Profound hypokalemia secondary to Cushing syndrome in SCLC

Terra Spinuzzi Sloat, DO PGY-1

Introduction

- Small-cell lung cancer accounts for 10 to 15% of lung cancers and is known for its rapid doubling time, aggressive nature, and often very advanced disease at presentation
- Small-cell lung cancer is most frequently associated with paraneoplastic syndromes which can be hormone-associated or immune-mediated
- Ectopic Cushing syndrome (ECS) is due to hypercortisolism secretion from non-pituitary tumors. May be either ACTH dependent (80%) or ACTH independent (20%).
- Ectopic secretion of ACTH by non-pituitary tumors accounts for 10–15%

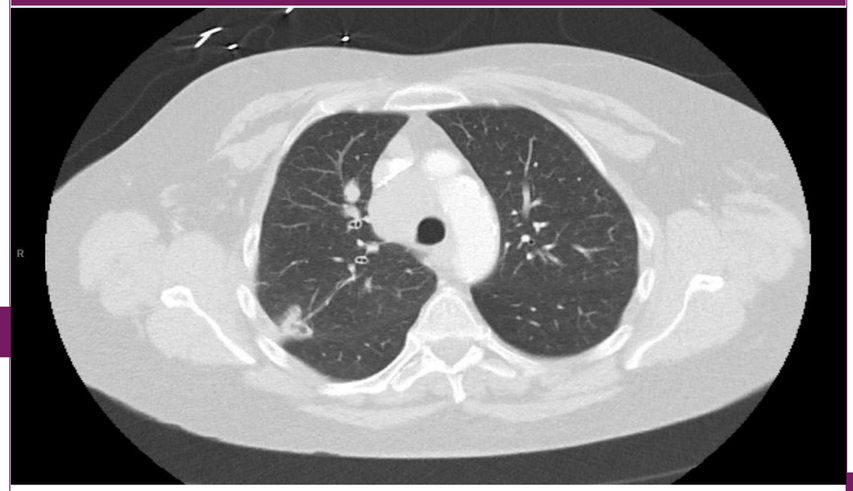
Case Summary

59-year-old female with small cell lung cancer diagnosed on 6/23/2022 by bronchoscopy biopsy of right upper lobe mass and 4R lymph nodes. A PET CT from 06/28/2022 demonstrated metastasis within liver, multifocal osseous metastases throughout axial and appendicular spine, and mediastinal and hilar involvement. Brain MRI 12/2022 showed brain metastasis. The patient was treated with Carboplatin + Etoposide for 4 cycles from 7/2022-9/2022. She was scheduled to start on Lurbinectedin on 02/02/2023. Seen by radiation oncology on 01/13/2023 for planned palliative brain radiation. Presented to the UPMC Lititz Emergency Department with a potassium of 1.8 discovered on routine outpatient laboratory analysis.

In the ED repeat potassium 1.8 and magnesium at 1.8. EKG with nonspecific T wave abnormalities consistent with hypokalemia. The patient was given potassium replacement 40mEq oral solution, 20mEq IV and magnesium sulfate 2g IV. Repeat potassium after replacement was 1.5. Metabolic alkalosis: pCO2 36, HCO3 36 secondary to hypokalemia. Trans tubular potassium gradient (TTKG) 9 suggesting renal potassium wasting. Cortisol elevated >60. ACTH elevated to 278 despite dexamethasone treatment 4mg IV twice daily for 6 days.

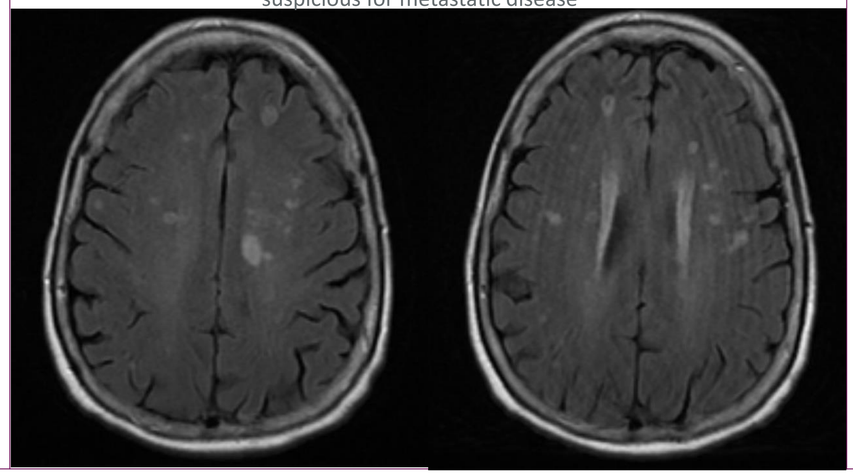
The patient was initiated on high dose IV potassium replacement via central line after multiple failed attempts at peripheral IV and oral replacement. Spironolactone and acetazolamide also administered. Peak potassium level 3.0 despite aggressive treatment. Considered treatment with ketoconazole to suppress adrenal function but patient with significant decline and overall poor prognosis elected for hospice treatment.

Images



CT chest with right hilar mass worrisome for conglomerate lymphadenopathy. Ground-glass and tubular densities in the right upper lobe.

MRI Brain T2 Flair showing at least 20 small peripherally enhancing lesions suspicious for metastatic disease



Discussion of treatment options

- Treatment of the primary tumor is the primary treatment goal
- Surgical option for bilateral adrenalectomy. Daily glucocorticoid and mineralocorticoid supplementation is necessary after surgery
- Ketoconazole and levoketoconazole normalize the cortisol level over a period of weeks but are contraindicated in patients with elevated levels on liver-function tests
- Metyrapone and osilodrostat are more likely than ketoconazole to normalize the cortisol level with dose adjustment over a period of weeks nut may worsen hypertension and hypokalemia, given the buildup of cortisol precursors with mineralocorticoid activity
- Other adrenal steroid synthesis inhibitors include mitotane and etomidate

References

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