



Case report

Lung adenocarcinoma presenting with an orbital metastasis

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ABSTRACT

Orbital metastasis of lung adenocarcinoma is very rare. The incidence is only found to be approximately 7%–12% of lung cancer cases. The lack of knowledge about orbital metastasis results in misdiagnosis between malignant or benign lesion. This was a case of a 39-year-old woman complaining about a protruding left eye and a blind pain in the left eye characterized by hyperemesis eyeball. A CT scan of the orbital showed a soft tissue tumor in the fronto-naso-superomedial area of the left orbital with suspicion of infiltration of the medial rectus muscle, left bulbus oculi, lamina papyracea, and left frontal sinus wall which causes proptosis and soft tissue tumor in the left temporal region with suspicion of infiltration in the left sphenoid wing with an impression of metastasis. A Fine Needle Aspiration Biopsy (FNAB) in the temporal and intra-orbital region showed metastatic adenocarcinoma. Moreover, findings of the chest x-ray and chest CT scan concluded that there was a tumor in the left lung, and a bronchoscopy found adenocarcinoma as the biopsy results.

1. Introduction

According to the Cancer statistics in 2017, the highest percentage of cancer cases for men was about 42% found in prostate cancer, colorectal cancer, and lung cancer whereas the highest percentage of cancer cases for women was around 30% found in breast cancer, lung cancer, and colorectal cancer [1]. It is estimated that around 27% of death caused by lung cancer. Over 57% of lung cancer cases were found to be at the advanced stage with 4% of 5-year survival rate. In advanced lung cancer cases bones (39%), brain (25%), liver (16%) and adrenal glands (13%) metastasise need to be carefully determined [2]. The symptoms that require medical actions are primary tumors, metastatic or paraneoplastic syndrome. Diagnosis can be a challenge in the occasion in which clinical symptoms are related to distant metastases as the initial clinical manifestation found.

Based on previously published reports, the incidence of breast and lung tumors is the most common primary tumors causing metastasis to the orbital with approximately 0.7%–12% of patients [3,4]. Metastatic tumors are considered as the most common malignancies, but very few

metastases to the orbital were found. Ocular metastases are commonly found in the vascular uveal tract (i.e. choroid, iris, and ciliary body), the posterior segment of eye, the orbital and the optic nerve is affected by the posterior portion of the choroids with a presentation of 7:1 in relation to metastasis [5]. In this paper, we reported a case of one patient diagnosed with pulmonary adenocarcinoma with intra-orbital metastasis.

2. Case presentation

A 39-year-old woman visited the hospital and complained about protruding left eye which made her unable to see, also pain and redness in the left eye. She reported that she was unable to see for the last 3 months. Respiratory complaint found was a chronic cough. She had no history of trauma, systemic disease, cancer history in the family, and previous eye disorders. Moreover, she had no history of smoking, but she has been exposed to smoke from her husband (second-hand smoke).

From thorax physical diagnostic, delayed left hemithorax movement, decreased to diminished breath sound of mid to left lower lung

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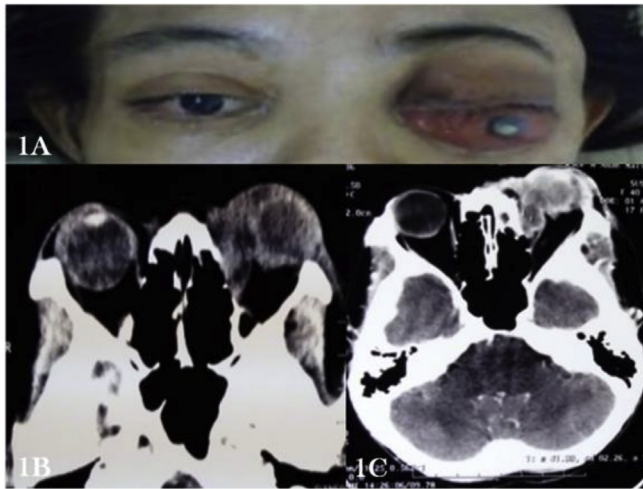


Fig. 1. A. left proptosis and redness in her left eye. B&C. The orbital CT scan showed a soft tissue tumor in the fronto-naso-superomedial region of the left orbital with suspicion of infiltration of medial rectus muscle, left bulbus oculi, lamina papyracea, and left frontal sinus wall which causes proptosis and a soft tissue tumor in the left temporal region with suspicion of infiltration of the left sphenoid wing may still be a metastasis.

zones, enlargement of lymph nodes on the left side of supraclavicular, and a lump in the left chest wall of the midclavicular line around the II–III ribs were found. Ophthalmic examination of the left eye showed visual acuity of no light perception, protruding eyeball (Fig. 1A), corneal opacity, conjunctiva bulbi: chemosis, camera oculi anterior: pupil, iris, and lens which could not be identified. A physical examination found a decreasing visual acuity, left proptosis (Fig. 1A). The orbital CT scan showed a soft tissue tumor in the fronto-naso-superomedial area of the left orbital with suspicion of infiltration of medial rectus muscle, left bulbus oculi, lamina papyracea, and left frontal sinus wall which causes proptosis and soft tissue tumor in the left temporal region with suspicion of infiltration in the left sphenoid wing may still be a metastasis (Fig. 1B and C). The chest x-ray results showed a mass in the left perihilar and homogenous consolidation in the left lower lobe of the lung. Based on the radiological findings, the ophthalmologist did a consultation with a pulmonologist.

The chest CT scan showed isodense mass with a relatively firm limit, lobulated with solid and half solid components, and had a size of $\pm 7 \times 4 \times 5$ cm in the 4th, 5th, 8th segments of the left lung. Half of the mass edge was seen attached to the left pleural wall in which the pleural tail was stuck to the pericardium whereas the other half was attached to the large blood vessel. Multiple nodules with a diameter of ± 1.1 cm were seen in the 4th, 5th, and 8th segment of the right lung. There was a minimal pleural effusion in the left lung. There was also an image of ground glass opacity in both lungs, especially in the right lung (Fig. 2A). A bronchoscopy result showed infiltrative masses covering LB 8 (segment anterior basal), and the biopsy result was adenocarcinoma. After a Fine Needle Aspiration Biopsy (FNAB) was conducted in the supraclavicular lymph nodes and chest wall, a similar result was found, namely metastatic adenocarcinoma. CT images for brain and bones were conducted with no signs of metastasis.

After discussing with a multidisciplinary team including radiologist, pathologist, radiotherapist, and thoracic oncologist, the consideration was to conduct FNAB directly in the temporal and intra-orbital region as it was not possible to do an incisional biopsy in the eye area due to the patient's condition. Besides, FNAB was done on supraclavicular lymph node, the soft tissue of the temporal region, upper medial, the upper lateral surrounding area of the lesion. All specimens showed metastatic adenocarcinoma with cell-tumor clusters, a group of palisaded columnar cells, and rosette/acinus-like structures (Fig. 2B). The EGFR examination was done with no mutation results. The patient was

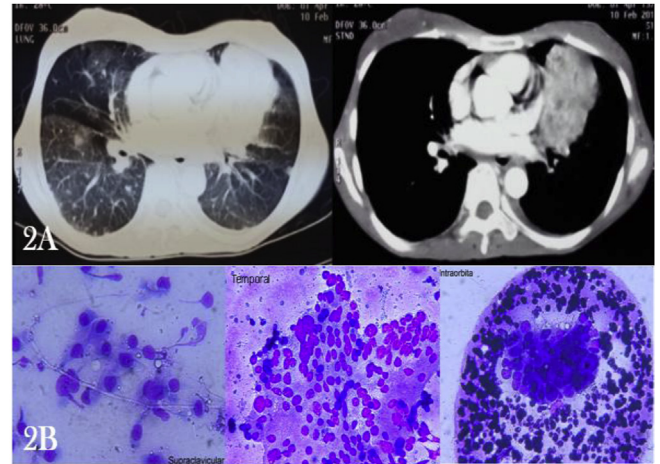


Fig. 2. A. The chest CT scan showed isodense mass with a relatively firm limit lobulated with solid and half solid components and had a size of $\pm 7 \times 4 \times 5$ cm in the 4th, 5th, 8th segment of the left lung. Half of the mass edge was seen attached to the left pleural wall in which the pleural tail was attached to the pericardium while the other half was seen attached to the large blood vessel. Multiple nodules with a diameter of ± 1.1 cm were seen in the 4th, 5th, 8th segment of the right lung. There was a minimal pleural effusion in the left lung. B. A fine needle aspiration biopsy (FNAB) was done in the enlargement of supraclavicular lymph nodes, temporal, and intra-orbital region, and the same result was found namely metastatic adenocarcinoma.

referred to oncologist and gynecologist to check on any lesions on breasts and reproductive systems, negative results were obtained from the consultation.

Based on these findings, the multidisciplinary team concluded that the case was adenocarcinoma lung cancer with metastasis to intra-orbital. Therefore, chemotherapy was offered to the patient. However, after one cycle of chemotherapy, the patient's condition dropped, and she eventually died.

3. Discussion

The eye is a rare organ to be the site for metastasis due to the absence of lymphatic system in the ocular. Normally, ocular metastasis occurs in hematogenous spread as there is a lot of vein in the eye. This orbital metastatic occurs the most at uveal tract (choroid, iris and ciliary body). Despite being rare, symptoms of the orbital may be early clinical symptoms before the diagnosis of lung tumor is established. At first, metastatic orbital cancer rarely occurs and consists of about 3–7% of orbital lesions and about 10% of orbital tumors. It often comes from breast primary lesions (39–48%), prostate and skin (melanoma) (12%), lung (8%), and kidney (7–11%) in Caucasian population. Due to the increasing number of lung cancer cases, the likelihood that doctors will see patients with orbital metastasis also increases [4,6]. Previous studies have shown that most tumors were usually unilateral with an average onset age of 40–60 years [6].

Most ocular metastases are asymptomatic [7]. Blurred vision or changes in visual acuity can be early manifestations. The ocular manifestations of systemic malignancy may precede cancer diagnosis. Approximately 30% of patients with orbital metastasis had no history of primary cancer when ocular metastasis was detected [8]. Ophthalmologists typically have an important role in diagnosing and making differential diagnosis for the cases of lung cancer metastatic to the orbital. The most common symptoms and signs are including abnormal eye position (65.22%), proptosis (63.04%), increased orbital pressure (54.35%), diplopia (54.35%), and limited eye motility (52.17%). These five symptoms are the most common clinical manifestations [9].

If the patient shows an orbital sign with suspicion of malignant cancer, the diagnosis of orbital metastasis should be promptly

performed with systemic investigations to detect primary lesions and the presence of metastasis from other organs. Magnetic Resonance Imaging (MRI) is an appropriate investigation in diagnosing orbital lesions which shows higher soft tissue contrast. It also has more benefits, such as lack of radiation exposure during CT. However, if systemic malignancy is predetermined or if the lesion is easily accessible and the patient rejects an open biopsy, FNAB can be useful as a minimally invasive procedure. Compared to an open biopsy, FNAB invades minimally and provides rapid results [5]. Although biopsy results produce a more conclusive diagnosis, it also carries the risk of severe complications, especially damages to the eyeballs, optic nerve, blood vessels, and even tumor enlargement simultaneously [7].

Treatment for orbital metastasis of the lung is usually palliative because the aims are to control the spread of the tumor and to preserve vision. Systemic chemotherapy has shown curative effects in most cases, but radiotherapy may be the mainstay for orbital metastasis because its objective response rate is up to 79%. Moreover, it can save visual quality in 80% of cases without invasive procedures which can decompress the optic nerve [8]. The common dose of radiotherapy is 30–50 Gy which should be administered carefully to prevent loss of eyelashes and injury of the lacrimal apparatus. On the other hand, surgery is recommended only for certain patients, and the aims are to relieve symptoms and improve orbital functions for as long as possible. However, in general, this is not the first-choice therapy. Zarogoulidis et al. reported the beneficial efficacy of a combination of bevacizumab and pemetrexed chemotherapy for patients with orbital metastases. The efficacy of bevacizumab in radiation retinopathy has also been reported [9]. Koma et al. reported cases of non-small cell lung cancer (NSCLC) patients with EGFR mutations, among which responded positively to the administration of gefitinib therapy, shown in the primary and orbital lesions [10]. However, chemotherapy was considered for patients whose EGFR results showed no mutation.

Orbital metastases are generally associated with a poor systemic prognosis. The incidence of metastatic lesions in the eyes, however, indicates the spread of hematogenous cancer. Therefore, the lesions are considered as the preterminal incidence which occurs in the late stage of lung carcinoma when most patients have had typical lung cancer symptoms, and the average survival is estimated to be no longer than 5–6 months [9]. Similarly, after diagnosis and one cycle of chemotherapy, the patient's condition in this case dropped, and she eventually died.

4. Conclusion

The most challenging thing about diagnosing this case was the scarcity of the case. However, the symptoms in the orbital in the case was found as an early sign. Therefore, the involvement and cooperation of the multidisciplinary team were important to establish a diagnosis and determine a treatment quickly and precisely. Several investigations should be performed to detect suspicion of an orbital metastasis from lung cancer. Lung cancer found in the case was the adenocarcinoma type. A study by Soeroso et al. [11,12] showed that the cytologic/histopathologic type which was mostly found was adenocarcinoma with approximately 92.9% compared with squamous cell carcinoma with approximately 7.1%. A proper enforcement of the diagnosis will be able to provide fast treatment so that the patient's quality of life will be better.

Consent for publication

The patient was properly informed and provided consent for her clinical information to be included in the publication of this case report and the accompanying images.

Conflicts of interest

The authors declare that they have no competing interests.

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Authors' contributions

NNS described and designed the article. NNS, SPT, and WS were involved in treating the patient. NNS, NL, and HL participated in editing the manuscript critically. All authors declared that they contributed to this article and that they have read and approved the final manuscript.

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