Leukemia or Lung Cancer? An unusual case of squamous cell lung cancer presenting with refractory cytopenias

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INTRODUCTION

- Non-small cell lung cancer(NSCLC) has propensity to metastasize to bones – around 40%.
- Bone Marrow involvement very rare, unlike in SCLC
- Persistent cytopenias as a result of diffuse bone marrow infiltration is uncommon
- Bone Marrow biopsy is not a routine part of staging process

CASE DESCRIPTION

- 65yo male with history of chronic tobacco smoking (40 pack years), chronic SDH and a recent prolonged hospitalization for COVID-19 pneumonia with residual restrictive lung disease
- Presenting symptoms of of several weeks of progressive fatigue, night sweats and palpitations with recent onset of nosebleeds and acute diplopia 4 days prior to admission
- Physical examination demonstrated scattered ecchymoses and petechiae. No respiratory distress or focal neurological deficits.
- Intake labs concerning for neutrophilic leukocytosis (WBC 21,900 cells/mm^3, absolute neutrophil count 11,600 cell/mm^3), normocytic anemia with hemoglobin level of 9.0 g/dL and severe thrombocytopenia with platelet count of 20,000 cells/mm^3.
- Lactate Dehydrogenase (LD) elevated at 2600 IU/L; Alkaline phosphatase elevated at 395 IU/L.
- MRI Brain -stable subdural hematomas and possible pachymeningeal enhancement.
- CT Chest with contrast - previously seen dense bilateral infiltrates that were attributed to COVID pneumonitis.
- CSF analysis from lumbar puncture – negative for evidence of infection and malignancy on morphology and flow cytometry.
- Bone Marrow Biopsy done to investigate for possible hematologic neoplasm - demonstrated extensive bone marrow infiltration and necrosis with scattered foci of metastatic carcinoma with squamous differentiation

LABORATORY EVALUATION

Peripheral Smear:
Leukoerythroblastic picture with normocytic anemia, neutrophilia with *left shift*, severe thrombocytopenia with 3% abnormal cells – possibly blasts with high N/C ratio, small nucleoli

FISH for BCR-ABL – not detected

Bone Marrow Biopsy and Aspiration:
Extensive necrosis in bone marrow with only focal, viable tumor cells with squamous differentiation–
(+) for AE1/AE3, p40, CK7
(-) for CK20, GATA-3, NKX3, TTF1, PAX8
No evidence of lymphoma or leukemia

Guardant360® cf-DNA 83-gene assay– MAP2K1 P124Q alteration – no targets

CancerType ID® – 92-gene real-time PCR assay for tumor classification performed on bone marrow specimen resulted positive (1 week into treatment) for squamous cell carcinoma (90% probability) of lung sub-type (78% probability)

IMAGING

Figure 1

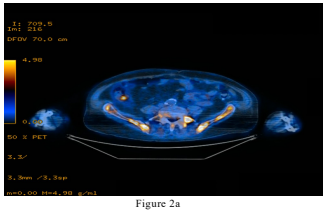


Figure 2a

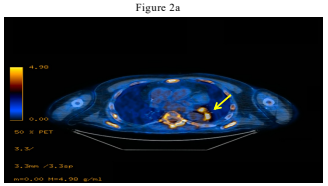


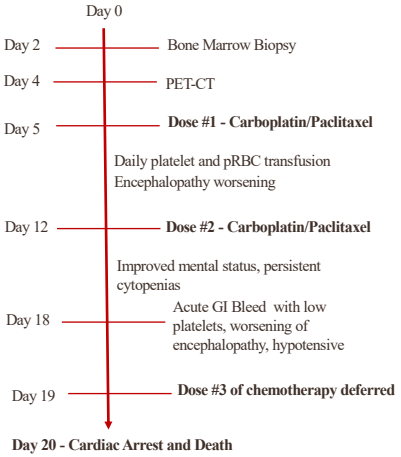
Figure 2b

Figures: PET-CT images showing diffuse FDG-avid osseous metastases throughout the axial and appendicular skeleton including medullary spaces (Figure 1 and 2a) with a metabolically active left lower lobe lung mass (Figure 2b, arrow)

DECISION-MAKING AND TREATMENT

- Persistent thrombocytopenia (nadir 6000 cells/mm^3) and anemia (nadir Hgb 6 g/dL) during inpatient course requiring frequent blood product transfusions, worsening encephalopathy
- Although initial clinical picture concerning for a possible hematologic neoplasm/bone marrow disorder, subsequent histopathological analysis and radiographic evidence indicating a metastatic squamous cell carcinoma with a likely lung primary. Overall tenuous clinical status
- To achieve rapid control of disease, palliative-intent chemotherapy initiated as inpatient – low-dose **paclitaxel** (40mg/m2) and **carboplatin** (AUC 2) on planned weekly basis

CLINICAL COURSE & OUTCOME



DISCUSSION

- Illustration of relative rarity of extensive bone marrow infiltration by metastatic tumor severe enough to cause cytopenias
- Initial diagnostic dilemma for clinicians as clinical picture often suggestive of a hematological neoplasm
- BM immunophenotyping and histopathology, with newer genomic modalities can represent a valuable tool for diagnosis.
- Early recognition and initiation of systemic chemotherapy must be done in a judicious manner with aggressive transfusion support, infection control and other supportive therapy
- Clinical outcomes are often poor

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