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CLINICAL VIGNETTE

Squamous Cell Carcinoma of the Lung Metastatic to the Brain in a Non-Smoker

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Case Presentation

A 71-year-old male presented to primary care for a routine visit and brought up complaint of floaters in bilateral eyes for the past two weeks. Patient did not have blurry vision or diplopia, and physical exam did not show any focal neurological deficits. The PCP referred to eye care where, he described to the optometrists that the floaters had improved compared to initial presentation. He denied any other changes in vision including flashes of light, eye irritation, diplopia, headache, dysarthria, weakness, numbness, tingling in an extremity, facial droop or dysphagia. Past medical history was remarkable for skin cancer: squamous cell carcinoma (SCC) of the forehead clinical stage II treated with radiation therapy with local recurrence and retreatment. Basal cell carcinoma of the posterior neck requiring MOHS surgery. On visual field testing, he was found to have right homonymous quadrantanopsia and consistent with a suspected left occipital or temporal lobe lesion with concerns for a stroke. Brain MRI showed an irregular rim enhancing cystic lesion measuring approximately 3.2 cm in the left occipital lobe concerning for solitary metastatic lesion versus a moderately aggressive primary neoplasm. Further imaging with PET/CT redemonstrated the left occipital lesion and also multiple bilateral non calcified pulmonary lesions with intense metabolic activity and right hilar lymphadenopathy. The largest measured 3cm x 3cm x 3cm in the right lower lobe suggestive of a primary lung neoplasm. The patient requested biopsy of the brain lesion and underwent a left occipital craniotomy with complete resection of the brain tumor. Pathology showed metastatic squamous cell carcinoma compatible but not diagnostic of a lung primary. Subsequent biopsy of the right lower lobe lung mass showed invasive squamous cell carcinoma, moderately to poorly differentiated, but unable to differentiate from primary versus metastatic squamous cell carcinoma.

Patient was seen by oncology. With his prior history of significant squamous cell carcinoma of the skin and being a never smoker, there was uncertainty whether the primary was of skin origin versus of the lung. A second opinion with another oncologist considered the multiple pulmonary lesions as well as the brain biopsy indicating likely lung primary and diagnosed stage IV squamous cell carcinoma of the lung. The patient enrolled in a clinical trial for chemotherapy and immunotherapy.

Discussion

Although it is well known that metastatic brain cancer is much more common than primary brain cancer with up to half of metastatic brain tumors originating from lung cancer, this case is interesting as secondary brain tumors often occur in people with a known history of cancer instead of the metastatic brain tumor being the first sign of malignancy.¹ Patients with brain cancer may experience either general symptoms that are caused by pressure of the tumor on the brain or spinal cord or specific symptoms that are caused by a specific part of the brain being affected by the tumor.² General symptoms include headaches, seizures, personality or memory changes, nausea or vomiting, fatigue/drowsiness while specific symptoms include incoordination; changes in vision; changes in speech, hearing, memory or emotional state; altered sensation; difficulty swallowing, facial weakness or numbness.² This patient did not have any general symptoms and only had the specific symptom with a change in his right eye visual field with the tumor in his left occiput.

After heart disease, cancer is the second leading cause of death in the United States. Lung cancer has the highest rate of cancer deaths making up about a quarter of all U.S cancer deaths in 2018 with 154,050 deaths.³ The largest modifiable risk factor for lung cancer is smoking, and current smokers have approximately 20 times the risk of lung cancer compared with non-smokers.⁴ Although around 80% of lung cancer cases can be attributed to smoking, 20% of lung cancer occurs in non-smokers, like this patient.⁵ Other risk factors for lung cancer include second hand smoke, exposure to radiation, occupational exposure to lung carcinogens (ie asbestos, arsenic, beryllium, cadmium, chromium, nickel), and air pollution.⁴ This patient did have the risk factor of prior radiation therapy to his forehead to treat his squamous cell carcinoma of the skin. If lung cancer deaths in non-smokers were separately categorized, they would be one of the top ten most common causes of cancer deaths.⁶

Unfortunately, most cases of lung cancer have metastasized at the time of diagnosis – 22% to regional lymph nodes and 57% to distant site.³ As most lung cancer has metastasized at the time of diagnosis, this causes a low 5-year survival of 18.6% for all lung cancer patients. From 2005-2014, patient with localized lung cancer have 56.3% survival rate; regional 29.7% survival, 4.7% for distant site; and unknown stage 7.8% survival.³

Conclusion

Although lung cancer in non-smokers is not as common as in smokers, the fact that the US has such a large number of lung cancer cases means that lung cancer in non-smokers represents a significant number of all lung cancer diagnoses. Also, as most cases of lung cancer have metastasized to a distant site, the presentation of lung cancer may not be chest symptoms of chronic cough, shortness of breath, chest pain, and/or wheezing. The most common places that lung cancer metastasizes to include the brain, bones, the liver, the other lung, and the adrenal glands. Thus, we should be aware of symptoms from the metastatic sites, which include focal or general neurological symptoms when the brain is affected; bone pain or fracture when bones are affected; right upper quadrant pain, appetite/weight loss, dark colored urine, jaundice, nausea, vomiting when the liver is affected; cough, shortness of breath, chest pain, wheezing when the lungs are affected; and abdominal pain or adrenal insufficiency when the adrenal glands are affected.

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