Ultrasound-guided Microwave Ablation of Adenolymphoma of Parotid Gland: A Case Report

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Abstract: Adenolymphoma is the second most common benign parotid tumor after pleomorphic adenoma. Although microwave ablation (MWA) has been proved to be effective for benign breast and thyroid nodules, there are few studies on ablation of adenolymphoma of parotid gland. An 82-year-old male with adenolymphoma of bilateral parotid gland treated with ultrasound-guided MWA. After 12 months of follow-up, the volume of bilateral parotid nodules was significantly reduced without recurrence and obvious complications. In conclusion, ultrasound-guided MWA is a safe and effective method for patients with parotid adenolymphoma who cannot tolerate surgery.

Key words: Adenolymphoma; Parotid gland; Microwave ablation; Ultrasound-guided; Contrast-enhanced US

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Adenolymphoma, also known as Warthin tumor, is the second most common benign tumor of the parotid next only to pleomorphic adenoma[1]. Of all benign parotid tumors, 25% are diagnosed as adenolymphoma [2]. Warthin tumor is slow growing and there appears to be related to severe smoking and bilateral Warthin tumors. Ipsilateral multi-centric occurrence is a well-documented feature of the disease [3]. Warthin tumors have a tendency to occur in the parotid tail where the majority of parotid lymph nodes occur, so partial parotidectomy is often required although ideal extent of surgical intervention for adenolymphoma of the parotid gland remains a matter of controversy [1,4]. In recent years, with MWA widely applied for thyroid and breast nodules whether MWA can be used as an alternative treatment for Warthin tumor patients has aroused our interest. Here, we report a case of Warthin tumor of bilateral parotid gland, which was successfully treated by ultrasound-guided MWA.

Case Report

An 82-year-old male patient was admitted to our

hospital due to the discovery of right parotid gland mass for more than 40 days. 40 days ago, the patient inadvertently found a "small jujube" size tumor behind the right ear without any treatment, and then the tumor gradually increased to the size of "walnut" with occasional discomfort. Physical examination showed the right parotid firm mass (3.5cm×3.0cm×2.0cm) and the left parotid firm mass (1.5cm×1.0cm×1.0cm) were medium hard, clear boundaries, mobility, with no overlying skin changes and non-tender. The facial nerve function was normal, and there was no other palpable mass in neck examination.

Preoperative computed tomography (CT) scan of the head and neck showed a 1.9cm×1.4cm fairly well margined inhomogeneous enhancing lesion within the right parotid gland and 1.0cm×0.8cm fairly well margined distinctly enhancing lesion within the left. Preoperative ultrasound (US) of the parotid showed solid-cystic nodules in the bilateral (right and left) parotid, 2.7cm×1.6cm×1.5cm (3.39cm³) and 2.3cm×1.2cm×1.0cm (1.44cm³) respectively, regular shaped and fairly well margined (Fig.1). US-guided core needle biopsy was performed subsequently and

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adenolymphoma was confirmed by pathology.

In view of the older patients and more underlying diseases, US-guided MWA was considered. The patient signed the informed consent.

Figure 1 US evaluation before MWA. (A, B) Longitudinal ultrasound images showed that there was a mix nodule of 2.7cm×1.6cm×1.5cm in the right parotid gland and 2.3cm×1.2cm×1.0cm in the left side, with regular shape and clear boundary.

US and contrast-enhanced US (Phillips IU22, Holland), with a 5-12MHz linear array transducer, were applied to evaluate the lesions of bilateral parotid before MWA by a sonographer with 3 years of experience in MWA for breast and thyroid nodules. The contrast agent (2.4ml, SonoVue, Bracco, Switzerland) entered in the parotid nodules of both sides at 20s and the nodular enhancement was visible in solid area (Fig. 2). With

patient placed in lateral position, local anesthesia with 1% lidocaine was performed on the puncture point. Then the puncture point of skin pricked by 16-gauge needle, under ultrasound-guided, a mixture of 2% lidocaine and 0.9% normal saline was infused into the surrounding parotid capsule, as the so-called “hydrodissection technique” to provide a safe barrier avoiding thermal damage to adjacent structures. With microwave ablation instrument (Nanjing Yigao Microwave Electric Institute, Nanjing, China), a 16-gauge MWA antenna was inserted into the nodule along its the longest diameter and positioned in the designated place. The microwave system was 2450 MHz, and output power 30W was selected in the study. The ablation procedures were monitored by real-time US, and ablations were not terminated until the transient hyperechoic zone caused by the gas covered all units of the nodules. The efficacy of MWA was evaluated by contrast-enhanced US immediately after MWA. No contrast enhancement was found in bilateral parotid nodules. The patient was well tolerated during the operation, and was given local ice compress at the puncture point after the operation without taking any drugs. The general condition was observed continuously for 24 hours. Slight auricle numbness and no facial nerve injury were found after operation.

Figure 2 Contrast-enhanced US of the nodule in the bilateral parotid before MWA. (A, B) The solid area of the inner wall of the right nodule was rapidly and highly enhanced; (C, D) Most of the left nodule were enhanced and some areas in the center were not.

The outcomes were assessed by US and contrast-enhanced US examination. After one month of MWA, the right parotid nodule was 1.9cm×1.4cm×1.2cm (1.67cm³) and the left one was 1.7cm×1.2cm×1.1cm (1.17cm³), with regular shape and clear boundaries (Fig. 3 A, B), but no enhancement (Fig. 3 E-H). The nodules volume decreased from 3.39cm³ to 1.67cm³(right) and 1.44cm³ to 1.17cm³ (left) at the 1-month follow-up, which the volume reduction rate (VRR) was 50.7% and 18.8%, respectively (Fig. 4A, B). After 6 months of MWA, the ablation areas shrunk to 1.3cm×0.8cm×0.7cm (0.38cm³, right) and 1.3cm×0.6cm×0.5cm (0.20cm³, left), respectively, with a well-defined margin (Fig. 3 C, D). The nodules volume decreased significantly from 3.39cm³ to 0.38cm³ (right) and 1.44cm³ to 0.20cm³(left) at the 6-month follow-up,

with the VRR of 88.8% and 86.1%, respectively (Fig. 4 A, B). No facial nerve injury and other complications were found in this case. No recurrence was found in the follow-up of 6 months. After 9 months of MWA treatment, CT scan of the neck showed that 0.8cm×0.7cm nodule was found in the right parotid gland and 0.6cm×0.5cm nodule was seen in the left side, regular shape, clear boundary, but no enhancement. After 12 months of MWA, the lesions of bilateral parotid detected by US and CT were not obvious because of absorption. The patient is still in continuous follow-up.

Discussion

Surgery is a mature and effective method for the treatment of Warthin tumor, although the ideal range of

Figure 3 Follow-up of the patient after MWA. (A, B) One month after MWA, the volume of the right parotid nodule shrank to $1.9\text{cm} \times 1.4\text{cm} \times 1.2\text{cm}$ and the left shrank to $1.7\text{cm} \times 1.2\text{cm} \times 1.1\text{cm}$ with a well-defined margin; (C, D) Six months after MWA, the volume of the right parotid nodule shrank to $1.3\text{cm} \times 0.8\text{cm} \times 0.7\text{cm}$ and the left shrank to $1.3\text{cm} \times 0.6\text{cm} \times 0.5\text{cm}$; (E, F, G, H) One month after MWA, contrast-enhanced US showed no enhancement in the bilateral nodules.

Figure 4 The curve of nodule volume with time after MWA.

surgical treatment for Warthin tumor is still controversial, mainly because it has the risk of bleeding, postoperative infection, permanent facial nerve injury and recurrence [4,5]. Although MWA is effective for benign breast nodules and thyroid nodules, with good VRR and treatment success rate (77.2% and 97% at 6 months, 81.6% and 100% at 12 months, respectively) [6], it is rarely used in parotid nodules. Considering that this case is an elderly patient with many underlying diseases and high risk of surgery and anesthesia, MWA was selected as the treatment method after full informed consent to reduce invasion and improve safety. The advantage of MWA is that it can be performed in a short time under local anesthesia, reach a higher intratumor temperature in the ablation area instantaneously, and use multiple therapeutic probes for larger lesions [7]. The risk of facial nerve injury should also be considered when the ablation process is guided by real-time US. In this case, the bilateral parotid nodules were located under the ear,

avoiding the normal facial nerve area, so there was no facial nerve injury after MWA.

Maurilio D et al. found that there was a significant correlation between different ultrasound features in radiofrequency ablation of thyroid nodules (sponge nodule showed 76% vs 67% and 66% reduction in mixed nodule and solid nodule, respectively, $P < 0.01$) and vascular (abundant peripheral and internal blood supply were 71% vs 68% and 67% reduction of slight peripheral/internal blood supply and peripheral blood supply, respectively, $P < 0.03$), but there was no large calcification [8]. In addition, there was a slight negative correlation between nodule base volume and contraction rate. Preoperative ultrasound showed that bilateral parotid nodules were cystic and solid nodules with large volume. One month after the operation, the volume of the right and left nodules decreased by 50.7% and 18.8%, respectively. Six months after the operation, the volume of the right and left nodules decreased by 88.8%

and 86.1%, respectively. As reported in the research, the VRR here is similar to that of thyroid nodules after MWA. In this case, the VRR of the right side is larger than that of the left side, mainly because the cystic ratio of the right side is larger than that of the left side. After 12 months follow-up, US and enhanced CT showed no enhancement and recurrence of the nodules, indicating that MWA is safe and effective in the treatment of parotid nodules.

Conclusion

In summary, US-guided MWA, a minimally invasive alternative to surgery, is a promising tool for the management of nodules of parotid gland with low incidence of local complications and good therapeutic effect. More cases and multi-center studies are needed to verify the effectiveness of US-guided MWA in the treatment of parotid adenolymphoma or parotid nodules, and to determine whether we can safely take the next step along with the path of minimally invasive treatment.

Conflict of Interest

The authors declare that they have no competing interests.

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