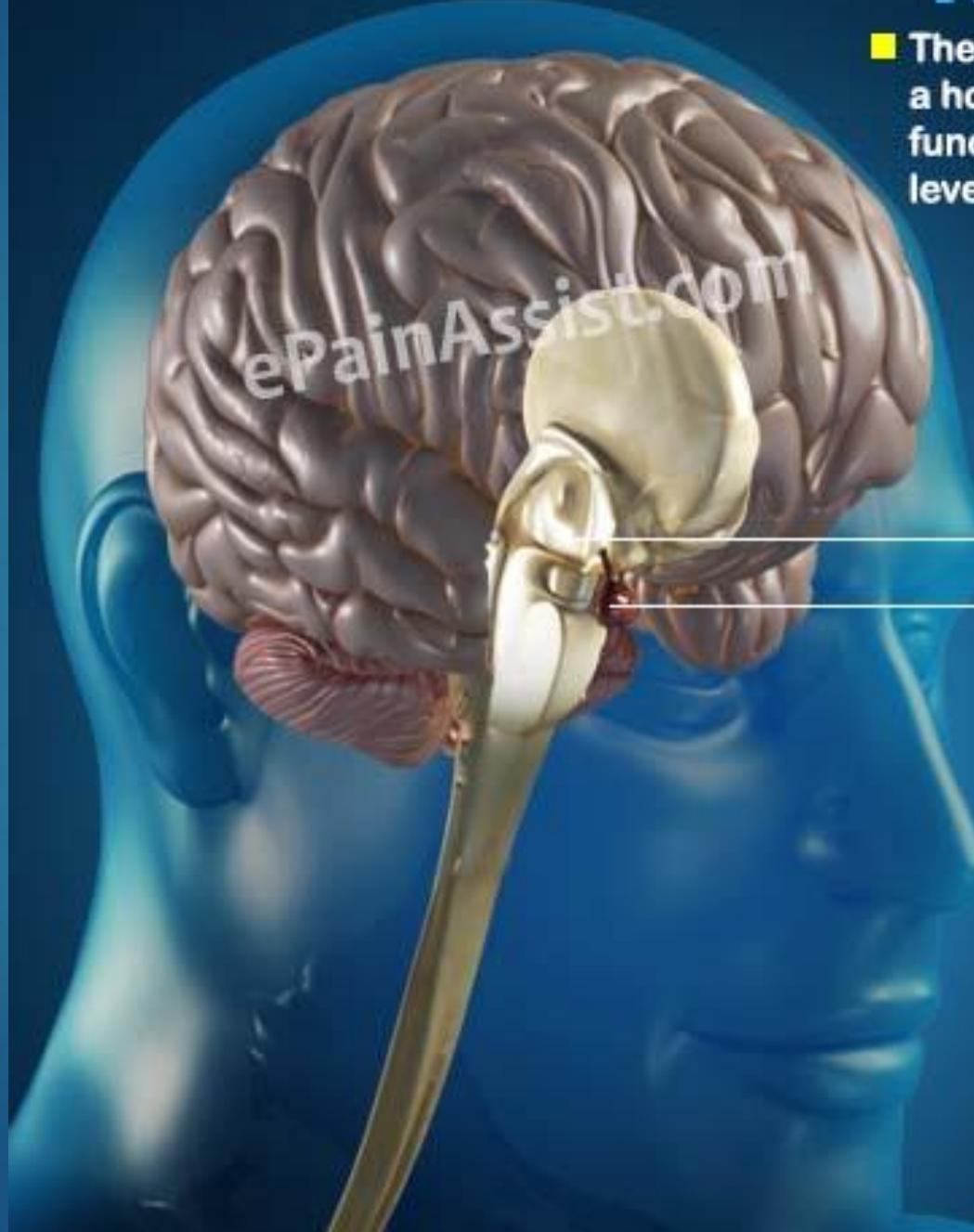


# SIADH:

## Appropriate Approach towards Inappropriate Secretion of ADH



# What Is SIADH?

- The hypothalamus located in the brain produces a hormone called as antidiuretic hormone. The function of this hormone is to control the levels of water present in the body
- SIADH is mainly caused by cancer especially that of the lungs. SIADH is also called by the name of Ectopic ADH Secretion.

For More Information:  
Visit: [www.epainassist.com](http://www.epainassist.com)



## Disclaimer

*The presentation on the specified topic is made only for educational purposes & the simulations with few characters are used solely for making the things to be more easier, palatable & enjoyable.*





“RADHA is half without Lord Krishna”

# Welcome MCICMUE

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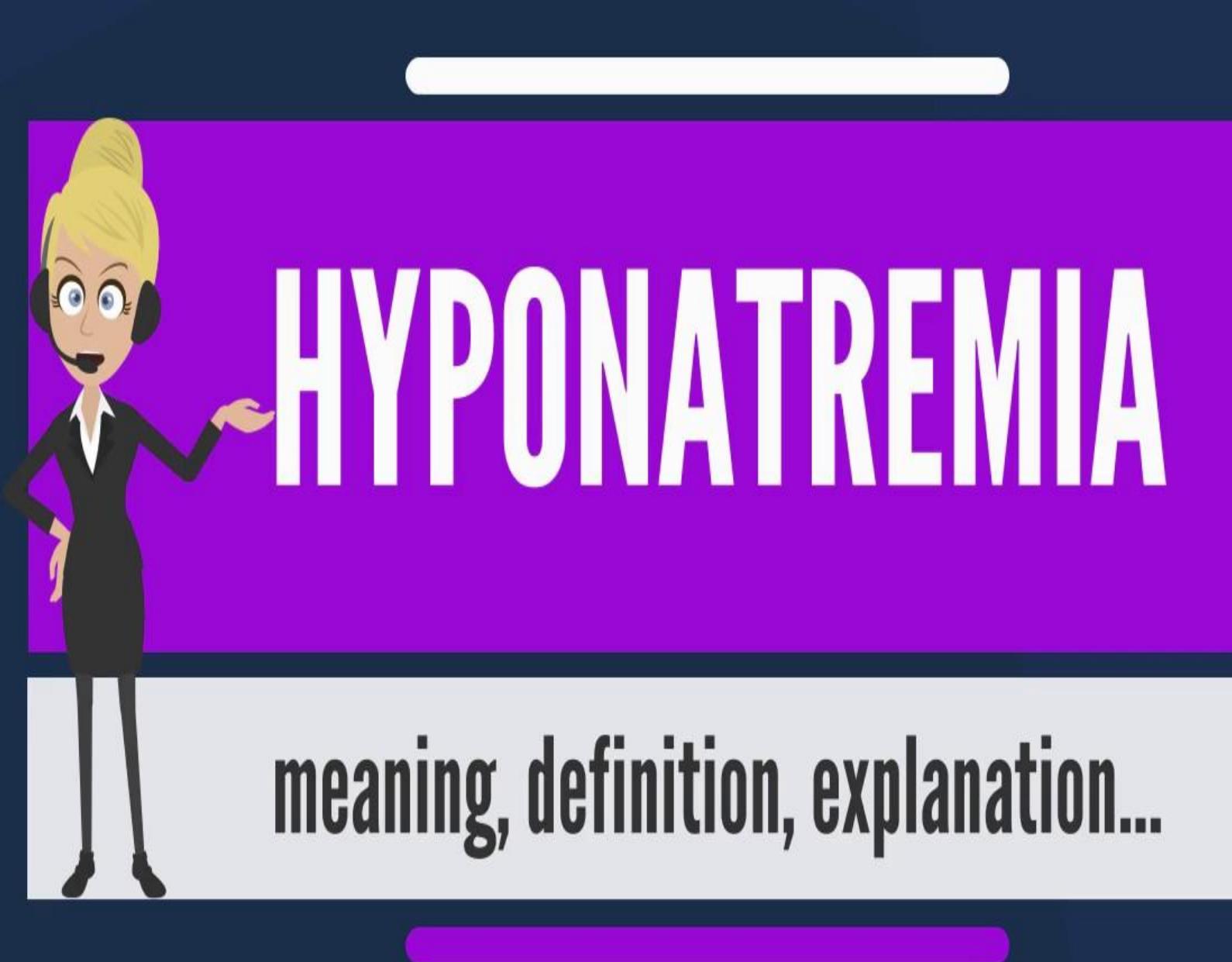
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# Contents:

1. Clinical Cases
2. Approach
3. Mx



## Case-01-Dehydration/Fluid Loss

A 36-year-old lady is brought to the OPD with two days history of general malaise, vomiting and vague abdominal discomfort.

After admission, she has become increasingly drowsy.

On examination she was unresponsive to verbal commands.

Her temperature 36.5°C, BP 74/48 mmHg.

Investigations revealed:

Sodium	121 mmol/L	(137-144)
Potassium	6.2 mmol/L	(3.5-4.9)
Urea	11.6 mmol/L	(2.5-7.5)
Creatinine	162 µmol/L	(60-110)
Glucose	1.1 mmol/L	(3.0-6.0)
Chloride	91 mmol/L	(95-107)
Bicarbonate	14 mmol/L	(20-28)



Q. What is the likely dx? - Addison's

## Case-02: Oedema/Fluid Overload

A 32-year-old man is presented with huge ascites with bilateral leg oedema. He is a diagnosed case of Decompensated Chronic Liver Disease due to Chronic HBV Infection with Portal Hypertension.

On examination his vitals are ok including BP 130/80 mmHg.  
Investigations revealed:

Sodium	121 mmol/L	(137-144)
Potassium	4.1 mmol/L	(3.5-4.9)
Urea	6.5 mmol/L	(2.5-7.5)
Creatinine	102 µmol/L	(60-110)
Glucose	1.1 mmol/L	(3.0-6.0)
Chloride	91 mmol/L	(95-107)
Bicarbonate	24 mmol/L	(20-28)



Q. What is the likely dx?-

**Hypervolaemic  
Hyponatraemia**

## Case-03: No Dehydration, No Oedema

A 62-year-old female is referred with mild confusion.

She has a history of depression, type 2 diabetes mellitus and angina for which she takes a variety of medications (**Fluoxetine, Metformin, sublingual GTN, Aspirin, Atorvastatin, Bisoprolol**)

Investigations reveal:

Sodium concentration	123 mmol/L	(137-144)
Potassium	3.4 mmol/L	(3.5-4.9)
Urea	5.2 mmol/L	(2.5-7.5)
Creatinine	70 µmol/L	(60-110)
Plasma osmolality	260 mosmol/L	
Urine osmolality	555 mosmol/L	
Urine sodium concentration	38 mmol/L	



Q. What is the likely dx?-

**SIADH**

# Hyponatremia Defined

- ▶ Definition: Serum Na<sup>+</sup> <135 meq/L
  - ▶ Generally associated with decreased osmolality to <275
  - ▶ Most common electrolyte abnormality in the US

$$c\text{Posm} = 2[\text{Na}^+ + \text{K}^+] + [\text{Urea}] + [\text{Glucose}]$$

# true hyponatremia

low serum sodium, low serum osmolality

## ADH dependent

high urine osmolality, low urine output

### hypovolemic

poor perfusion causes ADH release

- Thiazide/diuretic induced
- GI losses
- Burns/other skin losses

### hypervolemic

poor perfusion causes ADH release

- Heart failure
- Cirrhosis
- Nephrotic syndrome

### euvolemic

non-physiologic ADH release

- SIADH
- Hypothyroidism
- Adrenal insufficiency

## ADH independent

low urine osmolality

### Tea and toast

### Beer drinkers potomania

low urine output due to low solute intake

### Psychogenic polydipsia

excessive water drinking higher than maximum urine output

### Renal failure

low urine output due to renal failure

## Hyponatraemia

Dehydration?

Yes

$U_{Na} > 20 \text{ mmol/L}$

Yes

### Renal Loss (Diuresis):

- ☒ **Addison's dis.**, Renal failure eg: diuretic phase of renal failure; nephrocalcinosis or medullary cystic disease
- ☒ **Diuretic** excess, Osmolar diuresis ( $\uparrow$  glucose;  $\uparrow$  urea)

No

Oedema ?

Yes

### Fluid Overload:

- Heart-CCF
- Kidney-NS, RF
- Liver-CLD  
(hyponatraemia may precede oedema)

No

$U_{Osm} > 500 \text{ mmol/Kg}$

Yes

SIADH

No

Hypothyroidism  $\downarrow\downarrow$   
Glucocorticoid-  $\downarrow\downarrow$   
Water overload



# **P**arameters to be considered...

1. **P**-Osm
2. **P**ostural Drop
3. **P**itting Oedema
  - P**ulmonary Oedema
  - P**eter Oedema (Ascites)
4. **U**-Na
5. **U**-Osm

**HyPuu..natraemia...**

P....



# SIGNS AND SYMPTOMS OF HYponatremia

## **Central Nervous System**

Mild

Apathy

Headache

Lethargy

Moderate

Agitation

Ataxia

Confusion

Disorientation

Psychosis

Severe

Stupor

Coma

Pseudobulbar palsy

Tentorial herniation

Cheyne-Stokes respiration

Death

## **Gastrointestinal System**

Anorexia

Nausea

Vomiting

## **Musculoskeletal System**

Cramps

Diminished deep tendon reflexes

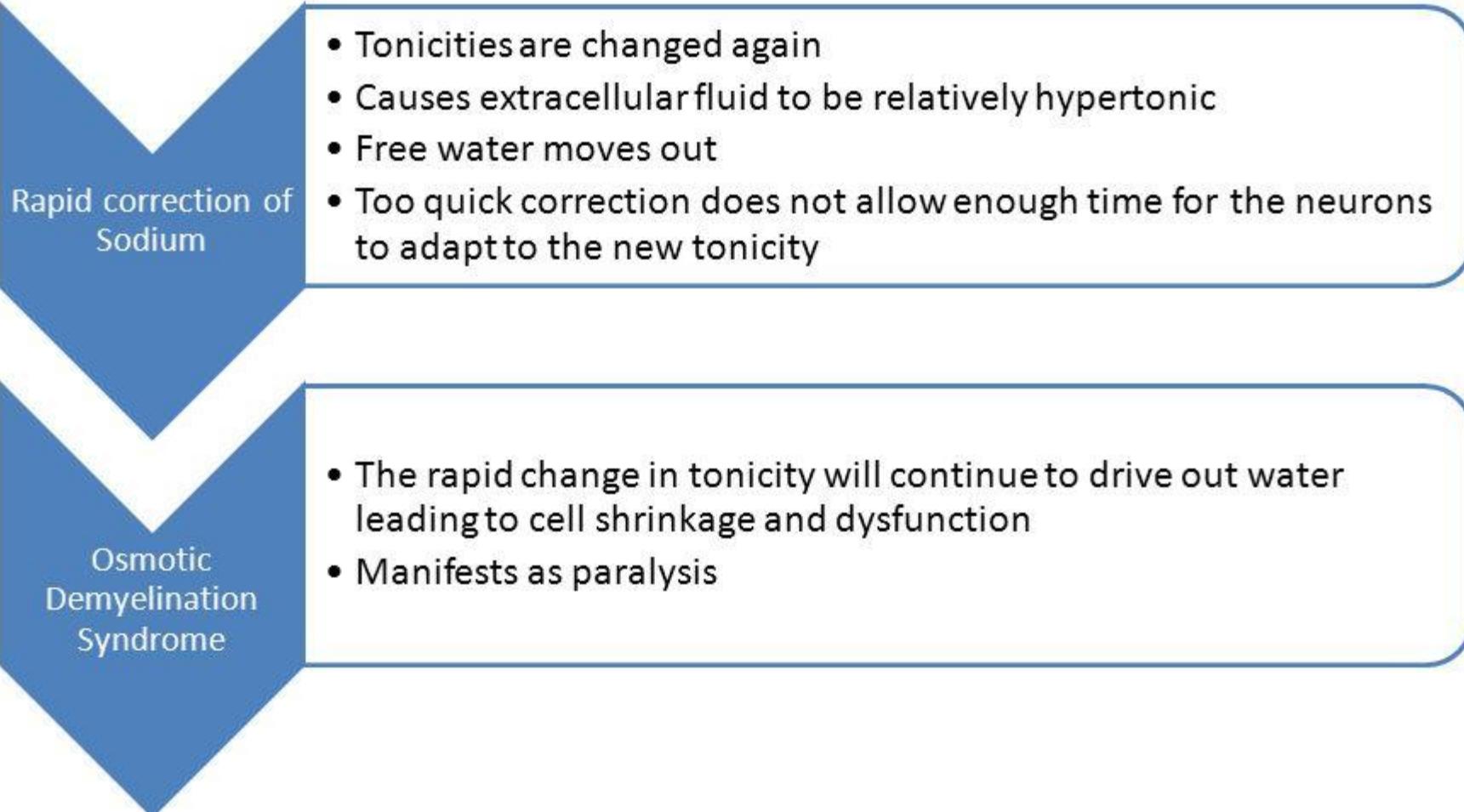
Q...



**Aim to increase [Na] by 0.5-1 mmol/L in the first 4h.  
Recheck U & Es 4-hourly.**

**Do not exceed more than 10 mmol/L rise in first 24h.  
3% saline usually started at about 50-60 ml/h and is then slowed  
down to~30 mL/h.**

# Osmotic Demyelination Syndrome







**Rapid Development**

**Rapid Correction**

**-Dangerous-**

**CPM/ODS**

R...



# **SIADH (Syndrome of Inappropriate ADH secretion)**

## **Diagnosis**

In the absence of a single laboratory test to confirm the diagnosis, SIADH is best defined by the classic Bartter-Schwartz criteria, which can be summarized as follows :

- Hyponatremia with corresponding hypo-osmolality
- Continued renal excretion of sodium
- Urine less than maximally dilute
- Absence of clinical evidence of volume depletion
- Absence of other causes of hyponatremia
- Correction of hyponatremia by fluid restriction



**TABLE 2: Criteria for the diagnosis of SIADH**

Criterion	Definition
Hyponatremia	Serum sodium level < 135 mEq/L
Hyperosmotic plasma	Plasma osmolality < 280 mOsm/kg
Hyperosmotic urine	Urinary osmolality > 500 mOsm/kg
Hypernatremic urine	Urinary sodium level > 20 mEq/L (without diuretic therapy)

SIADH = syndrome of inappropriate secretion of antidiuretic hormone

# Diagnosing SIADH

## Essential and supplemental diagnostic criteria for SIADH

### Essential<sup>1,2</sup>

- Hyponatraemia < 135 mmol/l
- Plasma hypo-osmolality < 275 mOsm/Kg
- Urine osmolality > 100 mOsm/Kg
- Clinical euvolaemia
  - No clinical signs of hypovolaemia (orthostatic decreases in blood pressure, tachycardia, decreased skin turgor, dry mucous membranes)
  - No clinical signs of hypervolaemia (oedema, ascites)
- Increased urinary sodium excretion with normal salt and water intake  $\geq 30 \text{ mmol/l}$
- Absence of other potential causes of euvolaeemic hypo-osmolality
  - Exclude hypothyroidism, hypocortisolism, renal disease and recent diuretic use
- Failure to correct hyponatraemia after 0.9% saline infusion
- Correction of hyponatraemia through fluid restriction

### Supplemental<sup>1,3</sup>

- Abnormal water load test over 4 hours
- Plasma vasopressin inappropriately elevated relative to plasma osmolality

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**SIADH (Syndrome of Inappropriate ADH secretion)**

She (**RADHARANI**) is  
**ADHA** (half-1/2) without  
Lord Krishna!!!!!!!!!!—

**SI-ADHA**



“RADHA is half without Lord Krishna”

# **SIADH (Syndrome of Inappropriate ADH secretion)**

**She (RADHARANI) is ADHA (half-1/2) without Lord Krishna!!!!!!—SI-ADHA**

So, Rule of Half (ADHA): 500-250-125-20-RADHA

500	-U <sub>osm</sub>	> 500	mosm/Kg
250	-P <sub>osm</sub>	< 250	mosm/Kg
125	-S <sub>Na</sub>	< 125	mmol/L
20	-U <sub>na</sub>	> 20	mmol/L

# **SIADH (Syndrome of Inappropriate ADH secretion)**

She (**RADHARANI**) is **ADHA** (half-1/2) without Lord Krishna!!!!!!—**SI-ADHA**

Absence of **R-ADHA**

**R-** Renal Impairment

**A-** Aedema

**D-** Dehydration, Diuretics

**H-** Hypothyroidism

**A-** Addison's Disease

S...



# Causes of SIADH

Pulmonary disorders  
Acute respiratory failure  
Infections  
Positive-pressure ventilation

Tumors  
Extrathoracic  
Mediastinal  
Pulmonary

CNS disorders  
Acute psychosis  
Hemorrhage  
Inflammatory and demyelinating diseases  
Mass lesions  
Stroke  
Trauma

SIADH

Drugs  
Carbamazepine  
Chlorpropamide  
Clofibrate  
Cyclophosphamide

Phenothiazines  
Prostaglandin-synthesis  
Inhibitors  
SSRIs  
MAO inhibitors  
Tricyclics  
Vincristine

Miscellaneous  
HIV infection  
Idiopathic  
Pain  
Postoperative state  
Prolonged exercise  
Senile atrophy  
Severe nausea

# Treatment

Treat the cause and restrict fluid. Consider salt ± loop diuretic if severe.

Demeclocycline is used rarely.

Vasopressin receptor antagonists ('vaptans', are an emerging class of drug used in SIADH and other types of hyponatraemia.

## **References:**

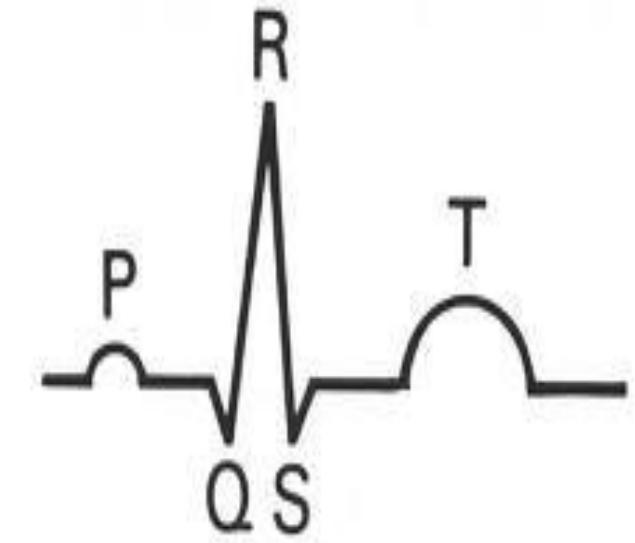
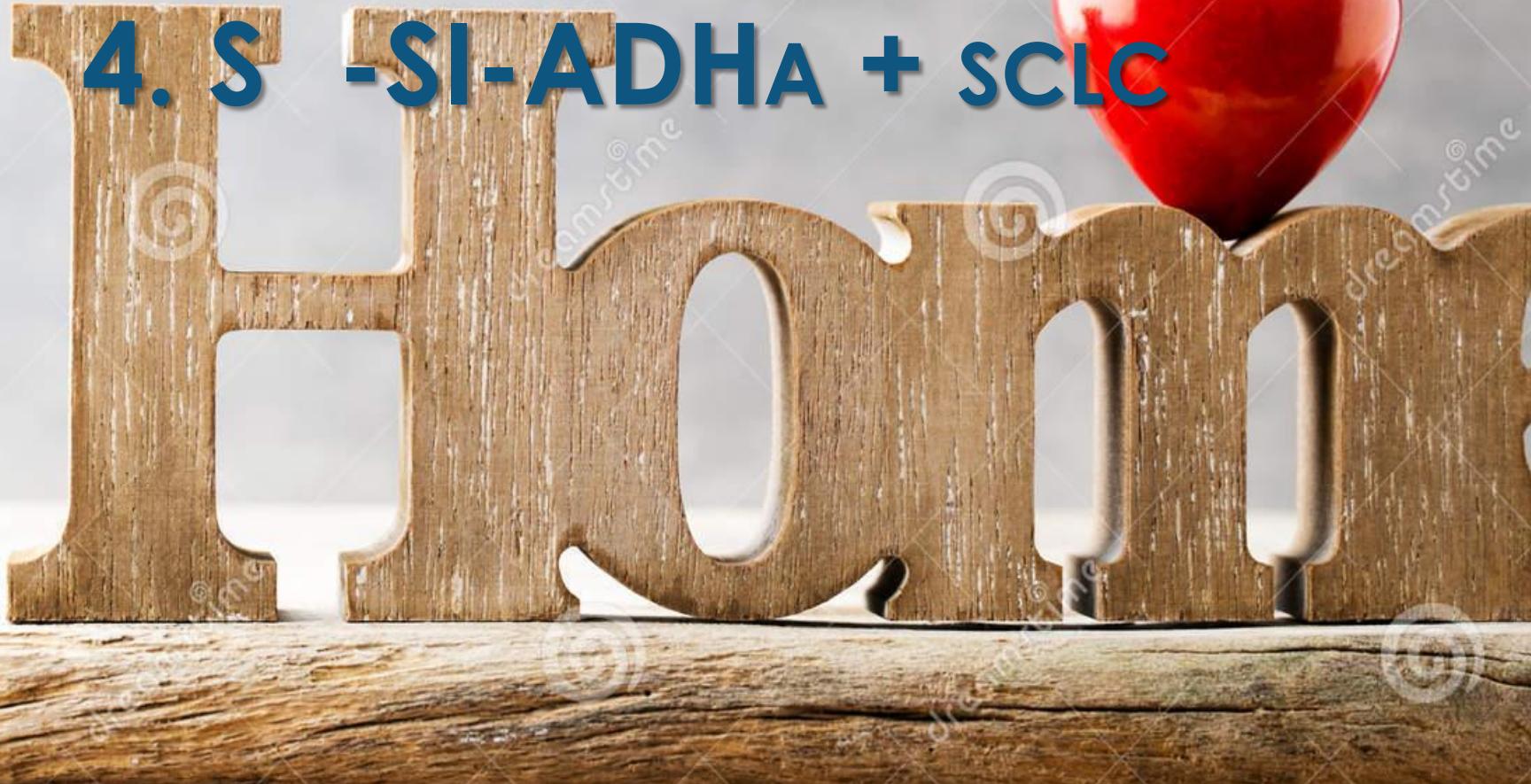
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**1. P -P ( $P_{Na} + Posm + U_{Na} + U_{osm} + P$ )**

**2. Q -Qoma (Coma)**

**3. R -Rapid-CPM/ODS**

**4. S -SI-ADHA + SCLC**





Ta. Ta...  
Thank You....