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CASE REPORT

HYPONATREMIA AND BILATERAL PLEURAL EFFUSION AS THE INITIAL PRESENTATION OF HYPOTHYROIDISM AND HYPOADRENALISM IN AN 87 YEAR OLD MAN

ABSTRACT

We report an 87 year old man who was admitted for an open reduction of a left hip dislocation. A month earlier, he had been admitted for a right-sided hemiarthroplasty to treat a fracture of the neck of femur, and had hyponatremia documented during his hospital stay. Evaluation of postoperative hyponatremia during his present admission revealed bilateral pleural effusion, elevated thyroid stimulating hormone levels and a urinary tract infection. His sodium levels had initially improved with oral L-thyroxine, but an adrenal insufficiency was unmasked two days after therapy; his condition was also complicated by respiratory failure, hypotension and altered sensorium. He was managed with mechanical ventilation, L-thyroxine, hydrocortisone, inotropes and antibiotics. His sodium remained normal thereafter until time of his discharge.

Key Words: Hypothyroidism; Hyponatremia; Aged; Myxedema.



OLGU SUNUMU

SEKSEN YEDİ YAŞINDA ERKEK BİR OLGUDA HİPOTİROİDİZM VE HİPOADRELANİZM BAŞLANGICI OLARAK HİPONATREMİ VE BİLATERAL PLEVRAL EFÜZYON

Öz

Bu olguda sol kalça çıkığı açık redüksiyon için başvuran 87 yaşında bir erkek olgu sunulmaktadır. Bir ay önce, hasta, femur boyun kırığı tedavi etmek için sağ taraflı hemiarthroplasti için kabul edildi ve hastanede kaldığı süre içerisinde hiponatremisi vardı. Hastanın şimdiki kabulündeki postoperatif hiponatremi değerlendirilmesinde bilateral plevrallı efüzyon, tiroid stimuli edici hormon düzeylerinde yükseklik ve üriner sistem enfeksiyonu saptandı. Sodyum düzeyleri oral L-tiroksin ile arttı, ama tedaviden iki gün sonra adrenal yetmezlik maskelenemedi; hastanın durumu solunum yetmezliği, hipotansiyon ve duyuşsal değişim sonucunda daha karmaşık oldu. Hasta mekanik ventilasyon, L-tiroksin, hidrokortizon, inotropikler ve antibiyotik ile tedavi edildi. Sodyum düzeyi de taburcu olana dek normal seyretti.

Anahtar Sözcükler: Hipotiroidizm; Hiponatremi; Yaşlılarda; Miksödem.

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INTRODUCTION

Hyponatremia, is the most common dyselectrolytemia in hospitalized patients (1), and also in hypothyroid patients (2). Hyponatremia is generally associated with more severe forms of myxedema (3). Hypothyroidism, hypopituitarism, surgical and psychological stress, drugs like non-steroidal anti-inflammatory drugs (NSAIDs) and morphine that are used post-operatively are common causes of euvolemic hyponatremia (4). We report a post-operative patient whose evaluation of euvolemic hyponatremia and pleural effusion revealed a diagnosis of hypothyroidism. These are unusual initial presentations of hypothyroidism.

CASE

This 87 year old man was referred from the orthopedics post-operative ward for management of hyponatremia. He had been admitted a month earlier in our hospital, for fracture of the right neck of femur sustained during a fall at home. He had been discharged in a stable condition after a hemiarthroplasty. A week after discharge to home, he fell again and dislocated his left hip and was hence readmitted to our hospital for an open reduction. On examination, he was drowsy, afebrile, hydrated, with normal pulse, respiratory rate and blood pressure. Except for slow verbal responses, his neurologic examination was unremarkable. Cardiorespiratory and abdominal examination was normal. He had been treated for pulmonary tuberculosis 40 years ago. There was no history of diabetes, hypertension or previous hospitalization.

During his first admission, his sodium levels ranged from 120 to 133 mmol/L and he had been treated with 3% saline and additional dietary salt. Sodium level of 125 mmol/L was observed at the time of second admission, and being asymptomatic, the patient did not receive any supplementation. Post operatively, he had been given 0.9% saline and 5% dextrose saline infusion. He was eating poorly, but had adequate urine output. On the day of examination (post-op day 17), his sodium and potassium levels were 113 and 3.7 mmol/L respectively. Calculated serum osmolality was 260 mmol/L. Renal function tests were normal. Surgical drain fluid had yielded *Enterococcus faecalis* and he had been treated with linezolid for two weeks. Urine had revealed pyuria without bacteruria. His treatment included also ranitidine and tramadol.

Chronic hyponatremia compounded by poor oral intake, and a syndrome of inappropriate antidiuretic hormone (SIADH) due to postoperative status and pain, surgical and

urinary tract infection (UTI), leading to a hypoosmolar hyponatremia were considered. Pending reports, he was instituted on intravenous ceftazidime and amikacin for UTI. Liver function tests, uric acid, TSH, urine sodium, chest radiograph and ultrasonogram of abdomen were ordered. He was reviewed the next day and investigations revealed normal liver function tests, hypouricemia (2.9 mg/dL), urinary sodium of 240 mmol/L, TSH of 13 mIU (0.5-4.8), Free T4 of 0.3 ng/dL (0.8-1.7) and bilateral minimal pleural effusion on sonogram. Guided thoracentesis was performed; fluid was exudative, with a differential count of 78% lymphocytes and negative adenosine deaminase (ADA). Echocardiography was normal. Oral L-thyroxine 50mcg/day was instituted.

Forty eight hours later, his sensorium worsened along with a fall in blood pressure and saturation levels and he was shifted to intensive care. He was unresponsive to verbal commands and had shallow breathing. Myxedema coma was suspected. Blood and urine cultures were repeated. Intravenous hydrocortisone 100mg and an oral loading dose of L-thyroxine 500mcg (intravenous thyroxine being unavailable) were administered. Central venous access was secured. Dopamine and noradrenaline were infused; antibiotics were changed to imipenem and ciprofloxacin and intravenous hydrocortisone 50mg was administered every sixth hour. Chest radiograph revealed bilateral upper lobe opacities (Figure 1). Pre-replacement cortisol level was 12 mcg (expected >18mcg). Urine grew *E coli* and *Pseudomonas* sensitive to imipenem and polymyxin B respectively, and these antibiotics were subsequently administered. Anti-thyroid peroxidase antibodies (TPO) of 46 IU/mL (<40) was observed. Financial constraints precluded us from doing anti-adrenal antibodies and computed tomography of the adrenals. He was weaned off inotropes and ventilator support within the following 72 hours. His sodium remained > 130mmol/L until time of his discharge from hospital. A diagnosis of chronic euvolemic hyponatremia due to hypothyroidism and hypoadrenalism and myxedema precipitated by sepsis was made. He was discharged home with L-thyroxine, oral prednisolone and calcium supplements.

DISCUSSION

About 1% of general medical inpatients are affected with overt hypothyroidism (4). According to a study, only 21% of patients with hypothyroidism were given the correct diagnosis initially in emergency (4). This is generally due to its protean manifestations, slow progression of subtle symp-

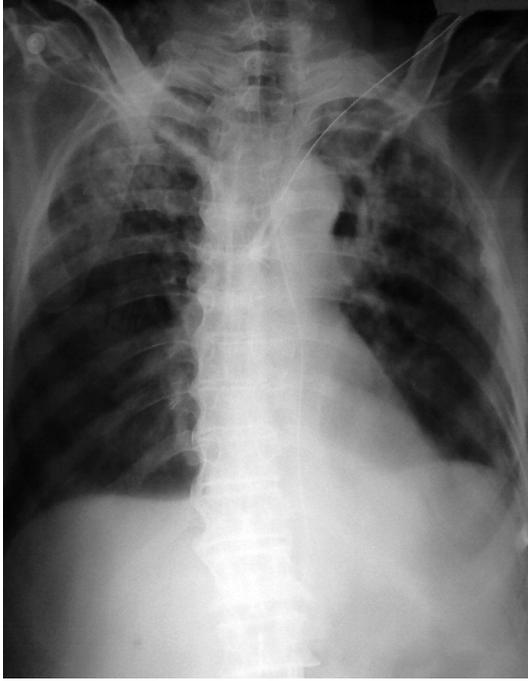


Figure 1— Bedside CXR-Bilateral upper lobe opacities and left costophrenic angle blunting.

toms and signs or sometimes an absence of symptoms. Also about half of geriatric patients admitted in the emergency can have hyponatremia (5). Overall prevalence of hypothyroidism in older adults is 2-5%. Severe illness can decrease elevated TSH levels in patients (6), which may have occurred in our patient, but we do not have a subsequent TSH value to corroborate our point.

Euvolemic hyponatremia is the most common dysnatremia, but in routine clinical practice, hyponatremia is rare in hypothyroidism (7). Hyponatremia in hypothyroidism can occur due to increased free water, impaired free water excretion, relative cortisol deficiency, nephron dysfunction, renal structural abnormalities, inappropriate arginine vasopressin (AVP) secretion, especially when associated with hypovolemia (8-10), movement of water to connective tissue spaces, reduced cardiac output and reduced glomerular filtration rate (GFR) (7). In the proximal convoluted tubule, there is reduced Na⁺ K⁺ ATPase induction, which reduces reabsorption of sodium; Na⁺ H⁺ exchange activity is also reduced (10). Atrial natriuretic peptide (ANP) synthesis is reduced in hypothyroidism and ANP causes natriuresis and diuresis (11).

Hyponatremia can be the chief symptom of hypothyroidism (12). Hyponatremia was, in a report, the presenting

feature of isolated thyrotropin deficiency (13). Hyponatremia can also occur following treatment with L-thyroxine due to relative hypocortisolism (14). Adrenal steroid production is low in hypothyroidism, and adrenal insufficiency can be unmasked following treatment with L-thyroxine as in our patient (13). Treatment with L-thyroxine increases renal blood flow and causes diuresis, natriuresis and reduction in levels of AVP (7). Life threatening hyponatremia has occurred after cessation of L-thyroxine therapy (7).

Older patients like ours can present with failure to thrive, mental confusion, and poor appetite with weight loss instead of weight gain, falling episodes, incontinence and depression (7). His confusion, recurrent falls and subsequent orthopedic injuries could be due to hypothyroidism, worsened by hyponatremia. These symptoms and others like dry skin, recent memory loss, increased somnolence of hypothyroidism can resemble aspects of normal aging (6,15). Aging is increasingly associated with thyroid abnormalities and 86% of patients in one study, who presented to emergency with hypothyroidism were older adults (4). The etiology of hyponatremia in older adults is generally multifactorial. SIADH, in one study was the most common cause in older adults (5). High prevalence of chronic liver and cardiac disease, dehydration, use of diuretics, age-associated reduction in GFR and urinary concentrating ability, higher levels of AVP and ANP in this subset of population predisposes towards hyponatremia (5).

Lack of history of pre-existing thyroid disease leads to delay in diagnosis or misdiagnosis (16). Hypothyroid patients generally present to emergency with cardiac or neurological symptoms (4). Hyponatremia and effusions are unusual presentations of hypothyroidism (7), while hyponatremia is more common in myxedematous respiratory failure (16). Precipitating factors for respiratory failure and coma include infections, surgeries, drugs, hyponatremia (16), all of which were present in our patient.

In conclusion, features of hypothyroidism can resemble normal aging process; hyponatremia and pleural effusion can be the initial manifestation of hypothyroidism. Concurrent hypoadrenalism can worsen or compromise treatment of hyponatremia especially in older adults. Coexisting hypoadrenalism can be unmasked after L-thyroxine therapy even when the patient is not myxedematous. Thyroid testing is needed in the elderly with asymptomatic or symptomatic pre- and post-operative hyponatremia and recent deterioration in clinical, cognitive, or functional status, or on admission to a health care facility.



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