Int J Clin Exp Pathol 2016;9(2):2359-2365
www.ijcep.com /ISSN:1936-2625/IJCEP0017122

Case Report

Parotid gland and cerebellum metastasis of lung cancer: a case report

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Received September 30, 2015; Accepted November 22, 2015; Epub February 1, 2016; Published February 15, 2016

Abstract: Parotid gland and cerebellum metastasis in lung cancer are extremely rare; very few cases have been reported. Here we present a case of a 56-year-old Chinese female patient who presented with a swelling in the right parotid gland. We diagnosed metastatic squamous-cell carcinoma from advanced lung cancer. The patient received 1 cycle nimustine (100 mg/m^2 IV Day 1) and nedaplatin (80 mg/m^2 IV Day 1). After the first course of chemotherapy, the parotid swelling subsided and local pain relief. Currently she remains under follow-up. Although metastasis to the parotid gland from any distant primary site is quite unusual and extremely rare, a potential metastasis of lung cancer should not be ignored in the diagnosis of parotid tumor. Before any therapeutic routine examination, such as a chest X-ray, lung computational tomography and brain magnetic resonance imaging may play an important role in differential diagnosis. Ultrasound-guided core needle biopsy is a very safe and effective tool in cases of parotid swelling. Although the management of the metastatic tumor to the parotid gland was controversial, the combination chemotherapy with platinum-based models has a certain effect.

Keywords: Parotid gland, cerebellum, metastasis, squamous-cell carcinoma, lung cancer

Introduction

Lung carcinoma is the most frequent malignant disease and the most common cause of cancer death in the world. It usually arises from dysplasia of squamous epithelium of the bronchi and has a propensity to metastasize to any organ. Squamous cell carcinomas accounts for approximately 30% of all non-small cell carcinoma of the lungs [1]. The estimated incidence of metastasis from primary elsewhere to oral and maxillofacial region ranges from 1% to 3% respectively [2]. To the best of our knowledge, the site of parotid gland in this case is very unusual and only a few articles have reported, which are primary small-cell carcinoma [3-7] and adenocarcinoma [8]. Lung carcinomas are characterized by their insidious onset, difficulty in detection, early metastatic spread and poor prognosis at the time of presentation. We describe a case of squamous-cell carcinoma of the lung which spread to the parotid gland.

Case report

A 56-year-old Chinese female presented with a progressive painful swelling in the right parotid gland and accompanied by headache, nausea and ataxia for three month prior to attending our hospital. The lung disease history of the patient was none. A clinical examination showed the size of the swelling to be approximately 2 × 2 cm, with a good activity, a moderate texture and a normal local skin temperature. An ultrasound (**Figure 1**) showed there to be several hypoechoic nodules with a lager size of 2.4 × 2.4 cm, which were diagnosed by mixed tumors. Because the patient with symptoms of intracranial hypertension was headache, nausea, and ataxia, we considered intracranial tumor metastasis. A cranial magnetic resonance imaging (MRI) (**Figure 2A** and **2B**) revealed a 1.4 × 2.1 cm lesion near meningeal in the right cerebellar hemisphere, considering metastatic tumors possibly. Therefore our initial diagnosis was that of primary parotid gland and brain metastatic tumors. For further, a chest X-ray (**Figure 3**) showed left widened mediastinum and an irregular shadow on the outside the top of left lung and aortic arch. At this stage we highly suspected that the swelling was metastases and required further examination. A lung computational tomography (CT) scan (**Figure 4**) revealed

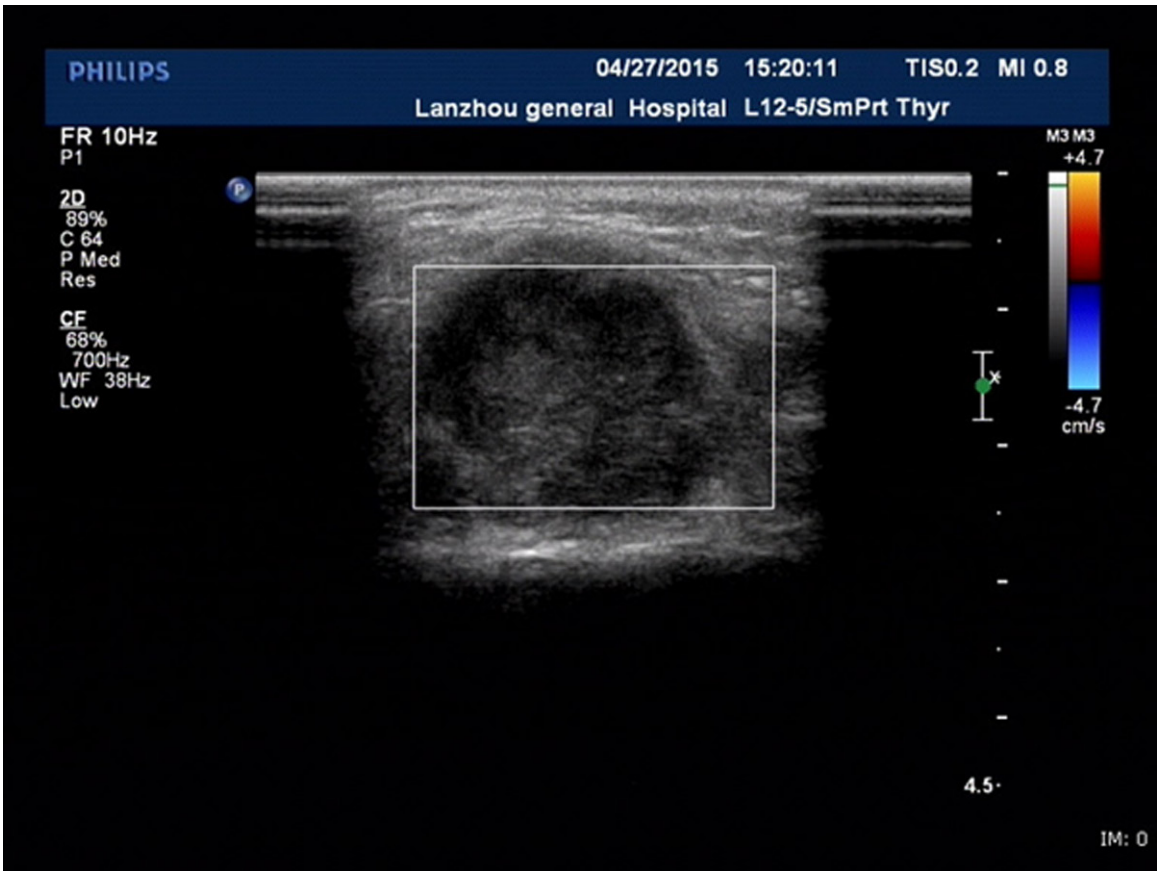

Figure 1. Ultrasound showed several hypoechoic nodules in the swelling of right parotid gland with a lager size of 2.4 × 2.4 cm, which were diagnosed by mixed tumors.

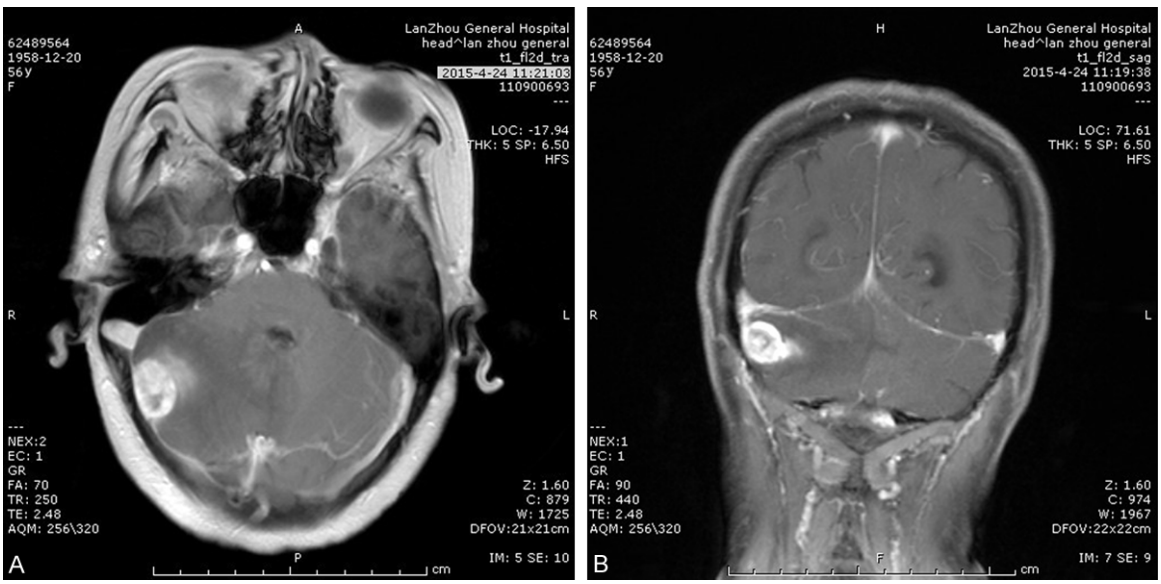

Figure 2. A cranial magnetic resonance imaging (MRI) revealed showed a nodular with equal T1-weighted image and shorter T2-weighted image abnormal signal intensity which was about 1.4 × 2.1 cm and clear boundary near meninges in the right cerebellar hemisphere. Fluid attenuated inversion recovery (FLAIR) showed equal signals and diffusion weighted imaging (DWI) showed a high and low heterogeneous signals. The edge of nodular surrounded by edema which was a large patchy long T1-weighted image Signals and longer T2-weighted image signal intensity in the sagittal (A) and coronal (B) plane.

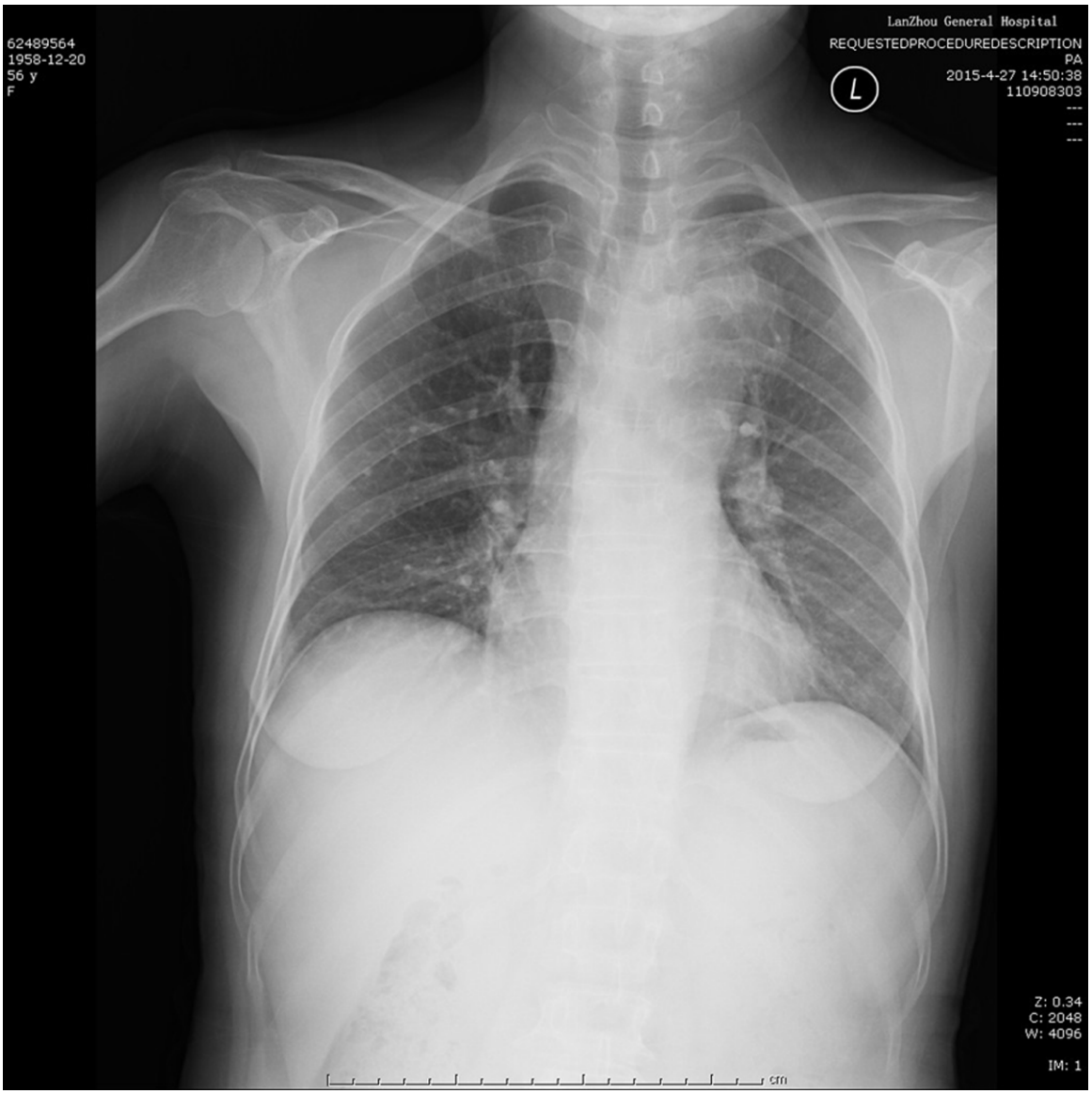

Figure 3. A chest X-ray showed left widened mediastinum and an irregular shadow on the outside the top of left lung and aortic arch.

a similarly round shadow was uneven density, within low-density areas, rough border, and showed filopodia-like changes among the surrounding lung tissue in the left upper lobe. It was next to mediastinum and unclear boundaries aortic arch, which size was approximately 3.3 × 3.4 cm, with multiple lymph nodes in the mediastinum appearing enlarged. After consulting with the patient, we performed a core needle biopsy guided by ultrasound on the right parotid swelling. The biopsy pathology reported a squamous-cell lung cancer metastases to parotid (**Figure 5A**) and immunohistochemistry (IHC) showed Ki67≈20% (**Figure 5B**), cytokeratin 5/6 (CK5/6, ++) (**Figure 5C**), P63 (++) (**Figure 5D**), TP53 (++) (**Figure 5E**), carcinoembryonic antigen (CEA, +) (**Figure 5F**) and thyroid transcription factor-1 (TTF-1, -) (**Figure 5G**). Therefore, we recommended that the patient receive palliative chemotherapy with nedaplatin (80 mg/m^2 IV Day 1), nimustine (100 mg/m^2 IV Day 1) and supportive therapy was given. After the first course of chemotherapy, the patient was showed II degree myelosuppression and the swelling on the right parotid basically subsided and local pain relief. Currently she remains under follow-up.

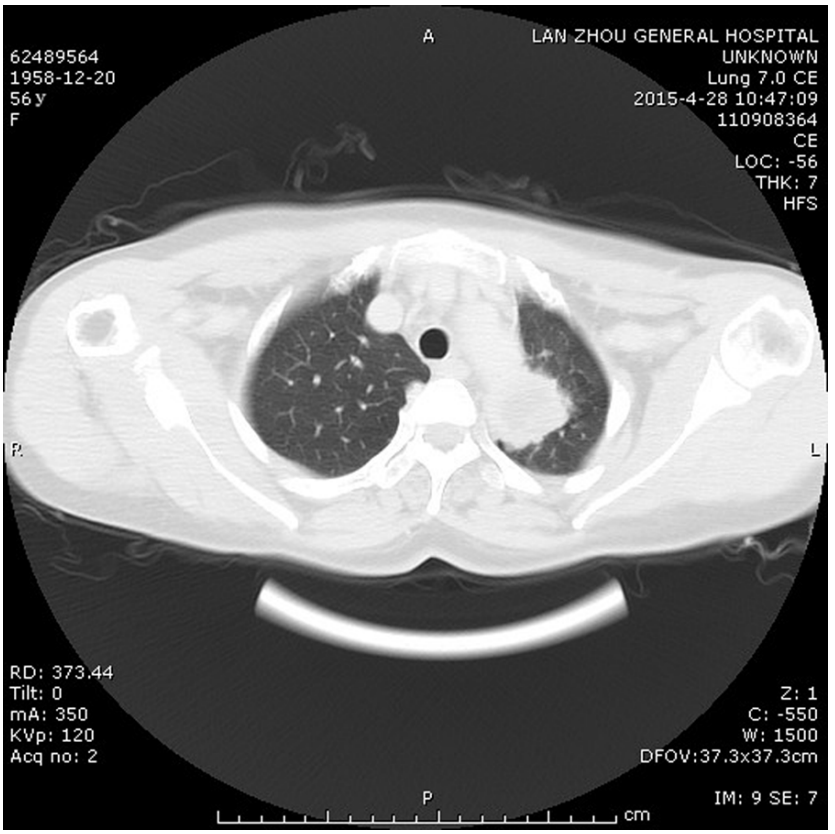

Figure 4. A lung computational tomography (CT) scan revealed a similarly round shadow was uneven density, within low-density areas, rough border, and showed filopodia-like changes among the surrounding lung tissue in the left upper lobe. It was next to mediastinum and unclear boundaries aortic arch, which size was approximately 3.3 × 3.4 cm, with multiple lymph nodes in the mediastinum appearing enlarged.

Discussion

In Western countries, approximately one-third of all cancer-related mortalities are caused by lung cancer. Lung squamous cell carcinoma (SCC) is a common type of non-small-cell lung cancer (NSCLC) and the second leading cause of death related to lung cancer, presenting as locally advanced disease in 25-30% [9-11].

Pulmonary SCC is generally a centrally located lung carcinoma that has been classified histologically by World Health Organization (WHO) into four broad categories: Clear cell, small cell, papillary and basaloid. Metastasis is defined as the transfer of disease cells from one organ or part to another site not directly connected with it [12]. Metastasis of lung cancer to the craniofacial region is not a common characteristic of this tumor. Despite many case reports on metastasis of lung cancer to the parotid gland, a case of lung squamous cell carcinoma diagnosed with metastasis to the parotid gland reported is rare in the literature [3-7]. After variable periods of growing within the lung parenchyma, the tumor usually invades the vascular and lymphatic channels, thereby metastasizing to regional lymph nodes and distant sites. The primary lung tumor site with the patient is not connected metastatic parotid, and there is no sign of lymph node metastasis in the neck and supraclavicular, while primary and metastatic lesions are not on the same side. So we considered the main mechanism proposed for metastatic spread to the oral region is backflow through the venous system. For rich network of blood vessels with circulation and pulmonary circulation, cancer cells have the more opportunity to invade blood vessels into the blood circulation resulting in distant metastasis. Despite Nuyens et al. [13] found that the predominant amount of metastatic diseases to the parotid gland were squamous cell carcinomas and malignant melanomas, the metastasis of non small cell lung cancer to the parotid gland is rare in the literature. The most frequent metastasis sites are the liver, the bone, the brain, and adrenal glands.

Diagnosis of parotid tumors is made via needle aspiration or excisional biopsy or ultrasound-guided core needle biopsy which is as a very safe and effective tool in cases of parotid swelling in which fine needle aspiration cytology has failed to give a definitive diagnosis [14, 15]. However, complications after these operations can not be ignored, such as facial nerve injury, fistula of parotid duct, hematoma, local swelling, pain, infection and other [16].

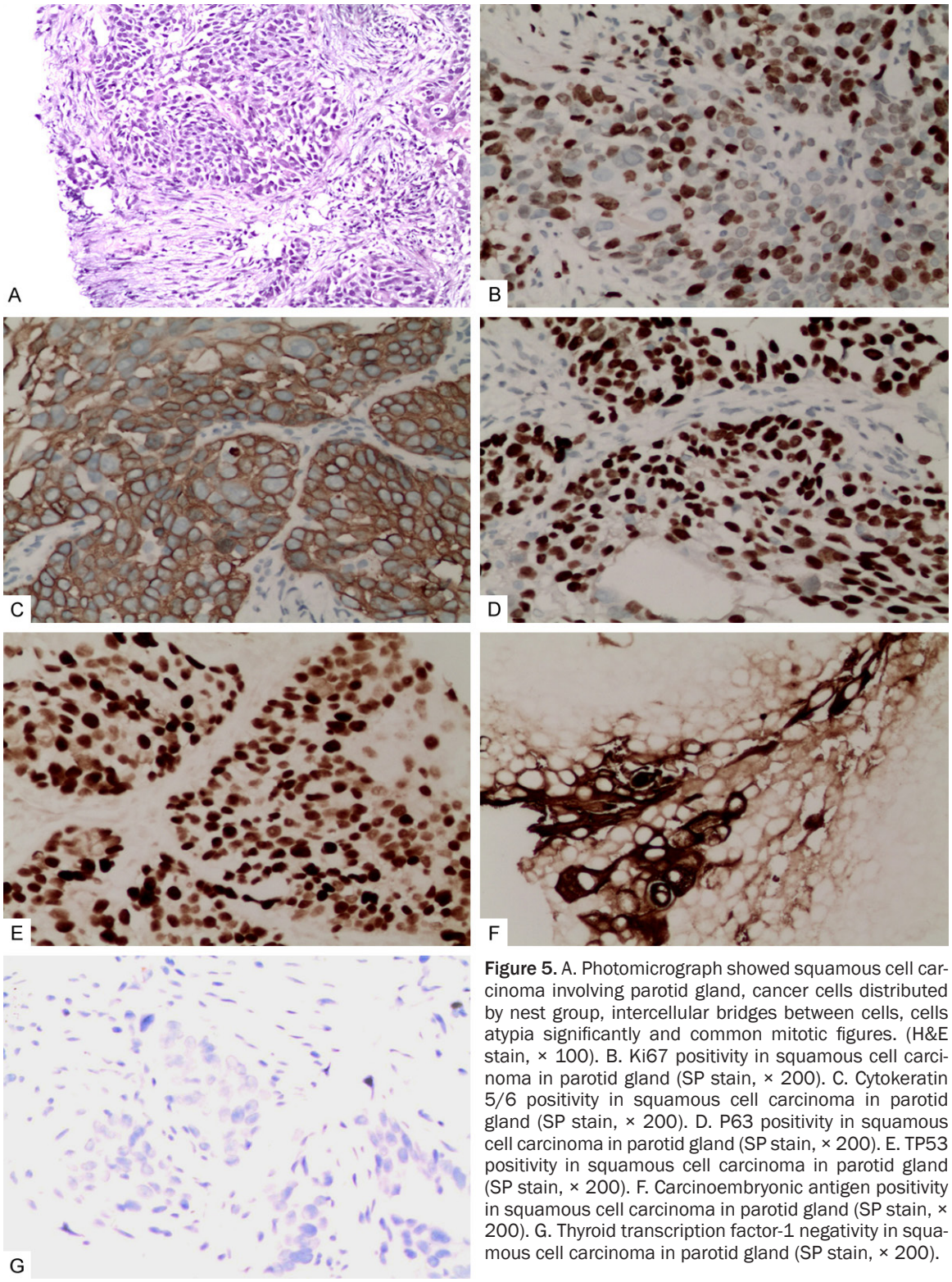

Figure 5. A. Photomicrograph showed squamous cell carcinoma involving parotid gland, cancer cells distributed by nest group, intercellular bridges between cells, cells atypia significantly and common mitotic figures. (H&E stain, × 100). B. Ki67 positivity in squamous cell carcinoma in parotid gland (SP stain, × 200). C. Cytokeratin 5/6 positivity in squamous cell carcinoma in parotid gland (SP stain, × 200). D. P63 positivity in squamous cell carcinoma in parotid gland (SP stain, × 200). E. TP53 positivity in squamous cell carcinoma in parotid gland (SP stain, × 200). F. Carcinoembryonic antigen positivity in squamous cell carcinoma in parotid gland (SP stain, × 200). G. Thyroid transcription factor-1 negativity in squamous cell carcinoma in parotid gland (SP stain, × 200).

In the past few decades, despite numerous advances in cancer treatment, the efficacy of chemotherapy for stage IV NSCLC is only slight improvement. For patients with an adequate performance status, modern chemotherapy regimens can realistically achieve a tumor response rate of 20 to 30%, median overall survival of 8 to 13months, and a 1-year survival rate of 30 to 50% [17]. The general principle for the treatment of stage IV NSCLC patients is pal-

liative care. It goal is to improve the quality of life for patients, and prolong to no obvious symptoms of survival as long as possible. The main method of stage IV is systemic chemotherapy [18]. However, chemotherapy will bring myelosuppression gastrointestinal symptoms and liver and kidney dysfunction. Compared with best supportive care, the platinum-based chemotherapy can improve the quality of life and prolong the median survival [19-21]. The patient was treated combination chemotherapy with nedaplatin (80 mg/m^2 IV Day 1) and Nimustine (100 mg/m^2 IV Day 1), because of metastasis to cerebellum from lung cancer. Although the parotid swelling gradually disappears and the treatment effect is acceptable, but she still needs to continue post-treatment and long-term follow-up.

Although metastasis to the parotid gland from any distant primary site is quite unusual and extremely rare, a potential metastasis of lung cancer should not be ignored in the diagnosis of parotid tumor. For this reason, in addition to the histopathologic findings, it is important to scan the other systems too. Core needle biopsy guided by ultrasound is a very safe and effective tool in cases of parotid swelling. Although the management of the metastatic tumor to the parotid gland was controversial, the combination chemotherapy with platinum-based models has a certain effect.

Disclosure of conflict of interest

None.

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