A new evolving incision for partial superficial parotidectomy

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Received May 2018
Accepted July 2018

The Egyptian Journal of Surgery
2018, 37:581–587

Background
The lazy S incision (Blair's incision) is the standard incision for parotidectomy. This incision gives an excellent exposure of the parotid gland, but may leave an ugly cervical scar, which may impair the patient's quality of life. Many incisions had been proposed as alternatives to Blair's incision with the aim of getting a sound scar but without impairing the adequacy of exposure of the operative field. Periauricular incision is one of these incisions which was compared in this study with the standard lazy S incision for partial superficial parotidectomy (PSP) regarding feasibility of the procedure, operative time, postoperative complications, and patient's satisfaction with cosmetic appearance of the scar.

Patients and methods
The present study was a prospective, randomized, controlled study which included 60 patients with the diagnosis of superficial benign parotid lesions who were candidates for PSP. Patients were divided into two groups. Group A included 30 patients who underwent PSP via periauricular incision and group B included 30 patients who underwent PSP via the standard Blair's incision.

Results
Preoperative data of patients were comparable in both groups. PSP was not feasible via the periauricular incision in two (6.66%) patients of group A. Completion of the procedure required adding a hairline incision in these two patients. Operative time was significantly longer in group A compared with group B (P=0.026). Both groups were comparable to each other's regarding postoperative complications. Patient's satisfaction with cosmetic appearance of scar using the visual analog scale was significantly higher in group A compared with group B ($P<0.001$).

Conclusion
PSP can be performed safely via a periauricular incision with a longer operating time, comparable postoperative complications, and significantly higher patient satisfaction with cosmetic appearance of scar compared with the standard Blair's incision.

Keywords:
benign parotid lesion, Blair's incision, partial superficial parotidectomy, periauricular incision

Egyptian J Surgery 37:581–587

1110-1121

Introduction

Lazy S incision (Blair's incision) is the most commonly used incision for parotidectomy [1,2]. This incision provides an excellent exposure of the operative field but may result in bad noticeable scar especially in the neck and may cause cervical or facial disfigurement causing patient's dissatisfaction [2,3]. The quality of life of many patients was adversely affected following surgery of the parotid gland via Blair's incision because of the poor noticeable scar [4]. Patients may reject operative intervention for their parotid masses until they have reached a considerable size or turned malignant for fear of the expected possible poor cosmetic appearance of the surgical scar. Several incisions for parotidectomy have been evolved so as to avoid the cosmetic problems of Blair's incision. These alternative incisions include modified face-lift [5–8], retroauricular [9], periauricular [10,11], and retroauricular hairline incisions [12]. This encouraged us to conduct this study to compare between the use of periauricular incision and the standard lazy S incision in partial superficial parotidectomy (PSP) for superficially located benign parotid tumors regarding feasibility of the procedure, operative time, incidence of complications, and patient's satisfaction with the cosmetic appearance of the surgical scar.

Patients and methods

Study design

This study was a prospective randomized controlled study which included 60 patients with diagnosis of

 DOI: 10.4103/ejs.ejs_101_18

superficial benign parotid tumors (≤4 cm in diameter), who were admitted to the Department of Surgery, Medical Research Institute Hospital, Alexandria University, from March 2013 to March 2017. The patients were divided into two groups. Group A included 30 patients who underwent PSP via a periauricular incision. Group B included 30 patients who underwent PSP via lazy S incision (Blair's incision).

Randomization method

Simple randomization of all candidates in this study was done using computer-generated random numbers.

Preoperative evaluation

Every patient in the present study underwent full history taking, complete physical examination with emphasis on facial nerve examination, and routine laboratory investigations. Ultrasonography of the parotid region was done routinely followed by ultrasound-guided fine-needle aspiration cytology of the parotid lesion to verify benign nature of the tumor. Diffusion-weighted MRI was done selectively when there is doubt about the location of the tumor (possibly deep lobe tumor) and for suspicious lesions of malignancy. Patients with recurrent parotid tumors, preoperative facial nerve affection, deep lobe or combined superficial and deep lobe tumors, and those with large parotid tumors more than 4 cm in diameter were excluded from the study. Every patient in the present study signed an informed consent which included full data about the type of surgery performed, possible complications, and their management.

Surgical technique

Every patient in the present study underwent PSP under general anesthesia with endotracheal intubation. Every patient was placed supine with pillow under his shoulders to extend the neck. The face was turned to the opposite side of the tumor with elevation of the head up. Group A patients underwent PSP via a V-shaped periauricular incision which consisted of a vertical preauricular portion extending along the anterior border of the tragus and then along the ear lobule curving posterior to reach the retroauricular portion about 2 mm posterior to the postauricular sulcus extending along the mastoid process up to middle of the ear [11]. The parotid skin flap was elevated using scalpel and diathermy. Anteriorly dissection did not exceed the anterior border of the gland (where the masseter fascia became visible). Posteriorly, dissection continued till complete exposure of superior portion of the sternomastoid muscle. Parotid was separated posteriorly and inferiorly from the sternomastoid muscle taking care to identify and preserve the posterior branch of the great auricular nerve if possible [13]. The cartilaginous portion of the external ear was separated from the parotid tissue until the tragal pointer was reached. Anterior border of the sternomastoid muscle was completely dissected until the posterior belly of the digastric muscle was clearly identified. The main trunk of the facial nerve was identified followed by antegrade dissection of the facial nerve branch or branches which were related to the tumor without dissection of the remaining facial nerve branches. The tumor was removed with at least 1 cm safety margin of the surrounding normal parotid tissue with preservation of the dissected facial nerve branches and the rest of the superficial lobe was left in place. If the tumor was intimately related to the facial nerve, then enucleation was mandatory to avoid nerve injury. If the tumor ruptured during dissection, the capsular tear was immediately repaired to avoid soiling and the operative field was cleaned properly with saline solution. The parotid duct was left intact without ligation. Hemostasis was done using bipolar diathermy and vicryl 3/0 stitches. Redivac suction drain number 12 was placed routinely in the wound. The wound was closed with subcuticular stitches. Group B patients also underwent PSP but via the standard lazy S incision (Blair's incision) [1,2]. The same operative steps were followed as in group A patients, the difference was only in the type of incision (Blair's incision).

Operative and postoperative course

Operative data for each patient were recorded including the need for extension of the surgical wound, time of the entire procedure; great auricular nerve identification and preservation, if tumor's capsule and facial nerve interface was present and if rupture or spillage of the tumor occurred. Postoperative complications were recorded including facial nerve paralysis (transient or permanent), gustatory sweating (Frey's syndrome), sialocele, wound hematoma or infection, patient's satisfaction with the cosmetic appearance of scar using visual analog scale (VAS) 1 year after the operation to be sure that maturation of the wound was complete, and to detect tumor recurrence if any. The VAS was graded from 0 to 10. Zero grade meant that the patient was not satisfied at all and 10 grade meant that the patient was completely satisfied.

Follow-up

Patients were followed up at the outpatient clinic 10 days, 1, 6, 12 months postoperatively for the assessment of any post-parotidectomy complications and exclusion of any recurrence. Patients with

postoperative complications were followed up at closer intervals until resolution of their complications and then they followed the same follow-up schedule as others.

Statistical analysis [14]

Data were fed to the computer and analyzed using IBM SPSS software package (version 20.0; IBM Corp., Armonk, New York, USA) [15] Qualitative data were described using the number and percent. Quantitative data were described using the range (minimum and maximum), mean, SD, and median. Significance of the obtained results was judged at the 5% level.

The used tests were:

(1) χ^2 test: for categorical variables, to compare between different groups.
(2) Fisher's exact or Monte Carlo correction: correction for χ^2 when more than 20% of the cells have expected a count of less than 5.
(3) Student's t test: for normally distributed quantitative variables, to compare between two studied groups.
(4) Mann–Whitney test: for abnormally distributed quantitative variables, to compare between two studied groups.

Results

Preoperative data of patients in the present study are demonstrated in Table 1. We needed to extend the periauricular incision to a formal face-lift incision in two (6.66%) patients of group A as we could not deliver the tumor via the periauricular incision. The operating time was significantly longer in group A compared with group B (P=0.026). Table 2 showed the operative data of the studied groups. Two patients in every group developed postoperative hematomas which were mild in three patients and managed conservatively, in one patient in group A, surgical evacuation was required at the same operative night and this patient developed transient facial nerve palsy. Three patients (one in

Table 1 Preoperative data of both groups

	Group A (N=30)	Group B (N=30)	Test of significance	P
Age (years)				
Minimum–maximum	20–70	18–70	t=0.328	0.744
Mean±SD	44.2±13.8	43.1±13.7		
Sex				
Male	15 (50)	10 (33.3)	χ^2=1.714	0.190
Female	15 (50)	20 (66.7)		
Tumor's size (cm)				
Minimum–maximum	1–4	1–4	t=0.883	0.381
Mean±SD	2.2±0.8	2.4±0.8		
Tumor's location				
Parotid tail	18 (60)	19 (63.3)	χ^2=0.071	0.791
Preauricular	12 (40)	11 (36.7)		
Pathological variant of the tumor				
Pleomorphic adenoma	16 (53.3)	18 (60)	χ^2=1.664	0.762
Adenolymphoma	12 (40)	10 (33.3)		
Intraparotid lymph node	2 (6.7)	1 (3.3)		
Lymphoepithelial cyst	0 (0)	1 (3.3)		

Qualitative data were described using n (%) and was compared using χ^2, Monte Carlo, or Fisher's exact test. Normally quantitative data were expressed as minimum–maximum and mean±SD. t, Student's t test. P, P value for comparing between the two groups.

Table 2 Operative data of both groups

	Group A (N=30)	Group B (N=30)	Test of significance	P
Operative time (min)				
Minimum–maximum	75–130	60–120	t=2.278*	0.026*
Mean±SD	100.8±13.6	92.5±14.7		
Extension of the surgical incision	2 (6.7)	0 (0)	χ^2=2.069	0.492
Preservation of great auricular nerve (posterior branch)	18 (60)	20 (66.7)	χ^2=0.287	0.592
Capsular rupture	2 (6.7)	2 (6.7)	χ^2=0.00	1.000
Contact with facial nerve	10 (33.3)	7 (23.3)	χ^2=0.739	0.390

Qualitative data were described using n (%)and was compared using χ^2, Monte Carlo, or Fisher' exact test. Normally quantitative data were expressed as minimum–maximum and mean±SD. t, Student's t test. P, P value for comparing between the two groups. *Statistically significant at P value less than or equal to 0.05.

group A and two in group B) developed postoperative sialocele; all patients were treated conservatively via medical treatment and hot fomentations. Frequent aspirations were required in one patient of group B. The sialocele resolved in all patients within 2 months of conservative treatment without the need for surgical evacuation or drain insertion. Patient's satisfaction with cosmetic appearance of scar (VAS) was significantly higher in group A compared with group B ($P<0.001$). Postoperative data of both groups are shown in Table 3. All patients were adherent to the follow-up schedule for 12 months. Figure 1 showed some of the steps of PSP for a 56-year-old female patient in group A with pleomorphic adenoma at the parotid tail via the periauricular incision; Fig. 2 shows pictures of the same patient 1 week after the operation. Figure 3 shows the view of the periauricular incision of a patient in group A, 1 year after the operation.

Discussion

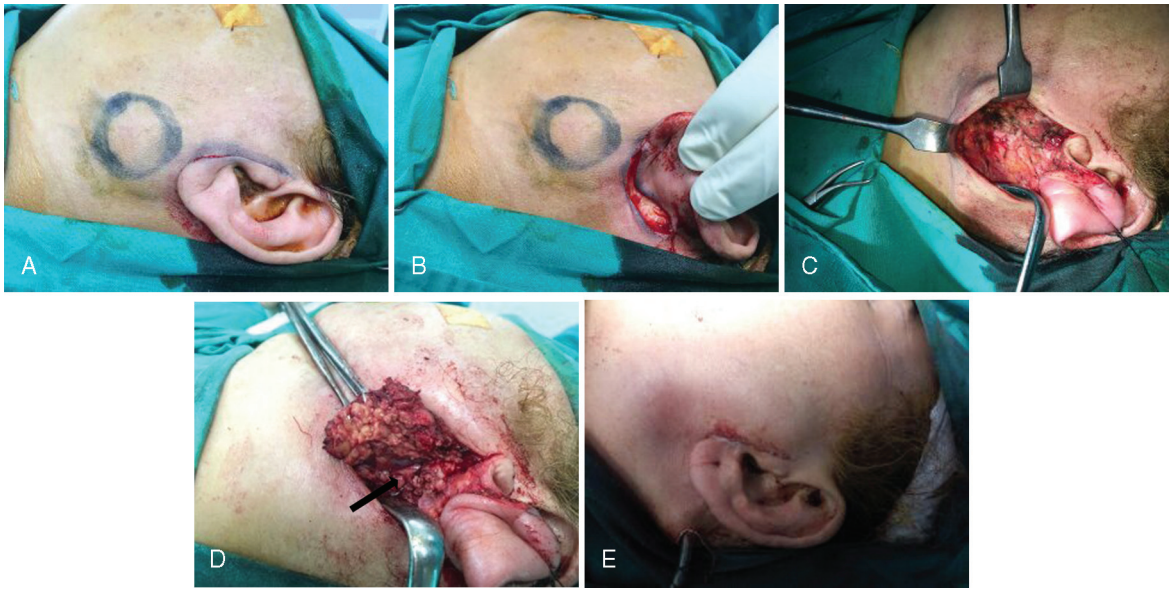
The surgical wound is an important concern among patients who have planned to undergo parotidectomy especially for benign diseases. Parotidectomy has been commonly performed via the standard lazy S incision. The face-lift incision (rhytidectomy) which was proposed by Appiani and Delfino [16] has gained increased popularity over the last 30 years. This incision provides a good exposure of the parotid gland as Blair's incision, but with a more cosmetic

Table 3 Postoperative data of both groups

	Group A (*N*=30)	Group B (*N*=30)	Test of significance	*P*
Postoperative complications				
Facial nerve injury				
Absent	26 (86.7)	27 (90)	χ^2=0.162	1.000
Transient	4 (13.3)	3 (10)		
Permanent	0 (0)	0 (0)		
Sialocele	1 (3.3)	2 (6.7)	χ^2=0.351	1.000
Hematoma	2 (6.7)	2 (6.7)	χ^2=0.00	1.000
Frey's syndrome	0 (0)	0 (0)	–	–
Patient satisfaction with cosmetic appearance of scar (VAS)				
Minimum–maximum	8–10	6–10	*U*=155.0	<0.001*
Mean±SD	8.9±0.7	7.5±1.2		
Recurrence of tumor	0 (0)	0 (0)	–	–

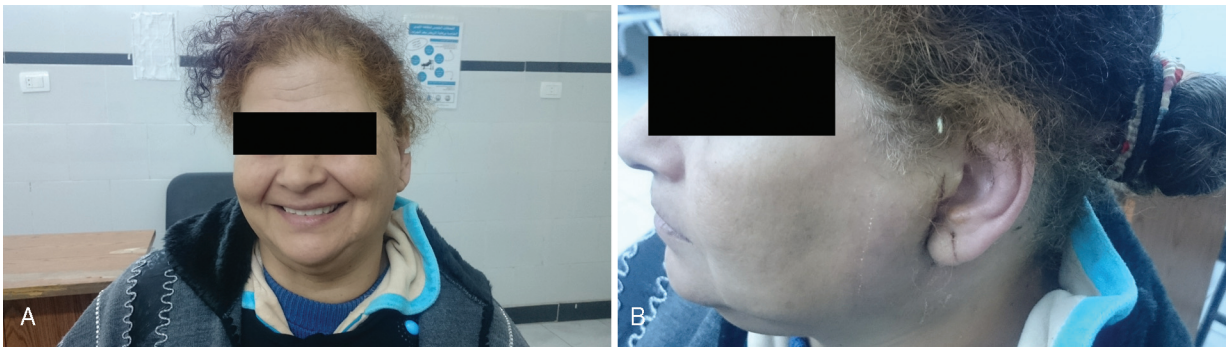
Qualitative data were described using *n* (%) and was compared using χ^2, Monte Carlo, or Fisher's exact test. Normally quantitative data were expressed as minimum–maximum and mean±SD. *U*, Mann–Whitney test. *P*, *P* value for comparing between the two groups. VAS, visual analog scale. *Statistically significant at *P* value less than or equal to 0.05.

Figure 1



(A) Pre-auricular portion of the V shaped peri-auricular incision. (B) Post-auricular portion of the peri-auricular incision. (C) Good exposure of the whole parotid gland. (D) Identification of the main trunk of the facial nerve dividing into upper and lower divisions. (E): Closure with subcuticular sutures after drain insertion.

Figure 2



(A) Front view of a patient one week after the operation showing intact facial nerve. (B) Side view of the same patient 1 week after operation.

Figure 3

(A) Side view of the peri-auricular portion of the scar 1 year after the operation. (B) Healing of the post auricular portion of incision 1 year after the operation.

appearance of the surgical wound [17,18]. The hairline portion of this incision may be associated with keloid and local alopecia. Shemen *et al.* [19], proposed a modification of rhytidectomy incision avoiding the hairline incision and consisting of only preauricular and postauricular portions, thus avoiding subsequent hairline scar. Shemen *et al.* [19] proposed an excellent exposure of the parotid gland via this limited incision. In the present study, we used this incision in patients of group A versus Blair's incision in patients of group B.

The operating time was significantly longer in group A compared with group B (mean of 100.8±13.6 min for group A vs. 92.5±14.7 min for group B). Pagès *et al.* [11], conducted a retrospective study which included 32 parotidectomies via periauricular incision in 31 patients and reported a mean operative time of 115 min with a range from 70 to 180 min [11]. The longer operating time of this study compared with our study was explained by inclusion of different types of parotidectomy (superficial, partial, and total parotidectomies) in their study, while in our study we included only PSPs. Wang *et al.* [20] in their study did not find any significant difference in the operating time of parotidectomy between periauricular incision and the standard lazy S incision. We could not find any explanation of the reported results by the Wang and colleagues study regarding operative time. We thought that our results were more logic regarding the difference between both groups in the operating time as periauricular incision required more flapping and retraction.

In the present study, parotidectomy via the periauricular incision was not feasible in two (6.7%) patients. In these two patients, we added a hairline incision such as the face-lift incision which enabled us to complete the procedure easily and safely. Both patients had exophytic parotid tail lesions and we could not expose the lower edge of the tumor except after extension of the surgical wound. We thought that the accessibility of parotid lesions was not different between periauricular and standard lazy S incision except for inferior parotid lesions especially if they were exophytic as these lesions required more flapping and retraction and if the tumor was much exceeding the lower pole of the parotid gland; access to the lower edge was not feasible except after extension of the wound. The same results were reported by Keskinöz *et al.* [21]. and Ahn *et al.* [22], who reported extension of the periauricular incision to face-lift incision in 13.4 and 6.7% of their patients, respectively, and they attributed wound extension in their patients to inferior location of parotid tumors. Other authors reported successful completion of parotidectomies in their patients via the periauricular incision without extension irrespective of tumor location and the type of parotidectomy performed

[10,11]. We proposed that one of the main advantages of the periauricular incision was that it could be extended easily by adding a hairline or cervical incision if there is any difficulty of the procedure because of the limited incision. This was one of the important points which encouraged us to use the periauricular incision in our institute as there was no fear of failure of the procedure.

In the present study, we included only PSPs with exclusion of other types of parotidectomy similar to the Ahn *et al*. [22] study. Wang *et al*. [20] and Hegazy *et al*. [23], used the periauricular incision for classic superficial parotidectomy. Other authors used the periauricular incision successfully for all types of parotidectomy including total parotidectomies [10,11]. We preferred to use periauricular incision in only PSPs as we did not have any previous experience with this type of incision for parotidectomy prior to this study.

In the present study, both groups were comparable to each other's regarding postoperative complications (facial nerve injury, sialocele, hematoma, and Frey's syndrome). The same results were recorded by Wang *et al*. [20]. Our results in group A regarding transient facial nerve palsy (13.3%) was close to that reported by the Keskinöz *et al*. [21] study (13.04%). Pagès *et al*. [11] reported a high incidence of postprotidectomy transient facial nerve palsy via the periauricular incision (40.6%), while Ahn *et al*. [22], reported a zero incidence. Most of the authors who used periauricular incision for parotidectomy reported no cases of permanent facial nerve palsy [11,19–23]. Petroianu [10] reported three cases of permanent facial nerve palsy (3/39). All these patients were operated by total parotidectomy via the periauricular incision for cancer and the complications were thought to be related to the procedure itself and not to the type of incision.

The authors who used periauricular incision for parotidectomy did not report extracomplications related to this limited incision and proposed that parotidectomies were technically feasible and safe via this incision [10,11,19–23]. We agreed with the results of the previous studies.

The results of the present study were comparable to most of the previous studies regarding patient's satisfaction with cosmetic appearance of the periauricular incision. All the previous studies reported an excellent patient satisfaction with cosmetic appearance of the scar [10,11,19–23].

The main advantages of the present study were its prospective nature and the presence of the control group, while one of the main limitation points was the inclusion of only patients with benign superficial parotid lesions which were candidates for PSPs.

Conclusions and recommendations

PSP can be performed safely via a limited periauricular incision with longer operating time, similar postoperative complications, and better cosmetic appearance of the surgical scar compared with the standard Blair's incision. Several studies with a large number of population are required to evaluate the limited periauricular incision for different types of parotidectomy and in different locations of parotid tumors.

Financial support and sponsorship

Nil.

Conflicts of interest

The are no conflicts of interest.

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