Syndrome of Inappropriate Antidiuretic Hormone Secretion secondary to Small Cell Lung Cancer

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Recommended Citation
SIADH Secondary to Small Cell Lung Cancer

Michael Weedman, BS, PA-S III

Case Presentation

**Setting:** Gateway Regional Medical Center in Granite City - Emergency Medicine

**Patient Demographics:** 76 y/o Caucasian Female

**Chief Complaint:** Hyponatremia on complete metabolic panel day prior to visit

**Possible Etiologies**
- **CNS:** Stroke, hemorrhage, infection, polydipsia due to psychosis
- **Malignancy:** Small cell lung cancer
- **Drugs:** SSRIs, Thiazides, antiepileptics, antipsychotics
- **GI:** Vomiting, diarrhea
- **GU:** Kidney function impairment
- **Cardio:** Heart failure

**HPI**
- Patient was seen in the emergency department and admitted on 9/30 with possible pneumonia and discharged with Tessenol Perles. While in the ED a chest X-Ray and Chest CT on 9/30 revealed a mass in her chest. BMP while in the ED showed a sodium level of 122 mmol/L. On 10/4, patient followed up with her primary care physician where a BMP was ordered.
- On 10/5, patient seen in ED after being sent by PCP due to hyponatremia from labs obtained on 10/4. Reports dizziness, visual changes, SOB, and non-productive cough. Denies nausea, vomiting, diarrhea, headache, or chest pain. Denies use of diuretics or polydipsia.

**PMH**
- **Medical Conditions:** Hypertension and Hyperlipidemia
- **Medications:** Aspirin, Norvasctain, Lisartan, Diolafenac, Sodium, Glucobay, Vitamin D3, Multivitamin, and Neurontin

**Allergies:** Bastrin, Hydroxychloroquine

**FH**
- No known family history of lung cancer

**SH**
- Current everyday smoker, 1 pack per day, 58th birthday

**ROS**
- **Endorses:** Fatigue; denies fever, chills, night sweats, weight change
- **HEENT:** Endorses dizziness, blurred and double vision; denies headache, cervical lymphadenopathy, dysphagia
- **Respiratory:** Endorses cough, SOB, dyspnea; denies hemoptysis, wheezing
- **CV/Peripheral vascular:** Denies chest pain, palpitations, LE edema
- **GI:** Denies abdominal pain, N/V, constipation
- **GU:** Denies dysuria, increased frequency, urgency
- **MSK:** Denies muscle weakness/pain/cramps
- **Neuro:** Denies confusion, gait issues, tingling, numbness
- **Endo:** Denies excessive urination

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**ADH** (Vasopressin) is a peptide hormone secreted by the posterior pituitary gland to increase free water reabsorption. ADH acts on renal collecting tubules to increase in number of aquaporin 2 water channels in the apical membrane to passive water diffusion.

**SCLC** tumor consists of cells derived from the neuroendocrine cells to ectopic production of ADH + increased free water diffusion to hypo-osmolar hyponatremia and high urinary sodium.

**Syndrome of Inappropriate Antidiuretic Hormone Secretion** (SIADH) is a hypo-osmolar euvolemic hyponatremia.

**Physiology/Pathophysiologic**
- **ADH** (Vasopressin) is a peptide hormone secreted by the posterior pituitary gland to increase free water reabsorption.
- **ADH** acts on renal collecting tubules to increase in number of aquaporin 2 water channels in the apical membrane to passive water diffusion.
- **SCLC** tumor consists of cells derived from the neuroendocrine cells to ectopic production of ADH + increased free water diffusion to hypo-osmolar hyponatremia and high urinary sodium.

**Clinical Manifestations**
- Mild to moderate symptoms can develop when Na concentration falls below 125 to 130 mEq/L: nausea, vomiting, headaches, confusion/memory difficulties, fatigue, and gait disorders
- Severe symptoms can develop when Na concentration falls below 115 to 120 mEq/L: seizures, AMS, respiratory collapse, coma and death
- Chronic onset of hyponatremia may present as subtle neurological manifestations
- **SCLC** symptoms: cough, chest pain, hemoptysis, and dyspnea

**Diagnosis**
- Syndrome of inappropriate antidiuretic hormone secretion is a paraneoplastic syndrome of impaired water excretion caused by the inability to suppress the secretion of ectopic ADH by SCLC tumor
- **SIADH** is a hypo-osmolar euvolemic hyponatremia

**Etiology**
- **SCLC** is most common etiology
- Other etiologies: CNS,学期的tumors, head & neck cancer, olfactory neuroblastoma, medications (carbamazepine, cyclophosphamide, SSRIs), surgery, pulmonary disease, hormone deficiency, and H1 infection

**Management**
- Treatment is directed towards the underlying tumor
- **Tumor-Node-Metastases classification of SCLC**:
  - T: Cancer > 2 cm but ≤3 cm in greatest dimension and does not involve zone
  - N: Metastasis in ipsilateral mediastinal and/or subcarinal lymph node
  - M: No distant metastasis
- Based on the TNM classification, her SCLC staging it considered Stage IIIA
- **Treatment for stage III disease**:
  - Chemotherapy: Preferred regimen is Etoposide + Cisplatin due to favorable response and survival rates
  - Thoracic Radiation Therapy
  - Chemotherapy + Radiation therapy is recommended
- **Salt Tablet + Loop diuretic**: 20 mg furosemide PO BID, lowers the urine osmolality and increases water excretion
  - **Tolvaptan**: Vasopressin receptor antagonist; produce a selective a water diuresis without affecting sodium and potassium excretion
  - Doses 3.75 mg to 15 mg of Tolvaptan were used in a study to correct hyponatremia in patients with SCLC > less than 15 mg of Tolvaptan is enough to stabilize plasma sodium levels
  - Mean time to correct plasma sodium after tolvaptan treatment was 3.7±5.8, and after 3 days of tolvaptan treatment, the mean plasma sodium level was 136±1 mmol/L
  - There is a risk of overcorrection of plasma sodium when using 15 mg of Tolvaptan
  - **Recommend serum sodium be raised by less than 6 to 8 mmol/L in any 24-hour period to prevent Osmotic demyelination syndrome**

**Patient Education and Prognosis**

**USPSTF recommends annual low-dose CT screening for adults aged 50-80 years who have a 20-year pack-year smoking history and currently smoking or have quit within the past 15 years**

**null**

**Resource**