A Modified Mini Incision for The Surgery of Parotid Benign Tumor: A Retrospective Analysis of 48 Cases

Mang Jin
Jinshan Hospital of Fudan University

Wei Zhu
Jinshan hospital of Fudan University

Chengyu Wang
Jinshan Hospital of Fudan University

Hui Jiang (jianghuiluck@aliyun.com)
https://orcid.org/0000-0001-8758-8924

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Abstract

Background: Parotid neoplasm is a result of inadequate surgical incision during the treatment of head and neck cancers, and most of them are benign tumors. Hence, to explore a new surgical incision for parotid benign tumor in order to minimize the scar size on the premise of guaranteeing the safety of operation.

Methods: We conducted a retrospective study of 48 patients who had undergone parotid surgeries from Jan. 01 2008 to Dec. 30 2014 at the department of otolaryngology, Jinshan Hospital of Fudan University. Histopathological examination confirmed benign parotid tumor (Warthin's tumor, pleomorphic adenoma, cysts, and monomorphic adenomas.) in all cases. All patients underwent a mini incision (cutting the skin directly on the surface of the tumor, and the incision was slightly longer than the diameter of the tumor).

Results: Among the 48 cases, no recurrence and facial nerve injury were reported during the follow-up period of more than 4 years. Two cases of saliva fistula and one case of temporary facial nerve dysfunction were reported; however, they recovered quickly after symptomatic treatment.

Conclusion: Extracapsular dissection is a safe and effective surgical procedure for the treatment of parotid benign tumor, and the postoperative scar is very small.

Background

Parotid neoplasm is a result of inadequate surgical incision during the treatment of head and neck cancers, and most of them are benign tumors. Before the 1940s, the capsule of the tumor was retained to preserve the facial nerve when the mass was locally excised. However, the recurrence rate was very high, up to 30% \[^1\]. By the 1950s, the surgeons started to remove the tumor and the major part of parotid gland after dissecting the facial nerve, thereby reducing the recurrence rate to less than 2% \[^2\]. However, the large incision and resection of large tissue masses are associated with many complications, especially the incidence of facial paralysis. Hence, the extracapsular resection with the Y-shaped incision surrounding the auricle proposed by Gleave had received significant attention. The complications of the surgery were reduced, with less recurrence \[^3\]. However, it has the drawback of relatively large incision. Although cosmetic surgery can eliminate the resulting scar tissue, it is problematic for women because of cosmetic reasons. Therefore, we performed the incision of the tumor surface along the posterior margin of the mandible. The incision was made about 5 mm beyond the edge of the tumor, which effectively exposed and removed the tumor. There was no recurrence, with less complications. The continuous suture was used, and the postoperative scar was very small.

Method

We conducted a retrospective study of 48 patients who had undergone parotid surgeries from Jan. 01 2008 to Dec. 30 2014 at the Department of Otolaryngology, Jinshan Hospital of Fudan University. The
characteristics of the patients were obtained from medical records (Table 1). The clinical data were obtained after obtaining informed consent from the patients. All the patients underwent careful clinical examination before surgery to confirm the depth, size, hardness, and mobility of the tumor. B-ultrasound was performed to confirm the texture (substantial or cystic), the size, and the boundary of the tumor. For deeper and larger tumors, CT scans were performed to confirm its relationship to surrounding tissues, especially blood vessels. Fine needle aspiration (FNA) was performed to exclude malignant lesions. For deep masses, facial nerve function tests were also performed.

**Surgical technique**

Different anesthesia methods were used based on the size of the tumor. Local infiltration anesthesia was used for superficial and small (less than 15 mm in diameter) tumor. The surface of the tumor and the surrounding skin were infiltrated with the mixture of 1% lidocaine plus adrenaline. General anesthesia was used when the tumors were deeper or larger in diameter, which was more than 15 mm. For the tumor located at the posterior margin of the parotid, we made an incision along the posterior margin of the mandible. For the tumor located at the center or at the leading edge of the parotid, we made, a lump surface incision. The incision was about 5 mm above and below the boundary of the tumor (figure 1A). After cutting the skin and subcutaneous tissue, the parotid tissue on the surface of the tumor was bluntly separated, and the tumor was exposed and bluntly separated along the capsule of the tumor (figure 1B). Generally, there was a pedicle-like tissue on the basal plane of the tumor, which was sheared and sewed after clamped by the forceps. Sometimes, there was a small mass inside the large tumor, so we needed to check for residue. B-ultrasound and CT sometimes could not distinguish it well. If there was a rupture in the mass, it must be completely removed, especially the pedicle. After ensuring there was no residue, stopped the wound bleeding, placed a drainage strip (figure 1C), and applied pressure bandaging (figure 1D). According to the postoperative condition, the drainage strip was usually removed after 1 day. If there was more exudation, the drainage strip retention time was prolonged, and the pressure bandage was continued for 3 days. Patients with general anesthesia, especially those with deep tumor, were monitored for facial nerve function during surgery. There was no antibiotic use after the surgery.

**Results**

A total of 48 patients with various parotid tumors were operated from Jan. 01 2008 to Dec. 30 2014. There were 31 men (64.5%) and 17 women (35.4%) with an age range of 26 years (average 55.3 ± 17.4) (Table 1). The size of the tumors varied from 2 to 8 cm (average 5.6 cm). The diameter of tumors varied from 1.2 to 6.5 cm (average 4.4 ± 2.7 cm). Pathological types of the tumors are shown in Table 1.
Table 1
Clinical characteristic of patients

| Characteristics            | Number of patients (n = 48) |
|---------------------------|----------------------------|
| Age (years)               | 26–83 average: 55.3 ± 17.4 |
| Gender                    | male 31 (64.6%)            |
|                           | female 17 (35.4%)          |
| Diameter of tumor         | 1.2–6.5 cm average: 4.4 ± 2.7 cm |
| Pathological type         | Warthin's tumor 16         |
|                           | Pleomorphic adenoma 13     |
|                           | Cysts 6                   |
|                           | Onomorphic adenomas 4      |
|                           | Inflammatory mass 3        |
|                           | Hemangioma 2              |
|                           | Myoepithelial neoplasia 1  |
|                           | Mikulicz disease 1         |
|                           | Scar tissue 1              |
|                           | Eosinophilic tumor 1       |

Table 2
Complications

| Complications                  | Number of patients (n = 48) |
|--------------------------------|----------------------------|
| Recurrence                     | 0 (0%)                     |
| Temporary facial nerve injury  | 1 (2.1%)                   |
| Permanent facial nerve injury  | 0 (0%)                     |
| Auricular nerve injury         | 0(0%)                      |
| Frey’s syndrome                | 0 (0%)                     |
| Rupture of the wall during resection | 3 (6.3%)               |
| Saliva fistula                 | 2(4.2%)                    |

The complications are listed in Table 2. Among the 48 cases, there was no recurrence, permanent facial nerve injury, or Frey’s syndrome during the follow-up period of more than 4 years. There was one case of temporary facial nerve dysfunction who recovered after neurotrophic therapy for 3 months. There were 3
cases with larger or deeper masses, and the wall ruptured during resection. We first removed some intracapsular tumors and extracted cystic fluid to reduce tumor volume, then gradually removed along the outside of the tumor capsule, and finally removed the whole tumor. There was no recurrence after surgery. Two cases of saliva fistula were occurred, possibly due to the fact that parotid incision stich and postoperative bandaging were not tight enough. After prolonged drainage and pressure bandaging for 1 week, the saliva fistula was eliminated and the incision healed well. Our concurrency rate was very low, and the postoperative scar was small and aesthetic (Fig. 2).

In addition, we compared various pathological types in 48 cases with benign parotid tumors (Table 3). We found that Warthin's tumor patients were slightly older than other pathological types. Most of the Warthin's tumor patients were males (15 male patients and only one female patient of 79 years old). The proportion of male patients in this study was consistent with that in the previous studies [4]. According to previous studies, Warthin's tumor is related to smoking and hormones [5, 6]. There is a significant association between this and gender, which needs further study. There is little difference in gender among other pathological types.

| Pathological types     | age | gender |
|------------------------|-----|--------|
|                       | Male | Female |
| Warthin's tumor        | 65.1 | 15     |
| Pleomorphic adenoma    | 49.5 | 6      |
| Cysts                  | 52.5 | 4      |
| Onomorphic adenomas    | 46.5 | 2      |
| Inflammatory mass      | 47.3 | 1      |
| Hemangioma             | 48.5 | 1      |

**Discussion**

Parotid neoplasm is one of the most frequent benign tumor in head and neck cancer. However, most of the benign parotid tumors are pleomorphic adenoma [4, 7]. Surgical resection is the main treatment, which includes enucleation, extracapsular dissection, superficial parotidectomy, and total parotidectomy [8]. Among these, enucleation is associated with a higher recurrence rate [2]. Total parotidectomy reduces the rate of the recurrence, but it increases the rate of postoperative complications [9]. In recent years, incision is generally made surrounding the auricle. This type of operation can fully expose the lesion and reduce the complications, but the incision and the postoperative scar are large [10]. Extracapsular dissection is a safer procedure, with less chance of recurrence [9]. Therefore, it can be considered as the most safe and
effective method. So, we modified the surgical approach. First, a mini incision was made on the surface of the tumor and then removed the tumor. Among the 48 cases, no recurrence was encountered during the follow-up period of more than 4 years. We considered that blunt dissection on the wall would not damage the facial nerve generally; therefore, there is no requirement of dissecting the full facial nerve, which can reduce the rate of facial nerve dysfunction. A total of 48 cases were treated with extracapsular resection, and no recurrence occurred. There were several minor complications, but all of these disappeared after symptomatic treatment. No serious complication was occurred, such as facial paralysis and Frey’s syndrome.

We found that parotid benign solid tumors often have pedicles on the upper inside, which should be paid attention during the operation. After being clamped with vascular forceps, those were ligated and retained a certain safety margin. In addition, after removing the mass, we have carefully examined the mass, to confirm whether tumor satellites were around the pedicle. Sometimes, there were other small masses inside of the large tumor and some tumor-like tissues around the pedicle, highlighting the need to check for residues and eliminate those to prevent recurrence. Postoperative hemostasis and pressure bandaging are very important, especially for larger tumors. There could be a larger cavity after surgery, which may lead to hematoma if treated improperly. We generally applied pressure bandaging for 3 days after surgery. In addition, we have closely sutured the incision of the parotid tissue, which could reduce the occurrence of salivary gland leakage.

The classic extracapsular resection incision is generally made in the area surrounding the auricle \(^2\). Generally, the female patients do not prefer such a large incision. And there is a high incidence rate of the female patients with the parotid tumor. Therefore, in this study, we made a tumor surface incision or a mandibular margin incision, and the incision line spanned 5 mm above and below the edge of the mass. It was enough to expose and safely remove the mass. In particular, for some small (the diameter of tumors varied from 1 to 1.5 cm) tumors, a mandibular margin incision was made. The scar was small and not obvious after the postoperative recovery period. In addition, after removal of part of the parotid tissue, especially removal of most of the parotid tissue, the patients might have the discomfort of oral dryness. Moreover, in the cases of extensive resection, the patients’ faces might have obvious concavity, which is an obvious appearance defect in.

Benign parotid tumors can be treated via extracapsular resection, with minimal complications and a very low recurrence rate. In addition, for postoperative aesthetics, a tumor surface incision or a mandibular margin incision can be made.

In addition, Warthin’s tumors are more common in males, which deserves further study.

**Abbreviations**

Not applicable.
Declarations

Ethics approval

All experimental procedures and protocols were approved by the Ethics Committee of Jinshan Hospital Affiliated to Fudan University (Jinshan Ethics-2019-02-01).

Consent to participate

The clinical data were obtained from all the patients with the written informed consent.

Consent for publication

The clinical data were obtained consent from the patients. All participants gave written consent for their personal or clinical details along with any identifying images to be published in this study.

Competing Interest

None.

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Author contributions

HJ performed the diagnostic investigations and surgery treatments; MJ performed writing this manuscript; WZ and CW performed the statistics and analysis data. All authors have read and approved the final version of the manuscript.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

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Not Applicable.

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Figures
Figure 1

Surgical technique A. The incision was made about 5 mm above and below the boundary of the tumor. B. The tumor was exposed and bluntly separated along the capsule of the tumor. C. A drainage strip was placed D. Pressure bandaging was used
Figure 2 shows the postoperative scar.

Supplementary Files

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