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CASE REPORT

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Renal Cell Carcinoma Metastasis to Ipsilateral Parotid and Submandibular Glands: Report of a Case with Sonoelastographic Findings

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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Summary

Background: Renal cell carcinoma (RCC) – also known as hypernephroma or grawitz tumor – accounts for 3% of the adulthood malignancies. Approximately 30–40% of the patients have metastasis at the time of the diagnosis and most common sites for metastasis are lung, regional lymph nodes, bone and liver. A total of 8–14% of the patients with RCC has head and neck metastasis. However, metastasis to major salivary glands is rarely seen. In this paper, we aimed to report a RCC case with metastasis to parotid and submandibular glands that has the same sonographic and sonoelastographic findings with the primary tumor.

Case Report: 66-year old woman with RCC history was referred to our radiology department for neck ultrasound (US) with painful swelling in the right parotid gland region. A well-defined, 37×21 mm sized hypoechoic heterogeneous solid mass was detected in the superficial-deep lobe of the right parotid gland. The mass was prominently hypervascular in color Doppler ultrasonography scan. Coincidentally, a 13×13 mm hypoechoic lobulated solid mass was detected in the right submandibular gland with similar sonographic findings.

Real-time sonoelastography (SEL) was performed to the masses and both of them were blue-green colored that indicates hard tissue. An US and SEL evaluation was also performed to the renal mass (RCC) of the patient. The primary mass was also similar in sonographic and SEL appearance as salivary gland masses. In the patient history, she revealed chemotherapy-radiotherapy treatment 1.5 years ago due to inoperable mass in the mid-lower pole of the left kidney diagnosed as clear cell RCC with vascular invasion, liver, lung and brain metastasis. Because of known primary tumor, the masses in the salivary glands were suspected to be metastatic and a tru-cut biopsy was performed. Pathological result was reported as clear cell RCC metastasis.

Conclusions: The etiology of RCC is still unknown and metastatic involvement can be seen at unexpected tissue and organs. Metastatic disease should be considered when a salivary gland mass detected in patients with RCC history. SEL examination would be helpful in differentiation of the origin of the metastatic lesion with known SEL features.

MeSH Keywords: Carcinoma, Renal Cell • Elasticity Imaging Techniques • Neoplasm Metastasis • Salivary Glands

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Background

Renal cell carcinoma (RCC) accounts for 3% of all adulthood malignancies and 85% of renal tumors [1,2]. Its incidence increases with age and has a peak in the sixth decade of the life [1,2]. Males are affected two times more often than females and the patients are over 40 years old when they get diagnosed [3]. Unexpected organ and tissue metastasis

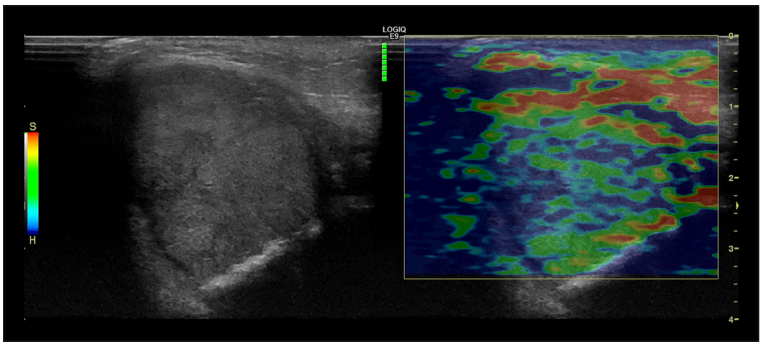

Figure 1. Real-time SEL revealed a blue-green heterogeneous solid mass in the parotid gland.

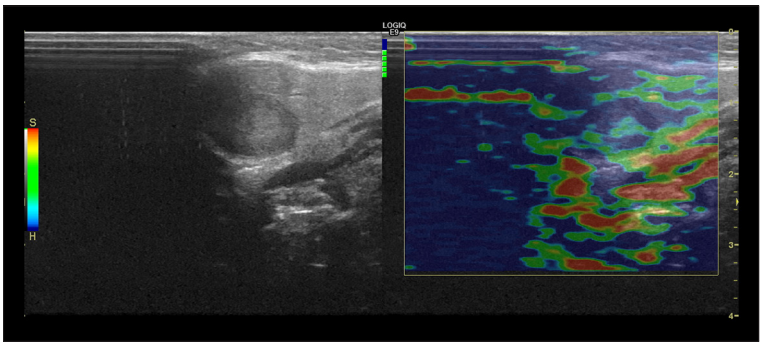

Figure 2. A blue-green lobulated solid mass in the submandibular gland on SEL evaluation.

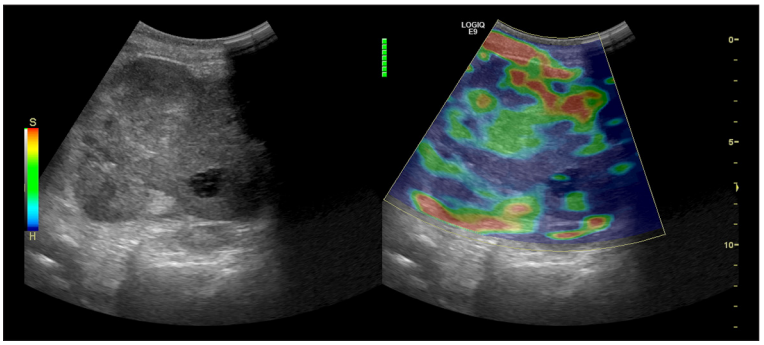

Figure 3. Similar SEL characteristic seen in the primary RCC tumor on SEL evaluation.

can be seen in RCC patients. Approximately 30–40% of the patients already have metastasis at the time of the diagnosis with a 15% incidence of metastasis to head and neck [4]. Metastatic malignancy of salivary glands was reported in the literature. However, as concerns the origin of the tumor, melanomas or squamous-cell carcinomas of the skin or mucosal folds of the head and neck are the most prevalent types [6]. RCC metastasis to the major salivary glands is quite rare with a predominance to the parotid gland [7]. In this paper we aimed to describe an RCC case with metastasis to ipsilateral parotid and submandibular gland, with similar sonographic and sonoelastographic findings.

Case Report

A 66-year-old woman with RCC history was referred to our radiology department for neck ultrasound (US) with painful swelling in the right parotid gland region. A well-defined, 37×21 mm in size, hypoechoic heterogeneous solid mass was detected in the superficial-deep lobe of the right parotid gland. The mass was prominently hypervascular in color Doppler ultrasonography. Coincidentally, a 13×13 mm hypoechoic lobulated solid mass was detected in the right submandibular gland with similar sonographic findings.

Real-time sonoelastography (SEL) was performed to the masses and both of them were blue-green in color, which indicates hard tissue (Figures 1, 2). An ultrasound and SEL evaluation was also performed to evaluate the renal mass (RCC) of the patient. The primary mass was also similar in sonographic and SEL appearance to salivary gland masses (Figure 3). According to the patient's history, she received chemotherapy-radiotherapy treatment 1.5 years ago due to an inoperable mass in the mid-lower pole of the left kidney diagnosed as clear cell RCC with vascular invasion, liver, lung and brain metastasis. Because of the presence of the primary tumor, the masses in the salivary glands were suspected to be metastatic and a tru-cut biopsy was performed. Pathological result was clear cell RCC metastasis.

Discussion

RCC constitutes almost 85% of primary renal tumors and clear cell RCC is the most common histopathological subtype [1]. In the early stages, RCC is asymptomatic due to the smaller tumor size. That is why most of the patients have larger tumors and high grade tumors at the time of the diagnosis [8]. Hematuria, left/right-sided pain and palpable mass is the classic triad of symptoms; but only 10%

of the patients show this classic triad. RCCs are hypervascular tumors that have a high potential to develop arteriovenous shunts and hematogenous metastasis as 25% of the circulating blood passes through the kidneys per minute [9,10]. It is a known fact that the cancer cells of RCC show a good adaptation to the microenvironment [9]. Therefore, RCC has a high potential for metastasis and unexpected metastasis to different organs and tissues can be seen. The most common sites for RCC metastasis are lung, bone, liver, brain and skin. RCC metastasis to the head and neck region is extremely rare and constitutes approximately 8–14% of all cases [11]. Thyroid gland is the most common site among head and neck metastases [4,5]. There is only one case reported in the literature by Jan and Pieter in 1984 with both parotid and submandibular gland metastasis at the same time.

Our case had liver metastasis at the moment of the diagnosis of RCC, as well as liver and brain metastasis developed during follow-up. Metastatic masses in the right parotid and ipsilateral submandibular gland were detected 1.5 years after the initial diagnosis. Parotid gland metastasis among other salivary glands is extremely rare and commonly originates from squamous-cell carcinomas or malignant melanomas of the neck [12]. Bernicker et al. reported a series of RCC patients, including 65 individuals with head and neck metastasis [13]. Among those patients, 47 had metastasis to cervical lymph nodes and 18 to the skin, thyroid gland, pharynx and lips. However, none of them had major salivary gland metastasis. In two different studies, Bernicker et al. and Park and Hlivko predicted that the time interval between the initial RCC diagnosis and the head-neck metastasis was about a few months to10 years [13,14]. The most common features of metastatic involvement of major salivary glands are painful swelling and a symptomatic mass causing tension [15]. Our case was also admitted to hospital with painful swelling in the right parotid region.

The diagnosis, staging and response evaluation of the patients with RCC primarily depends on imaging findings. US is commonly used as the first imaging tool to evaluate a patient with a suspected renal mass. However, computed tomography (CT) is generally preferred for staging of the tumor. Magnetic resonance imaging (MRI) can be an option in patients with renal insufficiency or contrast allergy. A recent technique, positron emission tomography (PET), when combined with multislice CT increased lesion localization and diagnostic accuracy in oncological patients [16]. It was shown that fluorodeoxyglucose (FDG) PET-CT accurately classified the presence of a recurrence or metastasis in advanced RCC patients [17]. The role of CT in assessing salivary gland tumors is limited. It would be useful to detect cortical mandibular involvement with CT. However, MRI is superior in terms of defining tumor characteristics and extension [18]. MRI is particularly advantageous in suspected pleomorphic adenoma as it is typically hyperintense on the T2-weighted sequences [19].

The principle of SEL is the same as in the oldest diagnostic method in medicine, i.e. palpation. SEL is an imaging technique that measures the elasticity and stiffness of the tissue by evaluating the response of tissue against applied compression. In this technique, a manual compression is applied to the lesion with a US probe for estimating the elasticity of the lesion by measuring the amount of compression against mechanical pressure. SEL helps to make assessment about the malignant potential of the lesions as malignant tumors are generally stiffer and show no response to compression. Tan et al. evaluated SEL features of renal masses and showed that RCC lesions are stiffer than angiomyolipomas and suggested that this method can be used to differentiate RCCs from AMLs [20]. In our case, SEL examination was performed to evaluate primary renal mass and metastatic masses in major salivary glands and all of them showed similar stiffness as previously described [20]. To our knowledge, this is the first report that demonstrates a similar SEL pattern of both primary and metastatic tumor. This finding can be useful in predicting a newly diagnosed lesion as a primary or metastatic one in patients with malignancy history or suggesting a primary lesion of metastasis of unknown origin by a previously described SEL pattern of the tumors. Further studies with large series would be useful to show SEL features of primary and metastatic tumors.

Conclusions

The etiology of RCC is still unknown and metastatic involvement can be seen within unexpected tissues and organs. Metastatic disease should be considered when a salivary gland mass is detected in patients with RCC history. SEL examination would be helpful in differentiation of the origin of the metastatic lesion with known SEL features.

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