresis

In Person who takes Lasix (furosemide) answer the following questions, which based on body control for his condition:

Q1. Where does it work?

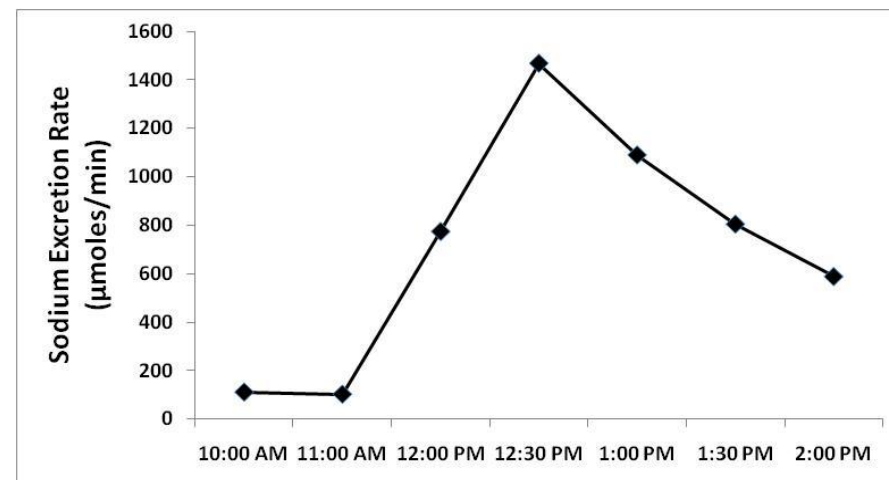
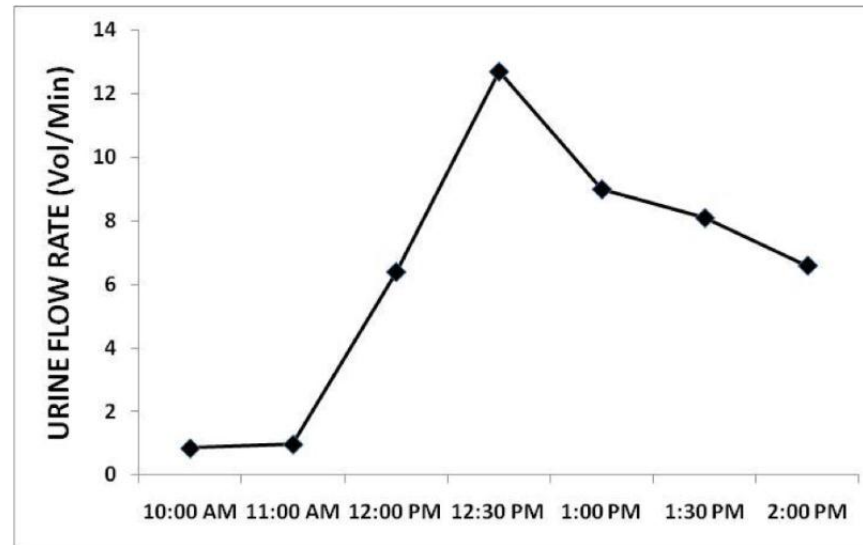
In Thick ascending limb of loop of hanle

Q2. What its action in Thick ascending limb?

Blocks of $\text{Na}^+/\text{K}^+/\text{2Cl}^-$ co-transporters

What are the changes in his urine due to this drug?

1. Increase urine osmolality (by increase sodium excretion)
2. Increase urine volume (by increase water excretion)



Complete the following table:

SAMPLE NO.	1	2	3	4	5	6	7
COLLECTION TIME (minutes)	120	30	30	30	30	30	30
VOLUME OF URINE (ml)	118	33	200	280	240	60	50
URINE FLOW RATE (ml / min)	0.98	1.1	6.66	9.33	8	2	1.66
SODIUM CONCENTRATION (mmoles/liter)	87	65	12	10	8	30	40
TOTAL SODIUM EXCRETION (mmoles)	10.3		2.4		1.9	1.8	2.00
SODIUM EXCRETION RATE (μ moles/min)	85.6		80	93.3	64	60	

Answers :

SAMPLE NO.	1	2	3	4	5	6	7
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SODIUM EXCRETION RATE (μ moles/min)	85.6	71.5	80	93.3	64	60	66.7

What is the name of machine that used to obtain sodium concentration?

Flame photometer

A 45-year old **male**, has recently undergone chemotherapy with a potentially nephrotoxic drug. As part of his followup examination, the doctor orders a creatinine clearance test. The results produced the following values: a creatinine **plasma concentration of 0.008 mg/ml**, and in **1 hour** the production of **50 ml of urine** with a **creatinine concentration of 0.45 mg/ml**.

Q1. Calculate the creatinine clearance value for this person.

$$\text{creatinine clearance} = \frac{0.45 \text{ mg/ml} \times 50 \text{ ml} / 60 \text{ min}}{0.008 \text{ mg/ml}} = \frac{0.45 \text{ mg/ml} \times 0.83 \text{ ml/min}}{0.008 \text{ mg/ml}} = \frac{0.37 \text{ mg/min}}{0.008 \text{ mg/ml}} = 46.25 \text{ ml/min}$$

Q2. What does the creatinine clearance value tell us about this person's GFR?

The creatinine clearance value indicates GFR significantly below normal values.

Q3. a patient with GFR lower than 15 ml/min/1.73m² what does it tell us about his kidney function?

This GFR value indicates that the patient has kidney failure .

Physiology Leader:

أُجِين السواط

Members :

- خولة العماري
- منيرة السلولي
- نورة القحطاني
- منيرة العُمري
- ديما الراجحي
- سارة العنزي
- العنودالسلمان

