

Research

Management of Benign Parotid Lesions: An Overview of Complications and Extent of Surgical Resection

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ABSTRACT

Background

The surgical management of benign lesions of the parotid gland is focused on the complete removal of the lesion, minimizing the chances of recurrence and to preserve facial nerve function. There is a relative paucity of literature regarding the post-operative complications of the surgical procedures for benign parotid lesions. The aim of this study is to evaluate the post-operative complications of a limited surgical procedure, namely partial superficial parotidectomy.

Material and Method

This retrospective cohort study included all parotid surgeries performed for benign parotid pathology from January 2008 to December 2018. The patient's demographic data, presenting symptoms, type of surgery performed, complications, presence of post operative facial nerve paralysis and grade, histopathology type and follow up period were collected from hospital records of Al Shifa system. The mean follow-up time was 12.5 months.

Results

The study yielded a total of 125 partial superficial parotidectomies performed on 123 patients with a mean age of 44.5 years (range 8-87 years). Pleomorphic adenoma (n= 68, 54.4%) and Warthins tumor (n=32, 25.6%), were the most common neoplastic lesions. Non-neoplastic lesions were 18 (14.4%). Temporary facial nerve weakness occurred in 11 patients (8.8%). All cases of facial nerve weakness improved within three months post-operatively. The rate of salivary fistula and sialoceles were 5.5% and 1.5% respectively. One patient who had histologically proven pleomorphic adenoma had recurrence of tumor (0.8%).

Conclusion

Partial superficial parotidectomy was associated with low incidence of facial nerve dysfunction which was mostly transient, and no permanent facial nerve dysfunction was reported. Other complications like sialoceles, salivary fistula and Frey's syndrome were reported at lower rates than the reported rates in the literature for the conventional superficial parotidectomy. The findings support partial superficial parotidectomy approach for the treatment of benign parotid pathology, which entails less extensive resection of parotid parenchyma and less extensive dissection of facial nerve branches thereby minimizing the risk of post-operative complications.

Keywords: Benign parotid lesions; Complications of parotid surgery; Facial nerve dysfunction; Partial superficial parotidectomy; Pleomorphic adenoma.

INTRODUCTION

The most common benign neoplasm of the parotid gland is pleomorphic adenoma as it accounts for approximately 60% to 70% of all parotid neoplasms.¹⁻⁴ It mainly affects the superficial portion of the parotid parenchyma.¹⁻⁴ The surgical management of benign parotid neoplasm has remained a matter of debate and controversy.⁵ In the early twentieth century, fear of damage to facial nerve lead to the development of intra-capsular enucleation but the recurrence rate was up to 40%,⁶ so superficial parotidectomy was popularized which involved identification and dissection of the main trunk and all branches of facial nerve and removal of parotid parenchyma lateral to the facial nerve along with the tumor within. This approach has reduced the recurrence rate to 5%.⁷ However, the procedure is sometimes associated with post-operative weakness of facial nerve, both temporary and permanent and with other complications such as salivary fistula, sialocele, Frey's syndrome and significant hollowing of facial contour at the parotid region.⁷⁻⁸ Subsequently less radical surgical techniques were introduced like partial superficial parotidectomy which entails removal of less parotid tissue and fewer branches of facial nerve were dissected thereby reducing the complications while recurrence rate remains similar.³ The surgical technique is even further refined to be less invasive and extra capsular dissection is practiced in which tumor is accessed directly, the tumor capsule is dissected out and only the branches of facial nerve directly in relation to the tumor are dissected and preserved.^{9,10}

The incidence of complications after superficial parotidectomy is variable. Post-operative facial nerve weakness can affect up to 40% of patients although most is transient and recovers completely.^{11,12} In addition, the incidence of sialocele and salivary fistula was reported as 17% and 6% respectively¹³ and the incidence of Frey's syndrome have been reported in the range of 3 to 22%.¹⁴

The authors offered partial superficial parotidectomy to the patients for the management of benign parotid lesions and the purpose of this study is to evaluate the outcome of this procedure in respect to post-operative complications like facial nerve dysfunction, hematoma, sialocele, salivary fistula, Frey's syndrome and recurrence. This will be helpful in providing data for patient information during pre-operative counseling and would further help to establish the credence of partial superficial parotidectomy procedure as a less invasive option for the management of benign parotid pathologies.

MATERIAL AND METHOD

This study is a retrospective cohort of all parotid surgeries performed for benign parotid pathology from January 2008 to December 2018. All the patients who underwent parotid surgery and histopathology confirmed a benign parotid pathology were included in the study. All patients who had pre-operative facial nerve dysfunction or parotid lesion had parapharyngeal space extension were excluded from the study. Fine needle aspiration cytology and CT Scan with contrast were done as standard pre-operative work up in the outpatient.

Demographic and clinical data were collected including age at the time of surgery, gender, smoking status, co-morbidities and length of follow up.

Approval was obtained from the hospital research and ethics committee for this retrospective analysis.

SURGICAL TECHNIQUE

Three senior surgeons of the department performed the surgical procedures. A four channel continuous nerve monitoring device was used.

As standard procedure, modified Blair incision was used except in a few female patients, where one surgeon used a modified face lift incision with a posterior limb extending along the occipital hair-line depending on tumor size. This procedure involves the following: a skin flap is raised underneath the Superficial Musculoaponeurotic System (SMAS) plane with adequate exposure of the operating field. The tympano-mastoid suture line is palpated and identified as the most definitive landmark for identification of the main trunk of the facial nerve. Only the branches of the facial nerve directly in relation to the tumor are dissected. Facial nerve branches unrelated to the lesion are not dissected. The tumor is removed with a cuff of 0.5cm to 1cm of normal parotid tissue wherever possible except for places where facial nerve branches directly abuts the tumor. After removal of tumor, the remaining portion of parotid gland and parotid fascia is approximated in order to reduce the resultant defect. A suction drain is placed and removed when the output is 10 ml or less per 24 hours. Post-operatively, the patient is evaluated daily for facial nerve function status as per the House-Brackman (HB) grading system by different team of doctors every day until they are discharged. Facial nerve status and any other complication is documented.

The guidelines followed for definition of complications is listed in Table I.

Table I. Definition of Complications

1. Facial Nerve dysfunction ^{15,16}	Any facial nerve weakness after surgery -Temporary: Any facial nerve dysfunction with full recovery within 12 months. -Permanent: Any facial nerve dysfunction which persist over 12 months
2. Sialocele	Persistent fluid collection at operation site needing treatment
3. Salivary Fistula	Salivary flow from the surgical site lasting for more than two days
4. Frey's Syndrome ¹²	Gustatory sweating occurring within 12 months of surgery leading to out-patient visit
5. Hematoma	Bleeding or collection of blood at the surgical site

The first follow up is scheduled after 2 weeks. In case of facial nerve dysfunction, the patient is reviewed every month until the facial nerve function recovers.

RESULTS

A total of 123 patients who underwent 125 parotidectomies from January 2008 to December 2018 were identified. Two patients had bilateral parotid surgeries. Two patients who were operated for schwannoma were excluded from the study because they had facial weakness pre-operatively.

The mean follow-up duration ranged from 3 months to 95 months (mean = 12.5 ± 14.0)

The complications noted were facial nerve dysfunction, hemorrhage or hematoma, sialocele, salivary fistula and Frey's syndrome.

The majority of lesions were pleomorphic adenoma (n=68, 54.4%). Warthin's tumor was next common pathology (n=32, 25.6%)

(Table II). The non-neoplastic lesions were 18 accounting for 14.4%. The details of non-neoplastic lesions are given in Table III.

Table II. Neoplastic parotid lesions

Lesion Type	Number of Cases
Pleomorphic Adenoma	68
Warthin's Tumour	32
Basal Cell Adenoma	5
Oncocytoma	2

Table III. Non-neoplastic Parotid lesions

Lesion Type	Number of Cases
Lymphoepithelial Cyst (HIV +ve)	3
Lymphoepithelial Cyst	2
Epidermal Cyst	2
Lipoma	3
Lymphoepithelial Sialadenitis	1
Chronic Sialadenitis	4
Chronic granulomatous Sialadenitis	3

The most frequent complication encountered is transient facial paralysis which was seen in 11 patients (8.8%) as shown in Table IV.

Table IV. List of complications (n=125)

Complications	N (%)
-Facial Nerve Dysfunction	11 (8.8%)
-Sialocele	2 (1.6%)
-Salivary Fistula	7 (5.5%)
-Hemorrhage/ Hematoma	2 (1.6%)
-Frey's Syndrome	2 (1.6%)

Facial paralysis recovered completely within 3 months post-operatively. The degree of facial nerve dysfunction as per HB facial nerve grading system was Grade II in 5 cases, grade III in 4 cases, and grade IV in 2 cases. Isolated marginal mandibular nerve involvement is encountered in 3 cases. We observed that almost all the patients who had transient facial nerve weakness recovered within two to four weeks except the two patients in grade IV weakness that were diabetic and took longer time to recover (Table V). The association between the histopathology and grade of facial nerve paralysis was not statistically significant (p value = 0.2, Chi-square test was used).

Table V. Grading of facial nerve weakness and its relationship with histopathology

Facial Nerve Dysfunction	n=11		
	Grade II	Grade III	Grade IV
HB facial nerve Grading	5	4	2
Histopathology			
Pleomorphic adenoma (n=5)	4	1	
Warthins (n=4)	1	2	1
Keratinous cyst (n=1)			1
Oncocytoma (n=1)		1	

The two patients who developed sialocele responded to conservative management with aspiration and pressure dressing. All salivary fistula cases (n=7, 5.5%) improved with pressure dressing and did not require any further intervention.

The two patients who developed hematoma post-operatively underwent surgical intervention. The two patients who developed Frey's Syndrome were managed with injection of botulinum toxin A. One of them had pleomorphic adenoma extending to deep lobe and the other patient had partial superficial parotidectomy for foreign body type granulomatous reaction. The list of encountered complications is shown in Table IV.

One of the 125 patients who had benign parotid tumors developed recurrence. He was a 23 years old male who had partial superficial parotidectomy for pleomorphic adenoma. Nothing significant was noted intra-operatively and there was no breach of capsule or spillage from the tumor. Recurrence was noted by the patient himself approximately one year after surgery when he was temporarily residing abroad. He underwent revision surgery there.

DISCUSSION

The parotid parenchyma lateral to the facial nerve accounts for almost 70% of the gland, only one third of parotid tissue lies deep to the facial nerve.¹⁷ Because most of the gland parenchyma is superficial to the facial nerve, 90% of the parotid tumors occur in the superficial lobe.⁸ Conventional superficial parotidectomy, which involves the removal of most of the superficial lobe, usually results in significant hollowing of the facial contour. The partial superficial parotidectomy usually offers better aesthetic outcomes with similar rate of success.^{3,5,8}

Over the last few decades, like in other fields of surgery, parotid gland surgery is also moving towards less invasive surgical procedures with lesser tissue resection. We have attempted to analyze the results of partial superficial parotidectomy in the management of benign parotid lesions. The technique and advantages of partial superficial parotidectomy has been widely publicized in literature.^{3,4,10,16,18,19}

In partial superficial parotidectomy the tumor is removed with a thin rim of normal parotid tissue, the resultant defect is small, and the remaining tissue can be put together so there is minimum deformity.^{3,8,20} Also, many surgeons believe that meticulous dissection of all branches of facial nerve increases the risk of intra-operative nerve damage and causes scarring in the area of the nerve which can make revision surgery for recurrence much more difficult and riskier.^{19,21,22}

The selection criteria for partial superficial parotidectomy varies.^{19,23} We did not follow any specific criteria for selection, we just followed the concept that less extensive surgery results in fewer complications.²⁴ Therefore, the decision for extent of surgery in our patients was also depended on the size of the tumor and the number of facial nerve branches involved.^{25,26}

Facial nerve monitoring was used in all the performed cases, although it has been shown in a meta-analysis that its use does not reduce facial nerve damage but it may reduce the incidence of transient facial nerve weakness and we also found that it is helpful when there is significant pericapsular fibrosis and adhesions.¹⁵ In our series, transient facial dysfunction occurred in 8.8% of cases and all of them recovered completely within three months. If we compare the incidence of transient facial nerve dysfunction in conventional superficial parotidectomy where all branches of facial nerve are dissected and preserved ranges from 13.6 to 26%²⁷ whereas in partial superficial parotidectomy the incidence of transient facial nerve dysfunction ranges from 6.9% to 18%.⁵ Also, no permanent facial nerve weakness occurred in our se-

ries which is consistent with other studies.⁴ In a meta-analysis, historical data showed that the incidence of permanent dysfunction average was 1.9% with superficial parotidectomy and 0.2% with Partial superficial parotidectomy.²⁷ In three of our patients who developed transient facial nerve dysfunction, only marginal mandibular branch of facial nerve was involved. In other studies, marginal mandibular nerve is the main nerve involved in transient facial nerve weakness.^{16,28}

We have described the extent of facial nerve dysfunction as per the House-Brackman facial nerve staging system. Out of 11 cases, in 9 cases, the stage of facial weakness was mild dysfunction (grade II and III). Only in two patients it was grade IV, interestingly both of them were diabetic. One of them had Warthins tumor and lot of fibrosis was encountered around the lesion. The other patient had keratinous cyst. The association between the histopathology and grade of facial nerve paralysis was not statistically significant.

Sialocele developed in two patients (1.6%) and salivary fistula in 7 (5.6%). Hematoma was recorded in two patients. In some studies, the incidence of sialocele is reported ranges from 5% to 17% and salivary fistula as 6% to 11%, so our findings are lower with the incidence cited in other studies^{13,29} perhaps due to approximation of parotid fascia and the remaining parotid parenchyma. The incidence of Frey's Syndrome is 1.6% in our series. This is based on subjective complain from the patients and minor's iodine test was not done in these patients. The reported incidence of Frey's syndrome in some studies is as high as 50%.³⁰ We think that limited removal of parotid tissue, approximation of parotid fascia after the excision and raising the flap in sub SMAS plane are the possible reasons for the low incidence of Frey's Syndrome.^{3,16,31,32}

The recurrence rate of pleomorphic adenoma is dependent on the degree of surgical resection. It has been reported as high as 45% for enucleation.³³ With superficial parotidectomy it has been reduced to 1 to 4%.³⁴ We had one recurrence of pleomorphic adenoma in our study. In a meta-analysis, as per historic data, the rate of recurrence with superficial parotidectomy, partial superficial parotidectomy and extra capsular dissection on average was less than 3%.³⁵

It is significant to note that among the non-neoplastic pathology in this study, three patients who had lymphoepithelial cyst were tested positive for retroviral infection post operatively. So, in all cystic lesion of parotid gland, the possibility of retroviral infection should be kept in mind along with other differential diagnosis.^{36,37}

CONCLUSION

Partial superficial parotidectomy is a less invasive surgical procedure for the treatment of benign lesions of the parotid gland. It is associated with reduced incidence of transient facial nerve dysfunction and other complications including sialocele, salivary fistula and Frey's Syndrome. Partial superficial parotidectomy procedure offers a moderate approach in comparison to the extremes of superficial parotidectomy with complete removal of superficial lobe of parotid and extra-capsular dissection with minimum identification and dissection of facial nerve branches.

The incidence of complications found in this study would serve to assist the surgeons in pre- operative counseling of the patients and decision making.

CONFLICTS OF INTEREST

None.

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