A more appropriate clinical classification of benign parotid tumors

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ABSTRACT

Objective: It is important to classify benign parotid tumors based on location when deciding the surgical strategy and conducting clinical research. For lower pole tumors, even those arising deep to the marginal mandibular branch, surgery is relatively simple compared with that for “true deep tumors” arising in the upper pole of the parotid gland. In this study, we examined a classification of benign parotid tumors that was useful for clinical practice.

Methods: We studied 582 patients with benign parotid tumors who underwent surgery. Their age, gender, tumor histopathology, maximum tumor diameter, postoperative facial nerve paresis, operating time, and blood loss were investigated after classifying the tumors as superficial as tumors, deep tumors, or lower pole tumors. We also investigated the same parameters after dividing the lower pole tumors into superficial and deep types.

Results: Lower pole tumors had distinct characteristics from superficial tumors and deep tumors. The incidence of facial nerve paresis was significantly higher and the operating time was significantly longer for deep tumors than for either superficial tumors or lower pole tumors, while there were no significant differences between superficial tumors and lower pole tumors. In addition, there were no significant differences of any of the parameters between the superficial and deep types of lower pole tumor.

Conclusions: It is appropriate to clinically classify benign parotid tumors into 3 groups, which are superficial tumors, deep tumors, and lower pole tumors.

INTRODUCTION

It is important to classify the location of parotid tumors appropriately for surgical planning as well as for clinical studies on postoperative complications and other outcomes. Traditionally, benign parotid tumors have been classified as superficial or deep tumors based on their location relative to the facial nerve [1]. The method of handling the facial nerve during surgery differs between superficial tumors and deep tumors. More invasive procedures are associated with a markedly increased risk of facial nerve damage and the incidence of postoperative facial nerve paresis is significantly higher for patients with deep tumors than for those with superficial tumors [2]. When we assess tumor location, we find that parotid tumors often arise in the lower pole of the gland. If tumors arising in the region inferior to the marginal mandibular branch of the facial nerve are defined as lower pole tumors, many benign parotid tumors will be classified this way. Lower pole tumors arising in the region superficial to the marginal mandibular branch can be treated by a similar surgical procedure to that for superficial tumors. Even for lower pole tumors arising deep to the marginal mandibular branch, the surgical procedure is less difficult than that for resection of “true deep tumors” arising in the upper pole of the parotid gland, because we only need to protect and preserve the marginal mandibular branch.

In the present study, we retrospectively investigated 582 patients with benign parotid tumors who underwent surgery at our department and examined the most appropriate clinical classification of benign parotid tumors.

METHODS AND MATERIALS

Patients: A total of 582 patients with benign parotid tumors underwent surgery at our department from September 1999 to December 2014. Based on the operative records, we initially classified the lesions into superficial tumors, deep tumors, and lower pole tumors according to location. We defined tumors arising in the region superficial to the main trunk of the facial nerve as superficial tumors, those arising deep to the main trunk of the facial nerve as deep tumors, and those located in the region inferior to the marginal mandibular branch of the facial nerve as lower pole tumors. In addition, we divided the lower pole tumors into 2 groups. Lower pole tumors arising in the region superficial to the marginal mandibular branch of the facial nerve were classified as the superficial type, while those arising deep to the nerve were classified as the deep type (Figure 1).

Surgical procedure: Surgery was performed under general anesthesia and a muscle relaxant was not used. An S-shaped skin incision was made, and then the main trunk of the facial nerve was identified. The operating time was measured from the performance of skin incision to the last skin suture.

Histopathology: We classified parotid tumors into 2 groups: superficial tumors (S) and deep tumors (D). For statistical procedures, we used R software (ver. 2.14.1). For all statistical analyses, p < 0.05 was considered to indicate a significant difference.

RESULTS

Patients: A total of 582 benign parotid tumors were analyzed. Among the 582 benign parotid tumors, there were 339 pleomorphic adenomas (58%), 156 Warthin’s tumors (27%), 28 cysts (5%), 26 basal cell adenomas (4%), and 33 other tumors (6%). Since pleomorphic adenoma (P) and Warthin’s tumor (W) accounted for 85% of all tumors, we performed further comparison by focusing on these 2 histological types.

Table 1. Comparison of superficial tumors, deep tumors, and lower pole tumors

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Number (n)</th>
<th>Age (years)</th>
<th>Male:Female</th>
<th>Histopathology</th>
<th>Maximum diameter (mm)</th>
<th>Facial paresis (%)</th>
<th>Operation time (min)</th>
<th>Blood loss (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>310</td>
<td>51.5 ± 16.4</td>
<td>127:83</td>
<td>P</td>
<td>25.1 ± 9.8</td>
<td>19.0</td>
<td>122.3 ± 30</td>
<td>21.1 ± 19.4</td>
</tr>
<tr>
<td>Deep</td>
<td>113</td>
<td>49.9 ± 16.0</td>
<td>82:31</td>
<td>W</td>
<td>38.6 ± 9.7</td>
<td>24.5</td>
<td>167.3 ± 26</td>
<td>31.7 ± 33.0</td>
</tr>
<tr>
<td>Lower pole</td>
<td>159</td>
<td>57.6 ± 13.0</td>
<td>100:59</td>
<td>P</td>
<td>33.5 ± 13.3</td>
<td>15.1</td>
<td>115.3 ± 22</td>
<td>23.3 ± 23.3</td>
</tr>
</tbody>
</table>

D-D test: p < 0.001, D-S test: p < 0.001, S-D test: p < 0.001.

The characteristics of lower pole tumors were distinct from those of superficial and deep tumors with regard to age, gender, and histopathology. Deep tumors have different characteristics from superficial tumors and lower pole tumors with regard to surgical difficulty and complications.

Table 2. Comparison of the superficial and deep types of lower pole tumor

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Number (n)</th>
<th>Age (years)</th>
<th>Male:Female</th>
<th>Histopathology</th>
<th>Maximum diameter (mm)</th>
<th>Facial paresis (%)</th>
<th>Operation time (min)</th>
<th>Blood loss (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>129</td>
<td>57.2 ± 13.9</td>
<td>76:53</td>
<td>P</td>
<td>26.6 ± 10.4</td>
<td>21.2</td>
<td>110.2 ± 28</td>
<td>21.2 ± 18.4</td>
</tr>
<tr>
<td>Deep</td>
<td>40</td>
<td>57.2 ± 13.9</td>
<td>35:5</td>
<td>W</td>
<td>33.5 ± 13.3</td>
<td>22.5</td>
<td>130.3 ± 36</td>
<td>29.5 ± 33.5</td>
</tr>
</tbody>
</table>

Chi-squared test of independence: p < 0.001.

DISCUSSION

When deciding which surgical approach to employ for the treatment of parotid tumors, we clearly need to classify the tumors by location. It is also important to classify tumors appropriately by location in order to predict postoperative complications as well as to investigate operative outcomes accurately.

In many reports on the clinical features of benign parotid tumors, the tumors are classified into 2 groups (superficial tumors and deep tumors) according to their location relative to the facial nerve. In this study, there was a significant difference in the incidence of postoperative facial paresis between tumor locations (superficial lobe versus deep lobe), but no difference was observed with regard to age, gender, histopathology, and maximum diameter. Bron et al. [2] also investigated the incidence of postoperative facial nerve paresis and concluded that tumor location is the most important factor apart from recurrence and inflammation. Therefore, from the viewpoints of surgical difficulty, complications, and tumor characteristics, it is reasonable to classify parotid tumors into 2 groups, which are superficial tumors and deep tumors. Posterior tumors often occur in the lower pole of the gland, and there were 159 lower pole tumors (27%) among a total of 582 parotid tumors in our study. The differences of age and gender were probably observed because Warthin’s tumors are frequently seen in elderly men. Since lower pole tumors have distinct characteristics from superficial tumors and deep tumors, it was considered appropriate to separate lower pole tumors in our classification. The incidence of facial paresis was similar for lower pole tumors and superficial tumors. In surgery for lower pole tumors, we should mainly pay attention to identifying and preserving the marginal mandibular branch of the facial nerve and it is not necessary to perform wide dissection of the nerve.

Even if a lower pole tumor is located in the deep region of the gland, surgery is relatively simple compared with resection of a “true deep tumor” arising in the deep region of the upper pole of the parotid gland, which requires identification and preservation of several branches of the facial nerve.

CONCLUSIONS

We examined the clinical classification of benign parotid tumors according to anatomical location. When benign parotid tumors are classified according to location, it may be appropriate to separate them into 3 groups, which are superficial tumors, deep tumors, and lower pole tumors.

REFERENCES