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Prolonged Survival on PARP Inhibitor Therapy In a Patient With Stage IV Non-small Cell Lung Cancer: A Case Report

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Abstract

A BRCA1 mutation has been identified in a 56-year old female with adenocarcinoma of the lung. Following partial response with Nivolumab therapy, the patient started maintenance therapy with Olaparib, a PolyADP-ribose Polymerase (PARP) inhibitor showing sustained progression free response that is still ongoing.

Keywords: Non-small cell lung cancer; NSCLC; Stage IV; PARP inhibitors; Olaparib; BRCA1 duplication

1. Case Presentation

A 56-year-old Caucasian woman with a long history of tobacco smoking and alcohol consumption presented on March 2015 to our clinic with left cervical lymphadenopathy, right gluteal skin erythema and generalized weakness. Patient underwent FNA biopsy of the cervical lymph nodes and core biopsy of the gluteal soft tissue, which showed metastatic adenocarcinoma of lung origin. A CT scan of the head, neck, chest, abdomen and pelvis demonstrated a 4.2 × 3.5 cm mass in the posterior ramus of the left mandible, a subsolid nodule in the upper lobe of the left lung measuring 1.8 × 1.2 cm, multiple immeasurable nodules involving all lobes of both lungs and a rim enhancing mass adjacent to the right gluteal cleft measuring 7.3 × 5.4 cm. Further testing revealed no ALK or EGFR/CEP7 gene mutations using FISH. The patient received Carboplatin/Paclitaxel chemotherapy from November 2015 to February 2016 until disease progression was noted on routine CT scans for tumor response assessment. Chemotherapy was discontinued and treatment with Nivolumab started on March 18th, 2016, CT scans obtained one year later showed a

partial response of both pulmonary and gluteal disease. Next Generation Sequencing of the tumor tissue from March 2016 showed BRCA1 duplication of exons 7-12.

After discussing treatment options for maintenance therapy with the patient, she agreed to start on Olaparib in March 2017. The latest PET-CT, obtained in October 2018 showed no hypermetabolic cervical lymphadenopathy, stable pulmonary nodules and residual skin thickening of the right gluteal mass. The patient is clinically stable at this point and taking Olaparib daily.

2. Discussion

BRCA1 mutation has been highly associated with hereditary breast and ovarian cancer, as well as other types, including prostate, gastric, colorectal and pancreatic but rarely has been reported in lung cancers, approximately only in 3.5% of sequenced tumors according to the lung adenocarcinoma TCGA dataset [1]. Over the years, the genotype of Non-small cell lung cancer has been identified and used as target therapy trying to improve prognosis.

This mutation identified in this patient makes her a candidate for targeted molecular therapies towards BRCA1/2 mutation, such as PARP inhibitors, which have been scarcely studied in this type of cancer. This makes this case unique and relevant towards demonstrating the efficacy of this class of medications in different cancer types and stages, as seen here, where the progression free survival has been largely prolonged. There are currently two-phase II trials evaluating Olaparib as a maintenance treatment in NSCLC, the PIPSeN trial and the PIN trial, which results are still pending and may show improved survival as we have seen with this patient [2, 3].

3. Conclusion

This is a case of prolonged survival in Non-small cell lung cancer observed upon BRCA gene manipulation. Few similar clinical reports are available in the medical literature. However, this case yields a selective oncogenomic pragmatic target for practicing oncologists in this field.

Acknowledgment

None.

Conflict of Interest

None.

References

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2. National Institute of Health. Clinical Trials.gov: Trial evaluating maintenance olaparib in patients with platinum-sensitive advanced Non-small cell lung cancer (PIPSeN) (2017).

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