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Case Report

Multiple intracranial metastasis from lung adenocarcinoma in a pregnant young woman: A case report ☆

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ABSTRACT

Lung cancer remains one of the leading causes of cancer-related deaths in both men and women worldwide. Although its occurrence during pregnancy is rare, it is fast becoming an emerging issue globally. Lung cancer is exceedingly rare in young individuals but is distinct, with adenocarcinoma and stage IV presentation being the most common features. This study presents the case of a 30-year-old woman who came to the emergency department with headache, loss of sensation in the left side of the body, progressing diplopia, and diabetes insipidus that first appeared when the patient was 6-month pregnant. Clinical examination showed right cranial nerve III paresis, bitemporal hemianopsia, and left hemiparesis, while MRI indicated multiple intracranial metastases proven by pathology anatomy. This study highlights the role of imaging in assessing lung adenocarcinoma with intracranial metastasis in a young pregnant woman.

Introduction

According to the American Cancer Society, cancer was the second-leading cause of death and lung cancer caused the highest cancer deaths in the United States of America in 2017 [1]. Moreover, it is also a major cause of cancer death globally [2–4]. Primary lung carcinomas have traditionally been classified as either small cell lung cancer or non-small cell lung cancer (NSCLC). NSCLC accounts for roughly 80% of all primary lung cancers, with adenocarcinoma, squamous cell carcinoma, and large cell carcinoma being the most common histological types [1].

Notably, studies from Europe and Japan revealed an increase in the incidence of lung cancer in young adults. Liu et al. showed that most of the patients were in the late-onset stage and primarily manifest as adenocarcinoma [5].

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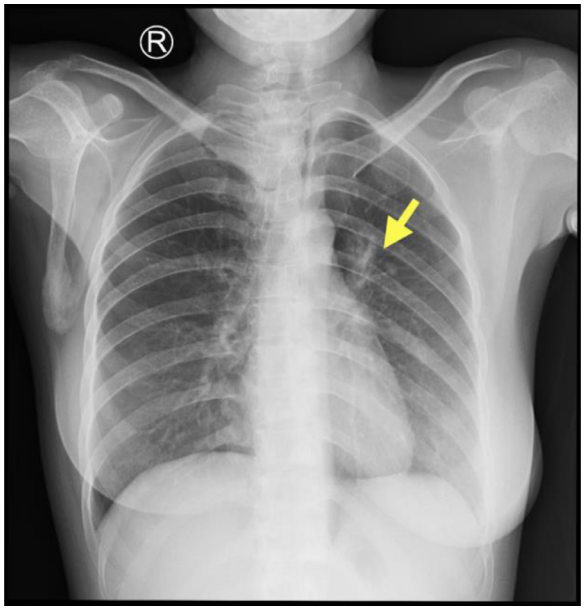

Fig. 1 – Chest X-ray showed small opaque lesion superior to the left hilum (yellow arrow).

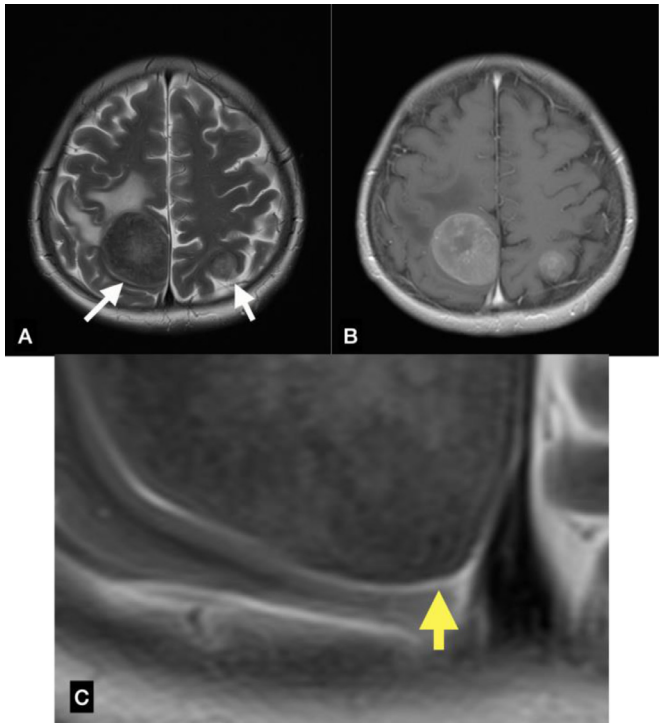

Fig. 2 – (A) Axial MRI in T2 showed multiple hypointense lesions with cerebrospinal fluid (CSF) cleft sign (white arrow). (B) Axial MRI in T1 with contrast showed enhancing lesion. (C) Magnification of CSF cleft sign (yellow arrow) that represent a thin rim of CSF between a tumor and brain parenchyma.

Case presentation

A 30-year-old woman, 6-month pregnant, complained of chronic headaches, at first, the pain eased with a pain reliever. After the seventh month, the patient complained of slowly progressing left hemiparesis accompanied by numbness in the left sides of the body, and the right eyelid seemed to be dropping. The patient also felt that the mouth was tilted to the right side and was then referred to the hospital for delivery. After delivery, the patient underwent a head computed tomography (CT) scan and was diagnosed with multiple intracranial masses, the chest X-ray showed vagued opacification on the left lung which was suspected as lung mass as demonstrated in Fig. 1. The patient complained of progressing diplopia, diabetes insipidus, and was then referred to a tertiary hospital. The magnetic resonance imaging (MRI) showed multiple intracranial lesions with morphological cerebrospinal fluid cleft sign in the concavity of the parietal area (dural metastasis), along with multiple lesions on the sellar and suprasellar regions. Furthermore, MR spectroscopy showed lipid peaks that support the diagnosis of metastasis as demonstrated in Figs. 2-4. Laboratory examination indicated serum cancer antigen (CA) 125 81.0 U/mL and serum carcinoembryonic antigen 41.06 ng/mL. The patient further underwent craniotomy for tumor removal. Pathology anatomy report showed a tumor mass consisting of round, oval-shaped cells that grow hyperplastic, in groups, some of which were in the structure of the gland. They were concluded to be a mass of metastatic adenocarcinoma in the right parietal area as shown in Fig. 5. To find a primary tumor, the patient underwent a chest CT that showed spiculated mass with cavitation sized 1.9 × 2.5 × 2.05 cm in the apicoposterior segment of the left lung (Fig. 6). The patient was then diagnosed as having lung adenocarcinoma with multiple intracranial metastases.

Fig. 3 – Sagittal MRI sequence T1 with contrast showed enhanced lesion in sellar and suprasellar area (yellow arrow).

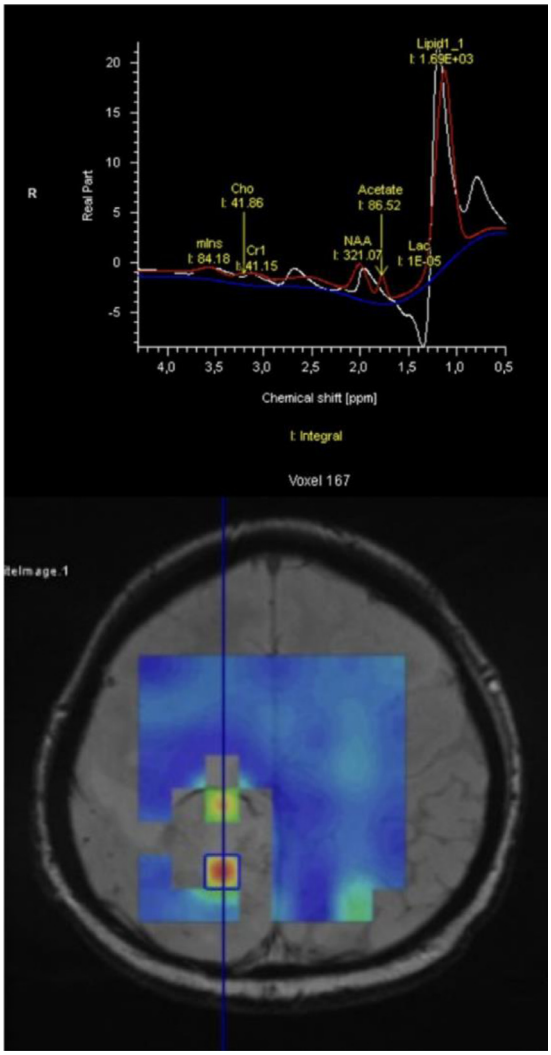

Fig. 4 – MR spectroscopy showed a prominence lipid peak, with low choline in the central lesion.

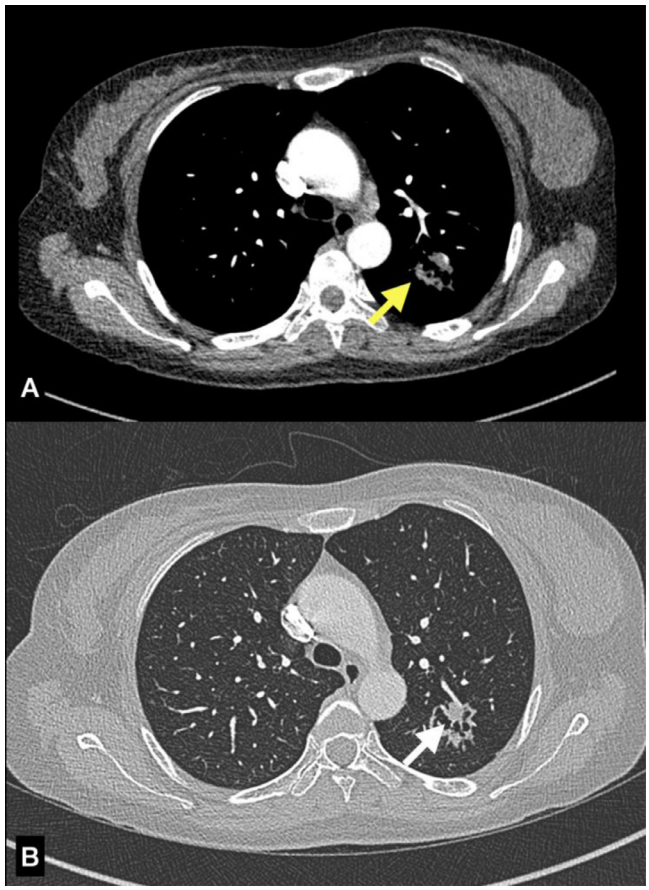

Fig. 6 – (A) Axial chest CT soft tissue window showed enhancing lesion in the lung parenchyma (yellow arrow). (B) Axial chest CT lung window showed a cavitating mass (white arrow).

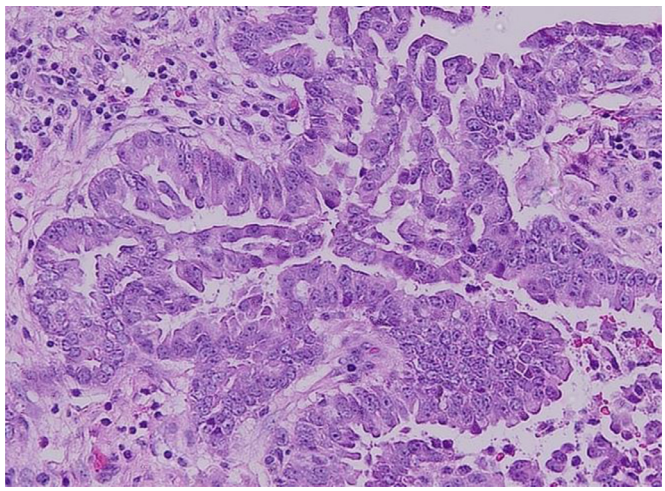

Fig. 5 – Pathology anatomy from intracranial mass showed tumor mass consisting of round, oval-shaped cells that grow hyperplastic lesions and in groups, some of which are in the structure of the gland and were concluded as metastatic adenocarcinoma.

Discussion

The term bronchoalveolar carcinoma was removed from the classification of lung adenocarcinoma in 2011. Adenocarcinoma in situ, minimally invasive adenocarcinoma, invasive mucinous adenocarcinoma, and lepidic predominant non-mucinous adenocarcinoma were introduced to replace this term. New histopathological subtypes of invasive non-mucinous adenocarcinomas including acinar, papillary, micropapillary, and solid were also introduced, and non-mucinous adenocarcinoma is now classified according to the predominant histological subtype, as most tumors are a mix of the subtypes. Meanwhile, lung adenocarcinoma has become more common than other types of lung cancer, and it is increasing in nonsmokers and smokers [6]. The mortality rate of women due to lung cancer is higher in developed countries than in developing countries. Lung cancer deaths among females in developing countries trail those caused by breast cancer [7]. This condition usually appears later in life and rarely coincides with pregnancy. Less than half of pregnant women with lung cancer have a smoking history, indicating that tobacco is not the only etiological factor in these young women. Other carcinogenic mechanisms, such as epidermal growth factor receptors or anaplastic lymphoma kinase activating mutations, might also be involved. NSCLC is the most common histological type, accounting for 80%-85% of all gestational lung cancer, while small cell lung cancer causes 10%-15%, and carcinoids of the lungs account for less than 5% [8]. Lung cancer in young adults is distinct, with adenocarcinoma and stage IV presentation being the most common features [5].

This patient MR Images showed multiple dural metastases. Furthermore, dural metastasis is one of the least common patterns of neoplastic spread to the craniospinal axis. The neoplasms develop either directly from skull metastases or through the hematogeneous spread. These tumors typically produce MR images with increased signals on T2-weighted images, often with an enhancing dural tail that mimics meningiomas [9]. In this case, multiple intracranial lesions are at first suspected as multiple meningiomas. To differentiate these lesions, MR spectroscopy assessment was carried out and the results showed dominant lipid peaks. This supports the study by Bendszus et al. which stated that MR spectroscopy of dural metastases revealed a significant increase in the Cho/Cr ratio, the absence of the NAA peak, and prominent lipid peaks, but no significant difference between meningiomas and metastases [10].

Metastatic lesions to the sellar area are mostly caused by breast, lung, renal, prostate, and colon cancers. Pituitary metastasis can affect both the anterior and posterior lobes, but the neurohypophysis is most commonly affected. Diabetes insipidus, hypopituitarism, headache, visual disturbances, ophthalmoplegia, and compression of adjacent structures by aggressive tumor masses are all clinical manifestations [11].

Carcinoembryonic antigen is normally produced by gastrointestinal tissue during fetal development, but it is not produced after birth. Consequently, it is lower in healthy subjects' serum than in patients with malignant tumors such as lung and colorectal cancers. This implies that it can be used as a serum biomarker for lung cancer detection. The diagnostic sensitivity was low, but the specificity was extremely high. The diagnostic sensitivity and specificity in a study by Xu et al. for lung cancer detection were 80.0% and 72.2%, respectively [12].

CA 125 tumor-associated antigen (CA125) is another commonly used lung tumor marker; it is recognized by the monoclonal antibody OC125 as a membrane glycoprotein of the serous ovarian cancer cell line OVCA 433. The use of CA125 for diagnosis and follow-up of ovarian cancer has not been well defined, at the moment, it is considered suitable as a marker for other cancers, including lung cancer [13].

The clinical presentation, as well as imaging, and laboratory results of the patient support the diagnosis of lung adenocarcinoma with intracranial metastasis.

Conclusion

At first, the age of the patient made the diagnosis unlikely, but all the imaging results indicated lung adenocarcinoma with intracranial metastasis. As a radiologist, the diagnosis was made thoroughly by clinical presentation and imaging results. When there is a patient with neurological complaints and imaging results in the form of multiple intracranial lesions, then awareness must be raised even on the smallest lesion found in the lungs. This report supports the study by Liu et al. which found that lung cancer in younger adults is a distinct entity and manifests primarily as adenocarcinoma, with late-stage onset at the first encounter.

Patient consent

I confirm that written informed consent for publication of this case report has been obtained from the patient.

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