Magnetic Resonance Imaging of Parotid Oncocytoma

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ABSTRACT

Oncocytomas are a group of rare neoplasms occurring in the parotid gland and account for less than 1% of all salivary gland tumors. Oncocytoma is a benign tumor composed of oncocyes with many hyperplastic mitochondria, usually presenting a solitary nodule. We reported a rare case of a slow-growing parotid oncocytoma in a 73-year-old woman who presented with a palpable mass in the left infra-auricular region for about 7 years. MRI showed a well-defined hypointense mass on T1-weighted images (T1WI) and iso- to slightly hypointensity on short inversion time inversion recovery (STIR) images compared to the parotid gland parenchyma. Moderate tumor enhancement was noted after intravenous gadolinium-based contrast medium administration. The patient underwent left parotidectomy and the histopathological examination confirmed the diagnosis of oncocytoma. The characteristic MR imaging features with their differential diagnosis are discussed and literatures reviewed.

CASE REPORT

A 73-year-old female presented with a palpable mass in the left infra-auricular region for about 7 years. On physical examination, the painless mass was a 3.0 cm × 2.0 cm, elastic, soft, mobile mass in the left parotid gland. Facial nerve function was intact. There were no palpable cervical lymph nodes. The patient had no history of neck surgery. No evidence of fever or chills had been noted recently. On magnetic resonance (MR) examination, a smooth margin and well encapsulated mass was found in the deep lobe of left parotid gland. The tumor showed low-signal intensity on T1WI and iso- to slightly hypointensity on short inversion time inversion recovery (STIR) images compared to the parotid gland parenchyma. Moderate tumor enhancement was noted after intravenous gadolinium-based contrast medium administration. The patient underwent left parotidectomy and the histopathological examination confirmed the diagnosis of oncocytoma. The characteristic MR imaging features with their differential diagnosis are discussed and literatures reviewed.
Figure 1. a. Pre-contrast axial T1-weighted and b. axial STIR images, MRI reveals a mass in the deep lobe of left parotid gland. The mass displays low signal intensity to the parotid gland on T1WI and iso- to slightly hypointensity on STIR images. (arrows) c. Post-contrast axial T1-weighted image with fat suppression shows moderate enhancement of the mass. (arrow)
cells with small uniform size nuclei in small lobular and acinic patterns. There was no necrosis or mitosis. The final diagnosis of parotid gland oncocytoma was confirmed.

After surgery, the patient recovered well without facial nerve weakness or any other complications. During the follow-up period, no obvious recurrent tumor could be found.

**DISCUSSION**

Oncocytic neoplasms are rare tumors occurring in the parotid gland, accounting for less than 1% of all salivary gland neoplasms. Oncytomas are usually found in the elderly over 50 years old and affect the parotid gland in 80% [4, 5]. Oncytic neoplasms are composed of large cells with an abundant eosinophilic and granular mitochondria-filled cytoplasm [2, 3]. In 1962, the first comprehensive review of oncocytic neoplasms was reported by Hamperl [6]. According to the World health Organization (WHO) classification, oncocytic neoplasms are divided into three types: oncocytosis or nodular oncocytic hyperplasia, oncocytoma, and oncocytic carcinoma [7]. Oncytoma, the most common form, is a well-defined benign tumor consisting of monotonous sheets of oncocytes, frequently with a central scar [5, 8].

Computed tomography (CT) images of oncocytomas usually demonstrate well-circumscribed enhancing masses. Oncytomas may be multifocal or bilateral, and as many as 7% of cases may present diffuse oncocytosis [4, 8, 9]. The MR imaging findings of oncocytomas in the parotid gland are relatively uniform among the reported cases. They are frequently seen as well-defined margin tumors within the parotid gland. The characteristic MR images demonstrate low signal intensity on T1- and T2-weighted images. On STIR images they display iso- or slightly hypointensity and are hard to be detected because of similar intensity of the tumors and parenchyma. The low signal intensity on both T1- and T2-weighted images is attributed to the high cellularity and low free water content of oncocytoma [10]. Few cases show heterogeneous high signal intensity on T2-weighted images. The foci of hemorrhage or necrosis never can be seen in the oncocytomas. Homogeneous enhancement of oncocytomas is noted after intravenous contrast injection [1-10]. The imaging differential diagnosis of oncocytomas in the parotid gland may include the pleomorphic adenoma and Warthin’s tumor. Pleomorphic adenomas are the most common benign parotid gland tumors, usually presenting as a slowly growing, asymptomatic mass in a middle-aged patient. Their MR images are intermediate signal intensity on T1-weighted images and isointense or high signal intensity on T2-weighted images, and may serve to differentiate it from oncocytomas [1]. Warthin’s tumors are the second most common benign tumors of the parotid gland. They may be multiple or bilateral and present as a slowly growing painless mass. The MR appearance of Warthin’s tumors has been described as low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. Both Warthin’s tumors and oncocytomas reveal intense uptake of the nuclide on technetium-Tc99m pertechnetate radionuclide scans of the salivary glands [5, 8]. High signal intensity on T2-weighted images of Warthin’s tumor could be the clue for the differentiation from oncocytomas. However, oncocytomas and Warthin’s tumors have similar imaging features. A reported case presented as coexistence of oncocytoma and Warthin’s tumor in the ipsilateral parotid gland [9]. The incidence of coexisting oncocytoma and Warthin’s tumor is extremely rare. In our case, the possibility of Warthin’s tumor can not be completely ruled out before surgery.

Surgical resection is the treatment of choice for most cases of oncocytomas. The majority of parotid oncocytomas have a benign nature and slow growth rate. Therefore, systemic adjuvant chemotherapy or irradiation may be no beneficial for the oncocytomas. The recurrence rate has been reported less than 20%, mainly because of incomplete surgical resection. Malignant transformation and metastasis are very rare [4, 5]. In our case, the total removal of tumor and preservation of the facial nerve are successful and it depends on the benign course of the oncocytomas in the parotid gland.

In summary, parotid gland oncocytomas are extremely rare. A correct diagnosis is often not made before the surgery because the clinical symptoms and the imaging features are very similar to Warthin’s tumors. The characteristic MR image findings of oncocytomas include low-signal to parotid gland parenchyma on T1- and T2-weighted images and homogeneous enhancement after intravenous gadolinium-based contrast medium administration. Complete surgical resection of the tumor is suggested for prevention of the recurrence. The parotid gland oncocytomas should be considered when the older adult presents a painless and slow-growing mass in the parotid gland.

**REFERENCES**