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Original Research Article

Assessment of functional outcome after parotidectomy reconstruction

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ABSTRACT

Background: Total or superficial parotidectomy, when a reconstructive technique is not used, usually leads to Frey's syndrome, preauricular and retromandibular depression. These together with the scar from a classic or modified Blair incision limit the final aesthetic outcome. The superiorly based sternocleidomastoid muscle (SCM) flap or superficial musculo-aponeurotic system (SMAS) flap can be used for reconstruction of the defect to achieve better facial contour restoration. The aim and objective of the study was to evaluate the functional and cosmetic outcome of patients after reconstruction in parotid surgeries.
Methods: This study was done in the department of Otorhinolaryngology & Head-Neck Surgery. Total number of patients with parotid tumours were 24 in each group namely- Group A: Patients undergoing parotid surgery without reconstruction. Group B: Patients undergoing parotid surgery with reconstruction using superiorly based sternocleidomastoid muscle flap. All patients were followed and analyzed on 6 weeks, 6 months and 1 year postoperatively on the basis of patient's satisfaction, cosmesis, subjective Frey's syndrome, retromandibular and pre-auricular depression using visual analogue scale.
Results: In Group A, subjective Frey's syndrome was present in 8.3% patients from 6 month to 1 year. In contrast, in Group B, it remain absent in all patients at all periods. In Group A, preauricular depression was present in 79.2% patients in immediate postop and 95.8% patients from 6 week to 1 year. In contrast, in Group B, it was present in only 4.2% patients at all periods. In Group A, retromandibular depression was present in 70.8% patients while in Group B, it was absent in all patients.
Conclusions: The superiorly based SCM flap for reconstruction of defect following superficial or total parotidectomy improves the final outcome in terms of the facial deformity (pre-auricular, retro-auricular depression) and lowers the incidence of Frey's syndrome.

Keywords: Parotidectomy, Sternocleidomastoid flap, Functional outcome

INTRODUCTION

Salivary glands are a common source of benign pathologies. Surgery continues to remain the mainstay of treatment for parotid gland neoplasms. This aspect of the management leads to facial disfigurement. Loss of bulk behind the ramus of mandible results in retromandibular depression which is aesthetically displeasing and emotionally traumatizing.[1,2] In parotid surgeries high rates of functional complications such as, temporary or permanent facial nerve injuries, Frey's syndrome and loss of ear sensation have been encountered.[3] To overcome the disadvantages of superficial or total parotidectomy, obliteration of defect is being done by flaps such as a sternocleidomastoid muscle (SCM) flap or superficial musculo-aponeurotic system (SMAS) flap, to achieve better facial contour restoration in reconstruction of the defect.[4-7]

The use of autogenous tissue interposition for the prevention of Frey's syndrome and cosmetic deformity during parotidectomy are considered as simple, safe and effective approaches. The superiorly based sternocleidomastoid muscle flap (SCMF) is one of the most commonly used autogenous tissues.[8]

Aims and objectives

- To evaluate the functional and cosmetic outcome of patients after reconstruction in parotid surgeries.

METHODS

This study was done in 48 patients at King George's Medical University, Lucknow during the period of August 2016 to July 2017. Clearance from ethical committee and informed consent of all patients was taken. Patients were divided into 2 groups namely-

- Group A: Patients undergoing parotid surgery without reconstruction.
- Group B: Patients undergoing parotid surgery with reconstruction using superiorly based sternocleidomastoid muscle flap (SCMF).

Inclusion criteria

Inclusion criteria were patient included were in Age group 10-60 years; patients who gave consent for the procedure; patients with benign parotid tumours requiring surgical management with or without reconstruction.

Exclusion criteria

Exclusion criteria were patients of age less than 10 years and more than 60 years; patient with any systemic illness or co-morbidities; patients not giving consent for the procedure; patients with parotid malignancy/recurrent case.

Methodology

All the diagnosed cases of benign parotid lesions, who satisfied the inclusion criteria were enrolled in this study and underwent complete history and examination. Radiological investigations (computed tomography/ magnetic resonance imaging) done according to need. After complete pre-operative investigations and pre anaesthetic checkup (PAC), patients underwent superficial or total parotidectomy depending on extension of lesion. Reconstruction of defect was done using superiorly based sternocleidomastoid (SCM) flap. All patients were followed on immediate post op, 6 weeks, 6 months and 1 year postoperatively on the basis of patient's satisfaction, cosmesis (visual analogue scale) (Table 1), subjective Frey's syndrome, retromandibular and pre-auricular depression.

Data collected was subjected to statistical analysis.

Table 1: The designed visual analog score.

Degree	Appearance
0	Normal appearance, symmetrical to the opposite side.
1	Minimal asymmetry, barely noticeable from a short distance.
2	Mild asymmetry, noticeable but with no disfigurement.
3	Moderate asymmetry, mainly in the preauricular area, apparent when looking at the patient.
4	Severe asymmetry, with deep preauricular and retromandibular groove.
5	Severe asymmetry, with deep preauricular and retromandibular groove with obvious scar.

RESULTS

In present study total 48 patients were enrolled and treated either with parotidectomy without reconstruction (Group A) or parotidectomy with reconstruction using superiorly based sternocleidomastoid muscle flap (Group B). The outcome measures of the study were cosmetic appearance (VAS score), retromandibular depression, preauricular depression, subjective Frey's syndrome and patients satisfaction. Outcome measures were assessed post operatively (immediate post-operative, 6 month and 1 year). The objective of the study was to compare the outcome measures between two groups at each period (immediate post-operative, 6 month and 1 year).

Demographic characteristics

The demographic characteristics (age and sex) of two groups at presentation (enrollment) are summarized in Table 2. In conclusion, patients of two groups were age and sex matched and comparable and thus may also not influence the study outcome measures.

Table 2: Demographic characteristics of two groups.

Demographic characteristics		Group A (n=24) (%)	Group B (n=24) (%)	t/χ^2 value	P value
Age (yrs)	Mean ±SD	31.29±12.62	29.50 ±15.15	0.45	0.658
	Median	30	25		
Sex	Female	12 (50.0)	7 (29.2)	2.18	0.140
	Male	12 (50.0)	17 (70.8)		

[ns]p>0.05- as compared to Group A

Outcome measures

Visual analogue scale (VAS)

The post-operative VAS (score) of two groups at different periods (immediate postop, 6 week, 6 month and 1 year) is summarized in Figure 1. In Group A, the mean VAS score remain similar (constant) at all periods while in Group B, it decrease with time. Further, the mean VAS score was comparatively lower in Group B as compared to Group A at all periods.

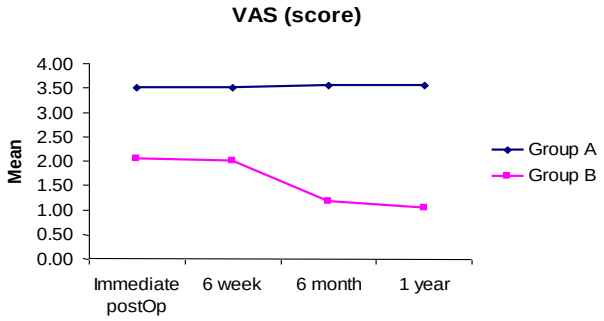

Figure 1: Mean VAS score of two groups over the periods.

For each group, comparing the mean VAS score between the periods, Newman-Keuls test showed insignificant ($p>0.05$) change in VAS score between periods in Group A. In contrast, in Group B, it decrease significantly ($p<0.001$) at both 6 month and 1 year as compared to both immediate postop and 6 week. Further, in Group B, it also decrease significantly ($p<0.05$) at 1 year as compared to 6 month. However, in Group B, it did not differ ($p>0.05$) between immediate postop and 6 week i.e. found to be statistically the same.

Retromandibular depression

The post-operative retromandibular depression (absent/ present) of two groups at different periods is summarized in Table 3. In Group A, retromandibular depression present 58.3% patients at immediate postop and 70.8% patients from 6 week to 1 year. In contrast, in Group B, it was absent 100.0% at all periods. For each period, comparing the distribution of retromandibular depression (absent/present) between two groups, χ^2 test showed significantly ($p<0.001$) different and lower presence of retromandibular depression in Group B as compared to Group A at all periods.

Table 3: Distribution of retromandibular depression of two groups over the periods.

Time periods	Retromandibular depression	Group A (n=24) (%)	Group B (n=24) (%)	χ^2 value	P value
Immediate postop	Absent	10 (41.7)	24 (100.0)	19.77	<0.001
	Present	14 (58.3)	0 (0.0)		
6 week	Absent	7 (29.2)	24 (100.0)	26.32	<0.001
	Present	17 (70.8)	0 (0.0)		
6 month	Absent	7 (29.2)	24 (100.0)	26.32	<0.001
	Present	17 (70.8)	0 (0.0)		
1 year	Absent	7 (29.2)	24 (100.0)	26.32	<0.001
	Present	17 (70.8)	0 (0.0)		

Table 4: Distribution of subjective Frey's syndrome of two groups over the periods.

Time periods	Subjective Frey's syndrome	Group A (n=24) (%)	Group B (n=24) (%)	χ^2 value	P value
Immediate postop	Absent	24 (100.0)	24 (100.0)	NA	-
	Present	0 (0.0)	0 (0.0)		
6 week	Absent	24 (100.0)	24 (100.0)	NA	-
	Present	0 (0.0)	0 (0.0)		
6 month	Absent	22 (91.7)	24 (100.0)	2.09	0.149
	Present	2 (8.3)	0 (0.0)		
1 year	Absent	22 (91.7)	24 (100.0)	2.09	0.149
	Present	2 (8.3)	0 (0.0)		

Preauricular depression

The post-operative preauricular depression (absent/ present) of two groups at different periods is depicted in Figure 2. In Group A, preauricular depression present in 79.2% patients at immediate postop and 95.8% patients from 6 week to 1 year. In contrast, in Group B, it was present 4.2% patients at all periods. For each period, comparing the distribution of preauricular depression (absent/present) between two groups, χ^2 test showed

significantly (p<0.001) different and lower presence of preauricular depression in Group B as compared to Group A at all periods.

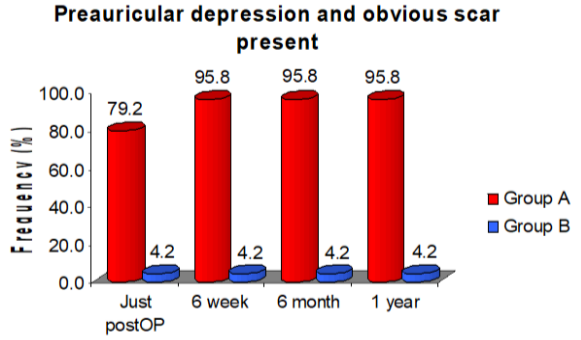

Figure 2: Distribution of preauricular depression present between two groups.

Subjective Frey's syndrome

The post-operative subjective Frey's syndrome (present/ absent) of two groups at different periods is summarized in Table 4. In Group A, subjective Frey's syndrome was absent in all patients at immediate postop and 6 wks but remain present in 8.3% patients from 6 month to 1 year. In contrast, in Group B, it remain absent in all patients at all periods. For each period, comparing the distribution of subjective Frey's syndrome (yes/no) between two groups, χ^2 test showed similar (p>0.05) distribution of subjective Frey's syndrome between two groups at all periods.

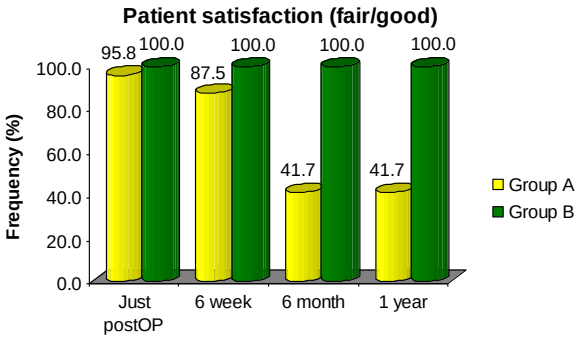

Figure 3: Distribution of patient's satisfaction present between two groups.

Patient's satisfaction

The post-operative patient's satisfaction (fair/good/poor) of two groups at different periods is summarized in Figure 3. In Group A, patient's satisfaction (fair/good) was 95.8% at immediate postop, 87.5% at 6 week and 41.7% from 6 month to 1 year. In contrast, in Group B, it was present 100.0% at all periods. For each period, comparing the distribution of patient's satisfaction (fair/good/poor) between two groups, χ^2 test showed significantly (p<0.001) different and higher presence of patient's satisfaction in Group B at 6 week, 6 month and 1 year. However, it did not differ (p>0.05) between two groups at immediate postop i.e. found to be statistically the same.

DISCUSSION

The study comprised of 48 patients in total with their random allocation in to two groups. Routine surgery (superficial or total parotidectomy) of parotid tumour was done depending on the tumour extension. In one group of 24 patients parotidectomy (superficial or total) procedure was done and in other group of similar number of 24 patients parotidectomy was followed by reconstruction of defect using superiorly based sternocleidomastoid muscle flap (SCMF). The two groups were followed at immediate post-operative, 6 weeks, 6 months and 1 year on the basis of, cosmetic outcome (visual analog scale), retromandibular, pre-auricular depression, subjective Frey's syndrome and patient's satisfaction.

The age of total patients ranged from 10 to 60 years in both the groups. The mean age of group A (parotidectomy without reconstruction) and group B (parotidectomy with reconstruction using superiorly based sternocleidomastoid muscle flap) was 31.29 years and 29.50 years respectively and median age of 30 years and 25 years respectively. There were no significant differences between the mean ages of two groups on comparison using t test. It can be safely concluded that most of the patients were from young age group and comparable to each other. In group A there were 12 (50%) females and 12 (50%) males while in group B it were 7 (29.2%) females and 17 (70.8%) males respectively. Comparing the sex proportion of the two groups using χ^2 test there was no significant difference and so the two groups were comparable.

In patients without reconstruction the mean in VAS score remain towards higher side (less satisfaction) and similar at all periods while in patients with reconstruction was towards lower side (more satisfaction). Noffal et al found that the partial-thickness superiorly based SCM flap offers a reasonable cosmetic option for reconstruction following either superficial or total parotidectomy by improving the facial deformity.[8] In patients without reconstruction, retromandibular depression was present in 58.3% of patients at immediate post op and 70.8% patients from 6weeks to 1 year. In contrast, in patients with reconstruction, it was absent in 100% at all periods.

In our study, in patients without reconstruction preauricular depression was present in 79.2% patients at immediate post op and 95.8% patients from 6 weeks to 1 year. In contrast, patients with reconstruction it was present in 4.2% at all periods. Subjective Frey's syndrome was present in 8.3% of patients without reconstruction at 6 month follow up while it was absent in patients with reconstruction at 6 months. Nofal et al in their study found that the partial-thickness superiorly

based SCM flap offers a reasonable cosmetic option for reconstruction following either superficial or total parotidectomy by improving the facial deformity.[8] The flap also lowers the incidence of Frey syndrome objectively and subjectively. Gooden et al studied that the sternocleidomastoid muscle flap may play a significant role in reducing the incidence of Frey's syndrome and maintaining facial contour after parotidectomy.[9] For each period, comparing the distribution of patient's satisfaction between two groups it was seen that patients were more satisfied in those cases in which reconstruction was done using superiorly based SCM muscle.

Therefore, in our study we found that there were better postoperative outcomes in patients where reconstruction using superiorly based muscle flap was done. It should be used as a reconstructive technique in patients undergoing parotidectomy for parotid tumours. The aesthetic outcome and complications related to parotidectomy can be minimized using this technique which improves quality of life of patient and better functional outcome.

CONCLUSION

The functional outcome after parotidectomy reconstruction using superiorly based SCM flap appears to be promising technique to overcome functional complications (Frey's syndrome, cosmetic deformity). Our study shows that reconstruction using SCM flap after parotidectomy gave better aesthetic results which must also be considered a major goal in parotid surgery. It has minimal donor site morbidity. This also give better understanding that reconstruction improved the quality of life and lowers frequent OPD attendance which itself is a morbidity.

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