Therapeutic Experience of 189 Patients with Warthin's Tumor of the Parotid Gland

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Abstract

We investigated the clinical characteristics and preoperative diagnosis rate of Warthin's tumor (WT) of the parotid gland. The subjects were 189 patients who underwent surgery at the Department of Otolaryngology, Head and Neck Surgery in Osaka Medical College between September 1999 and April 2017. We compared the date of the189 patients with 466 cases of pleomorphic adenoma (PA) of the parotid gland seen during the same period. Among the 189 patients with WT, there were 163 males and 26 females, with a median age of 62 years. The sites of origin of the tumors in the parotid gland were distributed as follows: superficial lobe, 64 cases; deep lobe, 14 cases; and lower pole, 111 cases. The median maximum diameter of the tumor was 30 mm. The median operative time and the median operative blood loss were 120 minutes and 20 mL, respectively. The diagnosis had been made accurately prior to the surgery in 72% of the patients, by the fine needle aspiration cytology. Postoperative facial nerve dysfunction occurred in 39 cases (20.6%); however, it was transient in all cases. The transient facial nerve dysfunction recovered within 2 months in 50% of all cases, within 6 months in 90%, and within 1 year in 100% of cases. The features that were especially frequently encountered in the cases with postoperative facial dysfunction were origin of the tumor in the deep lobe of the parotid and large size of the tumor; furthermore, these cases also required a longer operative time. As compared with PA, WT occurred more often in male patients. WTs occurred more often in the lower pole and they were larger in size. The operative blood loss was greater. There were no significant differences with regards to the incidence of postoperative facial nerve dysfunction and the operative time.

Keywords

- Warthin's tumor
- parotid tumor
- facial nerve dysfunction
- fine needle aspiration cytology

Introduction

Warthin's tumor (WT) reportedly accounts for 4 to 25% of all benign parotid tumors, second only to pleomorphic adenoma (PA).[1,2] Unlike other benign salivary gland tumors, WT has the following characteristics. This tumor commonly occurs in elderly men; it rarely occurs in salivary glands other than the parotid gland; it most commonly occurs in the lower pole of the parotid gland; it rarely becomes malignant; it may occur bilaterally; and its accumulation is observed with ^{99m}Tc salivary gland scintigraphy.[3] WT commonly occurs in the elderly and is nonmalignant; therefore, an observational follow-up is often chosen as its therapeutic option, except for cases requiring aesthetic care. Therefore, the actual incidence of WT may be greater than the number of the cases reported based on surgical cases only.

In the present study, we performed a clinical investigation of 189 patients who received surgical treatment at our department and had their WT confirmed in the past 18 years. Patients with PA who underwent surgeries in the same

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period were also enrolled as the control group, excluding recurrent cases.

Patients and Methods

We investigated 189 patients who had received surgical treatment in our department and had their WT of the parotid gland confirmed in the past 18 years from September 1999 to August 2017. Of the 491 patients with PA of the parotid gland who underwent surgeries in the same period, 466 patients were enrolled as the control group, excluding recurrent cases.

As a general rule, all patients underwent ultrasonography, guided fine-needle aspiration cytology (FNAC), and magnetic resonance imaging, as part of preoperative diagnosis. FNAC is associated with risks such as pain, infection, and cell seeding; therefore, it was performed, in principle, only once. In addition, for the patients who had not been confirmed as having WT by FNAC but it was clinically suspected, ^{99m}Tc salivary gland scintigraphy was performed. Of the patients who had been confirmed as having WT in final diagnosis, we examined those who had not been diagnosed with WT using FNAC. For postoperative facial paralysis, we determined patients with any paralysis on inspection as having paralysis, and then as having recovered when their score reached 40 points, as evaluated in the Yanagihara method. For patients who experienced postoperative transient facial paralysis, we examined the frequency and the period of recovery.

Statistical analysis was performed using the chi-square test and the Brunner–Munzel test, with $p < 0.05$ taken as significant.

Results

Characteristics of WT, as Compared with PA

We comparatively studied characteristics of 189 patients with WT and those of 466 patients with PA who had undergone surgeries in the same period (►**Table 1**). Of the patients with WT, 163 were males and 26 were females, with males accounting for 86% of the total. Of the patients with PA, 154 were males and 312 were females, with a male:female ratio of approximately 1:2 ($p < 0.001$). The age of the patients with WT was 20 to 85 years, with a median age of 62 years, which was higher than that of the patients with PA at 47 years ($p < 0.001$).

Location wise, WT commonly occurs in the lower pole, with lower pole tumors accounting for 58.7% of all the target patients. Of the deep-lobe tumors, 24.6% was PA, and 7.4% was WT, with PA approximately three times more common than WT ($p < 0.001$). The maximum tumor diameter of WT was 30 mm, and that of PA was 24 mm, with the former found to be significantly greater than the latter ($p < 0.001$). The blood loss of WT was also significantly greater than that of PA ($p < 0.001$). The operative time did not show a significant difference between WT and PA ($p = 0.074$). The incidence of postoperative transient facial paralysis also did not show a significant difference between PA and WT ($p = 1$).

Postoperative Transient Facial Paralysis

Postoperative transient facial paralysis was found in 39 of the 189 patients with WT (20.6%). A comparative study was conducted between the 39 patients who had experienced postoperative transient nerve dysfunction and the 150 patients who had not experienced it (►**Table 2**). No significant differences were observed in age, sex, and blood loss. The maximum tumor diameter was significantly greater in patients who had experienced the transient nerve dysfunction ($p < 0.01$). The operative time was also significantly longer in patients who had experienced the transient nerve dysfunction ($p < 0.01$). The tumor site was found significantly commonly in the deep lobe ($p < 0.001$), and nerve dysfunction was found in 10 of the 14 patients with deep-lobe tumors (71.4%; $p < 0.001$). On the other hand, nerve dysfunction was found in 20.3% of the patients with superficial-lobe tumors and 14.4% of the patients with lower pole tumors (71.4%; $p < 0.001$). To assess characteristics of WT-induced postoperative transient nerve dysfunction, we conducted a comparative study of the period of recovery from the nerve dysfunction, using patients with PA who had experienced postoperative transient nerve dysfunction as the control group. In patients with WT, approximately 50% recovered from postoperative transient nerve dysfunction within 2 months, approximately 90% within 6 months, and

Table 1 A comparison of patients with Warthin's tumor (189 cases) and patients with pleomorphic adenoma (466 cases), who had undergone surgeries

	Warthin's tumor (189 cases)	Pleomorphic adenoma (466 cases)	*p*-Value
Sex (male:female)	163:26	154:312	<0.001
Age (y)	62 (20–85)	47 (12–86)	<0.001
Sites (superficial lobe:deep lobe:lower pole)	64:14:111	303:114:49	<0.001
Maximum diameter (mm)	30 (11–70)	24 (8–80)	<0.001
Operative duration (min)	120 (25–205)	120 (40–270)	0.074
Blood loss (mL)	20 (10–170)	10 (10–160)	<0.001
Postoperative facial paralysis (%)	20.6% (39/189)	21.0% (98/466)	1

Table 2 Factors for transient facial paralysis in postoperative patients

	With paralysis (39 cases)	No paralysis (150 cases)	*p*-Value
Age (y)	61 (36–84)	62 (20–85)	0.48
Sex (male:female)	33:6	130:20	0.94
Sites (superficial lobe:deep lobe:lower pole)	13:10:16	51:4:95	<0.001
Maximum diameter (mm)	31 (17–69)	28 (11–70)	<0.01
Operative duration (min)	130 (45–205)	120 (25–202)	<0.01
Blood loss (mL)	20 (10–165)	20 (10–170)	0.15

all of them within 12 months. Although a trend in which transient nerve dysfunction recovered slightly faster in patients with WT than those with PA existed, no significant difference was noted (►**Fig. 1**).

Preoperative Diagnosis Using FNAC

In 136 of the 189 patients with WT (72%), WT was correctly diagnosed using preoperative FNAC (►**Fig. 2**). Diagnosis revealed defective samples (with low cell counts/defective quality) in 42 patients (22%), tumors considered benign with indeterminable histologic types in 9 patients (5%), and other benign tumors (all of them were PA) in 2 patients (1%). Of the 466 patients with PA confirmed in this period, 3 (0.6%) had been diagnosed with WT using FNAC.

Patients Who Were Not Diagnosed with WT Using FNAC

We examined the diagnoses made in the 51 patients (42 of defective samples and 9 of indeterminable histologic types) wherein preoperative FNAC failed to determine the histologic types. Of the 51 patients, 13 underwent ^{99m}Tc salivary gland scintigraphy, with some accumulation, suspected as WT, found in 9 of them. Among the target patients, 22 underwent intraoperative rapid pathologic diagnosis, with 20 of them diagnosed with WT, one with malignant lymphoma and one with cyst. These results have shown that WT was correctly diagnosed by FNAC in 136 patients (72%), by intraoperative rapid pathologic diagnosis in 20 patients (11%), and by ^{99m}Tc salivary gland scintigraphy in 9 patients (5%); histologic types were determined preoperatively or intraoperatively in 88% of all the target patients. WT was not diagnosed as such by preoperative FNAC, ^{99m}Tc salivary gland scintigraphy, or intraoperative rapid pathologic diagnosis in 24 of the 189 patients (12.7%), or 14 (7.4%) when men with lower pole tumors aged 50 years or older were excluded.

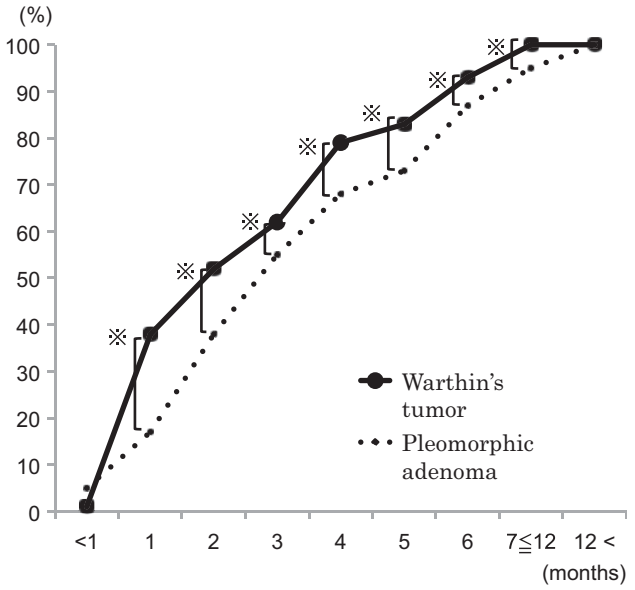

Fig. 1 The period of recovery from transient facial paralysis. Between Warthin's tumor and pleomorphic adenoma, no significant difference was found in the period of recovery. Regarding the period of recovery, ~50% of the patients recovered within 2 months and 100% of them within 12 months.

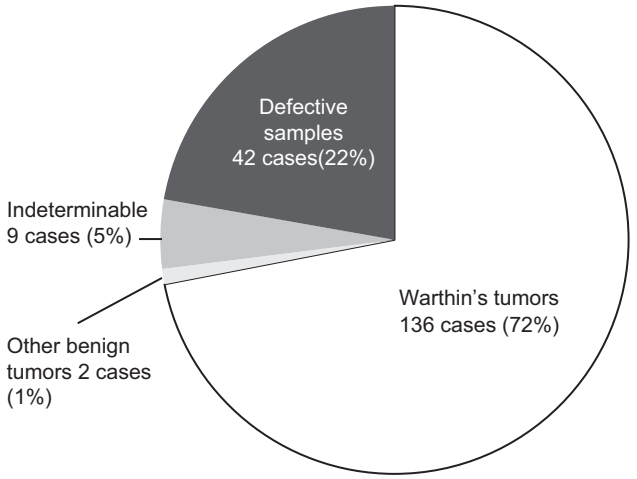

Fig. 2 Fine-needle aspiration cytology (FNAC) in Warthin's tumor (WT). 136 of the 189 patients (72%) were diagnosed as having WT. Both of the two cases of benign tumors (with other histologic types) were confirmed as pleomorphic adenoma.

Female Patients with Warthin's Tumor

As WT is known to occur more often in males, this study showed the male:female ratio as 163:26, with the incidence 6.3 times higher in males than in females ($p < 0.001$). We examined differences in the male and female patients and obtained the following findings: no significant differences in age, paralysis rate, and site; significantly greater tumor diameters in males ($p < 0.05$); and also a significantly longer operative time and a greater blood loss in males ($p < 0.05$ and $p < 0.001$, respectively; ►**Table 3**).

Table 3 Female patients with Warthin's tumor who underwent surgeries (26 cases), as compared with male patients

	Female (26 cases)	Male (163 cases)	*p*-Value
Age (y)	64 (38–84)	62 (20–85)	0.21
Paralysis (present:absent)	6:20	33:130	0.94
Sites (superficial lobe:deep lobe:lower pole)	8:2:16	56:12:95	0.94
Maximum diameter (mm)	25 (12–50)	30 (11–70)	<0.05
Operative duration (min)	100 (25–170)	120 (50–205)	<0.05
Blood loss (mL)	10 (10–65)	20 (10–170)	<0.001

Discussion

The frequency of WT is said to be 4 to 25% of benign parotid tumors,[1,2] with a mean rate of approximately 15% most frequently reported.[1,4,5] Of the 800 patients with benign parotid tumors in our department, 189 were diagnosed with WT (23.6%). Because we targeted surgical cases only, the actual incidence is considered to be higher than this rate.[6] For patients with PA, surgeries are usually indicated; however, observational follow-ups without surgeries are also indicated for many of them because WT does not become malignant and often occurs in the elderly. In our department as well, many patients have been indicated for observational follow-ups in recent years, except for cases requiring care for aesthetic damage such as with large tumors. As compared with 38% of the patients with WT having undergone surgeries in the 1999–2006 period,[7] the rate has declined to 16% from 2010 onward.

It is a well-known fact that WT commonly occurs in the lower pole.[6] We define a tumor whose center is located below the marginal mandibular branch as lower pole tumor.[8] In this study, tumors were found in the lower pole in 111 of the 189 patients (58.7%). On the other hand, PA of the lower pole was found only in 53 of the 466 patients (11.4%; $p < 0.001$). Deep-lobe tumors, defined as tumors occurring in sites deeper than the layer where facial nerves run, were found in 14 patients (7.4%) in this study. Lamelas et al reported the frequency of deep-lobe tumors being approximately 10%.[9] Because we classified tumors occurring in sites deeper than the layer where facial nerves run into lower pole tumors, when the lower pole tumors were included in deep-lobe tumors, the frequency would also be approximately 10%. PA of the deep lobe was found in 122 of the 466 patients (26.2%).

It is said that PA and WT account for 90% of benign parotid tumors. Therefore, it is crucial to understand the characteristics of these two tumors. This study also showed that WT was common in elderly men. In particular, the male:female ratio of PA was 1:2.0, as compared with that of WT being 6.3:1 ($p < 0.001$). In addition, while WT was shown to be associated with a greater maximum tumor diameter and a greater operative blood loss than in PA, no significant differences were found in the operative time and the frequency of postoperative transient facial paralysis between these two tumors. In the period of recovery from transient facial paralysis, a tendency of slightly faster recovery was observed in patients with WT than in patients with PA, albeit not a significant difference. It was inferred that patients with WT were easier to recover because WT commonly occurred in the lower pole where the area of surgical separation was smaller, nerve dysfunction was limited to the marginal mandibular branch in most cases, and the disease more often occurred in males whose nerves were generally thicker than those of females.

In female patients with WT, the operative time was shorter, blood loss was smaller, and tumor diameter was shorter than in male patients; however, it was considered likely that female patients underwent surgeries for cosmetic reasons, even if their tumors were small.

For parotid tumors, it is desirable whether they are benign or malignant and their histologic types are known preoperatively. FNAC is first performed in our department. In this study, FNAC successfully diagnosed 72% of patients (136 of the 189 target patients) as having WT. This result was nearly equivalent to an FNAC-based correct diagnosis rate of 71% for WT, as reported in the past.[10] In patients who had not been confirmed as having WT with FNAC but clinically suspected of having it, ^{99m}Tc salivary gland scintigraphy was performed. Consequently, 9 of the 13 patients were found positive and diagnosed with WT. When WT is excluded, ^{99m}Tc salivary gland scintigraphy positive tumors (e.g., oncocytoma) are rare; therefore, almost all positive cases are considered to be WT. Murata et al too reported that 18 of the 23 patients were WT positive (78%).[11]

Furthermore, when WT was not confirmed at our department, we performed intraoperative rapid diagnosis. As a result of performing it in the 22 target patients, 20 of them were diagnosed with WT. Thus, when the results of FNAC, ^{99m}Tc salivary gland scintigraphy, and intraoperative rapid diagnosis are included, histological diagnosis was successfully established in 88% of the target patients.

We consider observational follow-ups as applicable when WT has been diagnosed using FNAC or ^{99m}Tc salivary gland scintigraphy, as described earlier. This tumor commonly occurs in the elderly, its malignancy is not known, and its progression is generally slow. FNAC may be at risk of misdiagnosing malignant lymphoma. Therefore, we consider it advisable to perform actively ^{99m}Tc salivary gland scintigraphy in patients who are having observational follow-ups without undergoing surgeries so that they are confirmed as being positive.

Conclusion

A clinical investigation was conducted targeting 189 patients with WT of the parotid gland who had undergone surgeries. As a result of preoperative FNAC, 72% of the target patients were successfully diagnosed with WT. Compared with PA, WT was found significantly more often to occur in elderly men. Regarding the site of origin, the tumor occurred significantly more commonly in the lower pole. Compared with PA, no significant difference was shown in the incidence of postoperative transient facial paralysis, as well as in the period of recovery.

Conflict of Interest
None.

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