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Advanced Lung Neoplasia with Multisystem Paraneoplastic Syndrome in an Elderly Patient: A Case Report

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Abstract

Introduction: Paraneoplastic syndromes occur in approximately 10% - 16% of lung cancer patients, with electrolyte disturbances representing some of the most challenging manifestations in geriatric oncology. Elderly patients often present with atypical symptoms that complicate early diagnosis and management. **Case Report:** An 80-year-old autonomous woman presented with progressive asthenia, refractory hypokalemia, hypocalcemia, hypomagnesemia, and metabolic alkalosis over several weeks. Imaging revealed a right hilar lung mass with multiple metastases to the liver and adrenal glands. Despite an extensive workup, bronchoscopic biopsies remained inconclusive. The patient's condition deteriorated rapidly, precluding further invasive diagnostic procedures, and she died without definitive histological confirmation. **Conclusion:** This case underscores the multifaceted challenges in geriatric oncology, particularly when paraneoplastic syndromes dominate the clinical presentation. It highlights the importance of recognizing systemic manifestations of advanced malignancy and the need for individualized, palliative-focused care when curative interventions are not feasible.

Keywords

Paraneoplastic Syndrome, Lung Neoplasia, Electrolyte Imbalance, Geriatric Oncology, Palliative Care

1. Introduction

Lung cancer remains the leading cause of cancer-related mortality worldwide, with the majority of diagnoses occurring in patients over 65 years of age [1] [2]. The median age at diagnosis is approximately 70 years, reflecting the strong association between aging and malignancy development. Paraneoplastic syndromes, defined

as clinical manifestations resulting from tumor-produced substances or immune responses rather than direct tumor effects, occur in 10% - 16% of lung cancer patients [3] [4].

Electrolyte disturbances represent particularly challenging paraneoplastic manifestations, often presenting as the initial or dominant clinical feature [5] [6]. These abnormalities can be life-threatening and significantly impact quality of life, frequently preceding the diagnosis of the underlying malignancy by months. In elderly patients, the complexity is compounded by age-related physiological changes, multiple comorbidities, and the challenges of aggressive diagnostic and therapeutic interventions [7] [8].

The management of advanced cancer in elderly patients requires careful consideration of functional status, life expectancy, treatment tolerability, and patient preferences [7] [9]. Geriatric assessment tools have emerged as valuable instruments for predicting treatment outcomes and guiding therapeutic decisions. However, when a definitive diagnosis cannot be established due to patient frailty or technical limitations, management becomes particularly challenging [10].

2. Case Report

2.1. Patient Information and Initial Presentation

An 80-year-old woman presented to the emergency department with a several-week history of progressive fatigue, anorexia, and generalized weakness. Her medical history was significant for previously controlled hypertension, type 2 diabetes mellitus, major depressive disorder managed with sertraline, and a remote history of treated breast cancer. She lived independently with her husband and maintained functional autonomy until the onset of her current symptoms.

2.2. Clinical Course and Symptoms

The patient's initial symptoms included persistent asthenia, decreased appetite with unquantified weight loss, and recently refractory hypertension despite medication adjustments. She developed progressive bilateral lower extremity edema extending to the knees, which was initially attributed to cardiac decompensation. Additionally, she reported hypersweating and insomnia despite medication. Multiple emergency department visits over the preceding month documented persistent electrolyte abnormalities resistant to correction.

2.3. Laboratory Tests Carried Out

The laboratory investigations revealed several abnormalities consistent with advanced malignancy and paraneoplastic syndrome. Hematological analysis demonstrated persistent electrolyte disturbances with severe hypokalemia (2.5 mmol/L), hypocalcemia, hypomagnesemia, and metabolic alkalosis. These abnormalities persisted despite aggressive replacement therapy, suggesting ongoing losses or inappropriate hormonal activity.

CEA and CA-125 showed elevated CA 19-9 levels, while other markers, includ-

ing CEA and CA-125, remained within normal limits. Hormonal evaluation was significant for the exclusion of pheochromocytoma, with normal plasma and urinary metanephrines and catecholamines. Thyroid function tests were normal, and cortisol levels were within the expected range.

Inflammatory markers showed a mild elevation of C-reactive protein and erythrocyte sedimentation rate, consistent with a systemic inflammatory response. Liver function tests revealed mild elevations in transaminases, likely related to hepatic metastases observed on imaging. It is also worth noting the presence of nephrotic syndrome with proteinuria of 4.4 g/24 h, hypoalbuminemia, and an evident anasarca state.

2.4. Image Studies

Thoracic Computed Tomography: The chest CT scan revealed a heterogeneous mass in the right pulmonary hilum measuring approximately 3.5 cm in the largest dimension. The mass demonstrated irregular borders and a heterogeneous enhancement pattern. Multiple bilateral pulmonary nodules of varying sizes were present, consistent with intrapulmonary metastases or multifocal disease.

Extensive mediastinal and hilar lymphadenopathy was identified, with multiple enlarged lymph nodes exceeding 1 cm in short-axis diameter. Bilateral pleural effusions were present, more prominent on the right side.

Abdominal Imaging: Abdominal CT demonstrated multiple hypodense hepatic lesions consistent with metastatic disease. The lesions were distributed throughout both hepatic lobes and varied in size from 1 to 4 cm. Bilateral adrenal masses were identified, measuring 2.5 cm on the right and 3.2 cm on the left, which were highly suggestive of metastatic involvement.

No evidence of primary gastrointestinal malignancy was identified. The pancreas appeared normal, and no retroperitoneal lymphadenopathy was detected.

2.5. Diagnosis and Treatment

Given the clinical findings of difficult-to-control hypertension, asthenia, and hypokalemia refractory to supplementation, hyperaldosteronism was hypothesized. After imaging studies performed with an abdominal CT scan revealed a non-specific nodule in the left adrenal gland, possibly an adenoma or secondary lesion, we decided to do a lung CT scan that revealed a hilar mass (metastatic lung neoplasm? Other?). A bronchoscopy biopsy of the hilar lesion was performed, but it was inconclusive. A request for a new Endobronchial Ultrasound Bronchoscopy (EBUS) was made, but it was rejected due to the hypothesis of a possible pheochromocytoma. Because manipulation of a suspected catecholamine-secreting tumor can precipitate a life-threatening hypertensive crisis, EBUS was deferred. If a pheochromocytoma is present in a mediastinal or hilar location, airway instrumentation and sedation—even mild stimulation of the lesion—can trigger massive catecholamine release, leading to severe hypertension, arrhythmias, or cardiac ischemia. Therefore, until biochemical or imaging studies definitively exclude pheo-

chromocytoma, invasive bronchoscopic procedures that could mechanically disturb the mass are contraindicated. Metanephrine levels were then measured, and the result was normal, but the patient continued to show clinical worsening and did not undergo further invasive examinations.

A diagnosis of probable advanced pulmonary adenocarcinoma with multisystem paraneoplastic syndrome was established based on clinical presentation, imaging findings, and laboratory abnormalities. Despite the inability to obtain definitive histological confirmation, the constellation of findings strongly supports this diagnosis.

Treatment focused on supportive and palliative measures. Aggressive electrolyte replacement was attempted, including intravenous potassium chloride, magnesium sulfate, and calcium gluconate. Diuretic therapy was optimized to manage fluid overload while attempting to preserve electrolyte balance.

The patient remained under close surveillance with daily laboratory monitoring and symptom assessment. Given her deteriorating clinical condition and poor performance status, invasive diagnostic procedures were deemed inappropriate. The focus of care shifted to comfort measures, symptom control, and family support.

3. Discussion

This clinical case illustrates the complex presentation of advanced lung cancer in an elderly patient, characterized primarily by paraneoplastic metabolic disturbances, refractory hypertension, hyperswating and insomnia, rather than classic respiratory symptoms. These symptoms may reflect autonomic dysfunction or aberrant ectopic hormone secretion by the tumor, including peptides and cytokines that affect vascular tone, sweat gland activity, and neuropsychiatric status. Even when specific entities like pheochromocytoma are excluded, such clinical findings support the concept of widespread paraneoplastic effects beyond metabolic and renal disturbances, emphasizing the need for multidisciplinary assessment and individualized management in complex oncologic patients. The combination of refractory electrolyte abnormalities, extensive metastatic disease on imaging, and clinical deterioration strongly suggests advanced pulmonary malignancy despite the absence of definitive histological confirmation [11] [12]. Although elevated CA 19-9 is most commonly associated with gastrointestinal tumors, it is a nonspecific marker that can also be increased in certain cases of lung cancer, particularly adenocarcinomas and advanced disease, reflecting either direct tumor production or a paraneoplastic phenomenon, helping to corroborate our suspicion.

Paraneoplastic syndromes occur in 10% - 16% of lung cancer patients and can precede the diagnosis of cancer in up to 60% of cases [3] [4]. The electrolyte disturbances observed in this patient, particularly the refractory nature of hypokalemia, hypocalcemia, and hypomagnesemia, suggest multiple mechanisms, including ectopic hormone production, renal tubular dysfunction, and cytokine-mediated effects [5] [13].

Paraneoplastic glomerulopathies can occur in patients with advanced malignancies—particularly lung carcinomas—as part of multisystem paraneoplastic syndromes. Among tumor-or immune-mediated renal lesions, Focal Segmental Glomerulosclerosis (FSGS) and membranous glomerulonephritis are most associated with solid tumors in elderly patients. These glomerulopathies may cause significant proteinuria and reductions in glomerular filtration rate, exacerbating electrolyte imbalances and worsening the patient's weakness and malnutrition. In a setting of multiorgan failure and intolerance to invasive procedures, suspicion for paraneoplastic glomerulopathy relies on urinary markers (proteinuria and sediment analysis), exclusion of other causes, and confirmation of the primary malignancy—even in the absence of renal biopsy.

The diagnostic challenges encountered in this case highlight the limitations of invasive procedures in frail elderly patients with advanced disease. Bronchoscopic procedures carry significant risks in patients with poor performance status and multiple comorbidities [14]. The false-negative rate for bronchoscopic sampling can reach 20-30%, particularly in centrally located lesions or when technical factors limit adequate sampling [15].

The management of advanced cancer in elderly patients requires a careful balance between diagnostic pursuits and patient comfort. Geriatric assessment tools help identify patients who may benefit from aggressive interventions versus those who would be better served with palliative approaches [7] [9]. In this case, the combination of advanced age, multiple comorbidities, poor performance status, and extensive metastatic disease made palliative care the most appropriate approach [16].

The integration of early palliative care has been shown to improve quality of life and potentially extend survival in patients with advanced lung cancer [17] [18]. The focus on symptom management, psychosocial support, and family communication becomes particularly important when curative options are not available.

4. Conclusions

This case demonstrates the challenging intersection of advanced malignancy, paraneoplastic syndromes, and geriatric considerations in cancer care. The presentation of refractory electrolyte disturbances as the dominant clinical feature in an elderly patient with imaging suggestive of advanced lung cancer highlights the need for high clinical suspicion and comprehensive evaluation.

When a definitive histological diagnosis cannot be safely obtained, clinical judgment based on the integration of symptoms, imaging findings, and laboratory data must guide management decisions. The early involvement of palliative care services is essential for optimizing symptom control and quality of life in elderly patients with advanced cancer.

This case underscores the importance of individualized care planning that considers not only the suspected diagnosis but also the patient's functional status,

comorbidities, and personal values. Future research should focus on developing less invasive diagnostic approaches and improving prognostic tools for elderly patients with suspected advanced malignancy.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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