Hyponatremia Associated with Unilateral Hand Weakness and Numbness: A Case Report

Khaldoon Shaheen, Abdul Hamid Alraiyes¹, Motaz Baibars², Naseem Eisa, M. Chadi Alraies

Department of Hospital Medicine, Institute of Medicine, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland Clinic, Cleveland, Ohio, ¹Department of Pulmonary Diseases, Critical Care, and Environmental Medicine, Tulane University Health Sciences Center, New Orleans, Louisiana, ²Department of Hospital Medicine, Peninsula Regional Medical Center, Salisbury, Maryland, USA

Abstract

Context: The key clinical features in this case are to make the diagnosis apical lung cancer (Pancoast tumor) in a patient with brachial plexopathy and to recognize the association between syndrome of inappropriate secretion of antidiuretic hormone (SIADH) as a paraneoplastic syndrome and non-small cell lung cancer (NSCLC). Case Report: We herein describe a rare case of NSCLC presented as pancoast tumor complicated by brachial plexopathy and associated with SIADH as a paraneoplastic phenomena. There were no renal insufficiency, congestive cardiac failure, liver insufficiency, volume depletion, diuretic use, hypoadrenalism, and hypothyroidism in our patient. Furthermore, the findings of serum hyponatraemia and hypo-osmolality associated with an inappropriate high urinary osmolality indicate that the SIADH was present in our patient due to the NSCLC. Conclusion: Our case also emphasizes that early recognition and appropriate applied management may significantly improve symptoms and prevent complications of hyponatremia which may enhance quality of life in patients with paraneoplastic SIADH.

Keywords: Hyponatremia, Inappropriate secretion of antidiuretic hormone, Non-small cell lung cancer, Paraneoplastic syndrome

Address for correspondence: Dr. Khaldoon Shaheen, Department of Hospital Medicine, Institute of Medicine, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland Clinic, Cleveland, 9500 Euclid Avenue A13, Cleveland, Ohio 44195, United States of America. E-mail: khaldoonshaheen@yahoo.com

Introduction

Syndrome of inappropriate secretion of antidiuretic hormone (SIADH) is a well-recognized paraneoplastic phenomenon and it is typical of small cell lung cancer (SCLC). There are very few case reports of non-small cell lung cancer (NSCLC) induced SIADH described in literature. We herein describe an interesting case of NSCLC presenting with brachial plexopathy and SIADH. The case highlights that the early recognition and appropriate management may not only improve the quality of life in patients but can prevent serious complications including death.

Case Presentation

A 62-year old previously healthy man, a machinist, presented with 3 months history of worsening right hand weakness and numbness with difficulty operating machinery at work. Patient also described numbness in his right axilla and right scapular region from last 1 year. The numbness progressed along the posterior aspect of his arm and forearm. It later involved the right hand with flexion deformity of the right hand and fingers. He reported anorexia, fatigue, unintentional weight loss of about 20 lbs over 3 months and mild chronic cough with no history of fever, night sweats, hemoptysis or dyspnea. He denied neck pain, headaches, or dizziness. Patient also denied trauma to the neck or head. He had 40 pack-year smoking history but denied alcohol use. On examination, he had normal vital signs with no orthostatic changes and a BMI of 17. He appeared older than his stated age. He was conscious, cooperative, oriented to time, place and a person. He reported his mood as “desperate” because he had recently misplaced his glasses. His speech was slow, halting, and soft. His grip strength
in right hand was 4/5 with atrophy of the interossei muscles and flexion deformity was noticed at the distal interphalangeal joints (DIP). Sensation to pinprick was reduced along the right C7, C8, and T1 dermatomes. Otherwise the reminder of physical examination was unremarkable. Laboratory investigation showed WBC of 13100 cells/mm$^3$ with monocyte of 20%. The biochemical profile showed serum sodium of 121 mmol/L (reference range 136-145 mmol/L), serum osmolality of 254 mOsmol/kg (reference range 270-300 mOsmol/kg), and urine osmolality of 451 mOmol/kg and urinary sodium concentration of 69 mmol/L. Potassium, urea, creatinine, corrected calcium, and liver function test were all within normal. The chest X-ray showed right apical pleural-based density suggestive of a soft tissue mass lesion [Figure 1a]. CT scan chest was performed and showed large right apical mass suspicious for primary neoplasm (Pancoast tumor) with apparent chest wall invasion, mediastinal and right hiliar adenopathy, and a separate left lung metastatic nodule [Figures 1a and b]. MRI of the chest revealed large right apical superior sulcus pulmonary mass likely primary bronchogenic carcinoma with extensive local spread of disease was most prominent posteriorly involving and surrounding the proximal first and second ribs, spinous transverse processes, adjacent soft tissues and involving the right brachial plexus nerve roots exiting the upper thoracic spine [Figures 2a and b]. CT guided core biopsy of the right apex mass was performed and histopathology showed a poorly differentiated non-small cell lung carcinoma (NSCLC), adenocarcinoma is favored [Figures 2c and d]. Immunohistochemical staining showed cytokeratin 7 was positive, other staining such as the cytokeratin 20, TTF-1, and p63 markers were negative. Brain and abdomen computed tomography screening and bone scan showed no distant metastases could be demonstrated and tumor/node/metastasis staging (T3N2M1a) was stage IV.[1] The biochemical profile was consistent with SIADH, a paraneoplastic syndrome secondary to NSCLC. Patient was treated with fluid restriction. On discharge, he was planned for out-patient palliative chemoradiation. After two courses of MIC chemotherapy (mitomycin, ifosfamide and cisplatin) three times weekly, his hyponatremia improved (sodium 131 mmol/L). Patient also reported partial improvement in his right hand weakness and had less fatigue. Patient refused further chemoradiation and opted for hospice based management. He later died few months later.

**Discussion**

Syndrome of inappropriate secretion of antidiuretic hormone (SIADH) is a condition of hyponatremia and renal salt loss attributed to overexpansion of body...
fluids resulting from sustained release of anti-diuretic hormones which stimulates renal resorption of water. It is characterized by hyponatremia, high urine osmolality, low serum osmolality, normal acid-base, and potassium balance. [1] SIADH may be caused by various conditions, such as disorders involving the central nervous system, a variety of malignant tumors, major abdominal or thoracic surgeries, symptomatic HIV infection, and intrathoracic disorders such as infections, positive pressure ventilation, and conditions with a decrease in left atrial pressure. [2] Also, a large number of drugs have been shown to cause SIADH including chlorpropamide, carbamazepine, oxcarbazepine, SSRIs, and a number of cytotoxic drugs such as vincristine, vinblastine, cisplatin, cyclophosphamide, and melphalan. [1]

SIADH is a well-recognized paraneoplastic phenomenon and was first described in relation to malignancies in 1968. [3] About 75% of tumor-associated SIADH is caused by small cell lung cancer (SCLC). Less common causes of ectopic ADH secretion include head and neck cancers, hematologic malignancies, intrathoracic non-pulmonary cancers, skin tumors, gastrointestinal cancers, gynaecological cancers, breast cancers, prostatic cancers, and sarcomas. [4] Non-small cell lung cancer (NSCLC) is shown to be responsible for an exceedingly small proportion of paraneoplastic SIADH. [5] One larger series of patients with lung cancer have revealed that SIADH occurs in 0.7% of patients with NSCLC (3 cases out of 427 patients) compared to SIADH incidence of 15% of SCLC cases (214 cases out of 1473 patients). [4]

In the absence of renal insufficiency, congestive cardiac failure, liver insufficiency, volume depletion, diuretic use, hypoadrenalism and hypothyroidism, the findings of serum hyponatremia and hypo-osmolality associated with an inappropriate high urinary osmolality indicates the SIADH was present in our patient due to the NSCLC.

Patient with lung cancers often have mixed subtypes, e.g. SCLC mixed with non-small cell lung cancer. In our case, there is sufficient evidence that the tumor was only of the NSCLC type. The histological morphology, positivity pattern for cytokeratin 7, as well as negativity for the cytokeratin 20, TTF-1, and p63 markers were consistent with a poorly differentiated adenocarcinoma, a subtype of NSCLC.

The optimal therapy for SIADH is to treat the underlying malignant disease which may improve this paraneoplastic condition. There was resolution of SIADH after the surgical resection of the primary lung cancer and after palliative chemotherapy in other case reports, [6] this could suggest that chemotherapy may be a useful option in improving this condition in unresectable tumor. [6] If this is not applicable or if the disease has become refractory, other treatment methods are available such as water restriction, demeclocycline therapy, or, in severe cases, infusion of hypertonic saline together with furosemide during careful monitoring.

References

1. Ellison DH, Berl T. Clinical practice. The syndrome of inappropriate antidiuresis. N Engl J Med 2007;356:2064-72.
2. Lambert HJ, Baylis PH, McAulay JA, Coulthard MC. Does positive pressure ventilation increase arginine vasopressin in preterm neonates? Arch Dis Child Fetal Neonatal Ed 1998;78:F38-42.
3. Vorherr H, Massry SG, Utiger RD, Kleeman CR. Antidiuretic principle in malignant tumor extracts from patients with inappropriate ADH syndrome. J Clin Endocrinol Metab 1968;28:162-8.
4. Sørensen JB, Andersen MK, Hansen HH. Syndrome of inappropriate secretion of antidiuretic hormone (SIADH) in malignant disease. J Intern Med 1995;238:97-110.
5. Katsuragi N, Shiraishi Y, Nakajima Y, Kurai M, Takahashi N, Tanaka S. Squamous cell bronchogenic carcinoma with syndrome of inappropriate secretion of antidiuretic hormone. Kyobu Geka 2004;57:847-50.
6. Tho LM, Ferry DR. Is the paraneoplastic syndrome of inappropriate antidiuretic hormone secretion in lung cancer always attributable to the small cell variety? Postgrad Med J 2005;81:e17.

How to cite this article: Shaheen K, Alraiyes AH, Baibars M, Eisa N, Alraies MC. Hyponatremia associated with unilateral hand weakness and numbness: A case report. North Am J Med Sci 2013;5:660-2.

Source of Support: Nil. Conflict of Interest: None declared.