



# Postoperative Craniotomy Patient with a Cerebral Aneurysm That Develops Cerebral Salt Wasting, Diabetes Insipidus, or Syndrome of Inappropriate ADH Secretions

## Simulated Clinical Experience (SCE™) Overview

**Location:** Neurosurgical Ward

### History/Information:

This patient is a 42-year-old female who was admitted to the Neurologic Intensive Care Unit seven days ago with a subarachnoid hemorrhage (SAH) secondary to a rupture of a right anterior communicating artery. Her Hunt and Hess classification was a three. Her chief complaint was severe headache, nuchal rigidity and the patient was noted to be lethargic. Otherwise, there was no focal deficit. Seizure prophylaxis was initiated with phenytoin and her BP and vascular spasm was controlled with the calcium channel blocker nimodipine. The day after admission she underwent a successful aneurysm clipping. Postoperatively her BP was stable and prevention of cerebral vasospasm was initiated with fluids to maintain a slightly hypervolemic state. Neurologically she remained intact with no neurological deficit. Prophylactically she had postoperative IV antibiotics and dexamethasone. She has incisional pain and is only taking prn pain medication at night to help her sleep.

### Healthcare Provider's Orders:

Vital signs and neuro checks every 4 hours  
Diet as tolerated  
Activity with assistance as needed  
Intake and Output every shift  
IV 0.9% NS with 20mEq KCl at 100mL/hour, saline lock IV if PO intake greater than 400mL/shift  
Oxycodone 10mg PO every 12 hours  
Oxycodone 5mg with acetaminophen 325mg 2 tablets PO every 6 hours prn pain  
Promethazine 50mg IV every 6 hours prn nausea  
Ranitidine 150mg IV or PO twice daily  
Phenytoin 100mg IV or PO every 8 hours  
Nifedipine 60mg PO every 4 hours, hold if systolic BP less than 110 or HR less than 50  
Labetolol drip for systolic BP greater than 160  
Desmopressin acetate 1mcg IV every 12 hours for urine output greater than 200mL/hour, specific gravity less than 1.005, Na greater than 145  
Docusate calcium 240mg PO twice a day  
Urinary catheter to gravity or straight cath every 6 hours prn  
Oxygen for SpO<sub>2</sub> less than 90%  
Anti-embolic or sequential hose while in bed  
Cerebral perfusion pressure (CPP) target is 70  
Central venous pressure (CVP) every 4 hours, Call if less than 6 or greater than 12  
Labs for today: Electrolytes, BUN, Creatinine, Glucose, Uric Acid, WBC, Hct, Serum Osmolality  
Urine Specific Gravity every shift  
Daily weight  
Head of bed minimally 30 degrees  
Avoid excessive Valsalva maneuvers  
Limited visitors, calming atmosphere

## Learning Objectives

1. Defines the pathology of cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH) and diabetes insipidus (DI) (KNOWLEDGE).
2. Analyzes the event history and assessment findings in a patient with cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH), or diabetes insipidus (DI) (ANALYSIS).
3. Performs a focused neurological assessment on a postoperative craniotomy patient (APPLICATION).
4. Identifies the correct diagnosis and expected orders for the patient with cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH), or diabetes insipidus (DI) (KNOWLEDGE).
5. Formulates a plan of care for a patient with cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH), or diabetes insipidus (DI) (SYNTHESIS).
6. States rationales for medications and fluid resuscitation and correctly administers treatments (APPLICATION).
7. Evaluates the patient's response to nursing interventions for the patient with cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH), or diabetes insipidus (DI) (EVALUATION).

## Questions to Prepare for the Simulated Clinical Experience

1. Describe the anatomy, physiology and functioning of the pituitary gland and hypothalamus.
2. Identify the circulatory system of the brain.
3. Discuss subarachnoid hemorrhage and the classic symptoms.
4. Describe postoperative complications of a patient with an aneurysm clipping (hypovolemia, vasospasm and ischemia).
5. Discuss electrolyte imbalances (especially sodium), correlating with the appropriate fluid replacement (hypertonic, isotonic and hypotonic solutions).
6. Describe cerebral salt wasting (CSW).
7. Describe the syndrome of inappropriate anti-diuretic hormone (SIADH).
8. Describe diabetes insipidus (DI).
9. Compare and contrast the differences in the patient with cerebral salt wasting (CSW), syndrome of inappropriate anti-diuretic hormone (SIADH), or diabetes insipidus (DI). This includes clinical presentation, lab values and treatment modalities. Fill in the comparison table for SIADH, CSW and DI.
10. Practice performing and documenting a neurological exam. This should include assessment of level of consciousness, cranial nerves, motor, sensory, coordination, gait and reflexes (Babinski).
11. Discuss the indications, actions, contraindications, side effects, and associated nursing measures for the following medications: oxycodone hydrochloride, nimodipine, phenytoin, prednisolone, desmopressin, furosemide, and salt tablets.

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**Comparison Table: Syndrome of Inappropriate Antidiuretic Hormone (SIADH), Cerebral Salt Wasting (CSW), and Diabetes Insipidus (DI)**

PARAMETER	CSW	SIADH	DI
Plasma volume			
Signs of dehydration			
Mucous membranes			
Skin turgor			
Jugular vein distention			
Blood pressure			
Heart rate			
Weight			
CVP			
Orthostatic hypotension			
Hematocrit			
Serum Osmolality			
Serum Potassium (K+)			
Serum Sodium (Na+)			
Urine Specific Gravity			
Urine output			
Urine Osmolality			
Fluid balance			
Thirst			