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Parotidectomy for benign parotid tumors: An aesthetic approach

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Abstract Background/aims: The sternocleidomastoid (SCM) partial thickness muscle flap is among the various methods described to correct parotidectomy defects, but its indications and limitations are not clearly demonstrated in several reports. This study was done to test the aesthetic outcome of this method, its indications and limitations. The technique was combined with a face lift incision to further improve the outcome.

Patients and methods: At the National Cancer Institute, Cairo University, Egypt, 23 patients presenting with benign tumors underwent parotidectomy, 19 had superficial parotidectomy and four had total parotidectomy done. The superiorly based (SCM) muscle flap was used to correct the contour deformity. The aesthetic result was evaluated by assessing and scoring the overall appearance of the scar, the degree of symmetry of the reconstructed parotid region and the site of the donor muscle to their contralateral normal sides. The overall aesthetic appearance was then calculated by the summation of the scores of the latter three parameters. Patients’ satisfaction was assessed by patients’ questionnaire.
Result: The overall aesthetic appearance was good in 17 patients, and moderate in six patients. 16/23 patients had an overall deep satisfaction with the result. The residual hollowness of the parotid following reconstruction of the total parotidectomy defect and the poor quality of scars were the main reasons affecting the aesthetic outcome.

Conclusion: Superficial parotidectomy through facelift incision with immediate reconstruction with superiorly based partial thickness SCM flap allows adequate resection of most benign parotid tumors with a satisfactory aesthetic outcome and minimal donor site morbidity.

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Introduction

Salivary gland neoplasms represent 5–7% of all head and neck tumors [1]. Among salivary gland neoplasms, 80% arise in the parotid gland, from which 80% is benign. Pleomorphic adenoma is the most common tumor of parotid gland and represents 60% of all parotid neoplasm [2].

Following conventional parotidectomy using the classic Blair incision (or its modification), a varying degree of cosmetic deformity in the form of visible scar and hollowed out preauricular and infra-auricular defects occur. These together with the Frey’s syndrome constitute the main undesirable consequences of this surgery [3–6]. In addition, numbness of the ear lobule due to sacrifice of great auricular nerve (GAN) can be of great concern to some patients [7].

The surgical methods described in an attempt to prevent those aesthetic consequences, range from various modifications of the incision to different forms of volumetric autogenous soft tissue to fill the parotidectomy defect and at the meantime get interposed between the skin and the parotid bed. Despite few limitations of exposure, the face lift incision has now replaced the modified Blair incision for approaching most benign parotid tumors [8–12]. If the latter approach is combined with a method to replace the soft tissue volume following parotidectomy such as the superficial musculoaponeurotic system (SMAS), the postoperative cosmetic will be much improved [10,12]. Among the various other methods described to fill up the contour defect is the platysma muscle flap [3], dermal-fat interposition grafts [4], temporoparietal fascia flaps [13,14], and free tissue transfer [15,16]. These techniques have their limitations despite the favorable outcomes reported. Nosan et al. [4] noted a 10–15% incidence of fat absorption and liquefaction of free dermal fat grafts in their series of 11 patients. The SMAS layer can often be ill-defined or attenuated especially with large tumors and it may have to be resected in tumors close to the parotid fascia [13,14].

Also when the SMAS and platysma are elevated on the tumor side to fill the defect, there may be an asymmetry created over the neck and cheek regions compared with the nontumor side. A contralateral SMAS rhytidectomy may be then indicated [13].

The additional operation time to dissect a temporoparietal fascia flaps (TPFF) can affect patients with relative contraindications for general anesthesia. Also there is a possibility of a volume defect in the temporal region where part of the temporalis muscle may be elevated [13]. Nonetheless, free flaps should not be used indiscriminately for all defects because of their complexity and the potential donor site morbidity. The sternocleidomastoid muscle flap with its several designs is among the various methods described to fill up the postparotidectomy defect. The partial thickness design which can be based superiorly or inferiorly is the most commonly described variant [6,11,17,18]. It has a lower donor site morbidity compared to the total or full thickness muscle flap design [11,17,19]. Nevertheless, the limitations of its use are not clearly demonstrated in previous studies. The aim of this study is to assess the aesthetic outcome of the superiorly based partial thickness sternocleidomastoid flap in the reconstruction of postparotidectomy defects as regards its indications, limitations and complications. The flap has been combined with a face lift incision to approach the tumor to optimize the aesthetic outcome.

Patients and methods

The present prospective study was conducted in the department of Surgery at the National Cancer Institute in Cairo, Egypt. The approval of the study protocol from the Local Ethical Committee and informed patients’ consents were obtained.

From 2004 to 2008, 23 patients presenting with mobile parotid tumors located in the superficial or deep lobe with no clinical or cytological evidence of malignancy were included in this study. Nineteen patients underwent superficial parotidectomy, and four patients with deep lobe tumors underwent total parotidectomy; all with conservation of facial nerve. Out of the 23 patients, two patients presented with a recurrence following inappropriate treatment of pleomorphic adenoma elsewhere by simple enucleation. Tumor size ranged from 1 to 5 cm in diameter. The incision used in all cases was the standard face lift incision except for the two patients with recurrent tumors who were approached through the previously used Blair’s incision.

Surgical technique

The patient was placed on the operating table in supine position with the head extended and rotated contralaterally and was orally intubated. The incision line was marked. It involves a standard preauricular curvilinear incision which begins at the tragus, going around the inferior border of the lobule and then was continued backwards in the auriculomastoid groove. The superior aspect of the postauricular incision reached to the level of the superior aspect of the mastoid and then was extended posteriorly into the hair line of the neck and then inferiorly along the hairline (Fig. 1a).

After elevation of skin flaps, the GAN was identified over the sternomastoid muscle, and was dissected up towards the lobule of the ear. The nerve normally gives rise to multiple small anterior branches that enter the parotid gland parenchyma. These were sacrificed, while the larger posterior trunk going directly towards the ear lobule was preserved (Fig. 1b).
The facial nerve was then identified using the three standard anatomic landmarks (the tragal pointer, the posterior belly of digastric muscle and the tympanomastoid suture line).

Either superficial parotidectomy with dissection and preservation of facial nerve from underlying parotid tissue, or total conservative parotidectomy in case of deep lobe parotid tumors was done (Fig. 1b).

Following parotidectomy, the length of the muscle flap required to reach the surgical defect was measured from the mastoid tip. Superior partial thickness SCM flaps was raised to a depth of approximately one-third of the muscle and one third to one-half of its length depending on the measured distance to the defect. The muscle was left attached to the mastoid. The elevated flap was then brought to the surgical area and sutured to the edge of the SMAS with 4/0 non-absorbable sutures (Fig. 1c). The wound was closed in two layers over a suction drain which was then removed when the drain fluid is minimal (Fig. 1d).

Patients were evaluated for facial nerve dysfunction, tumor recurrence, wound complications, the integrity of the great auricular nerve, manifestations of Frey’s syndrome, and the presence of any disturbance of neck movements due to muscle transfer. Patients were followed up for three years.
The aesthetic result was evaluated after one year by two independent surgeons assessing the following parameters; the overall appearance of the scar, the degree of symmetry of the reconstructed parotid region to the normal contralateral side, and the symmetry of the site of the donor muscle to the contralateral normal side of the neck. The appearance of the scar was rated as either good (score of 3), moderate (score of 2), or bad (score of 1). The symmetry of both the reconstructed parotid region and the site of the donor sternomastoid postoperatively to their contralateral normal sides (as a control) were each rated separately as follows; minimal asymmetry (score of 3), moderate asymmetry (score of 2), and marked asymmetry (score of 1). The overall aesthetic appearance was then calculated by the summation of the scores of the three previously measured parameters and was rated as either good (score of 8–9), moderate (score of 6–7), or poor (score of 3–5). In addition, patients' satisfaction with the aesthetic outcome after one year was subjectively assessed by patients' questionnaire asking about; the quality of the scars and the ease to hide them by a particular hair style, the degree of symmetry between both parotid regions, and the degree of symmetry of both sides of the neck (Fig. 1e). The overall satisfaction of patients was rated as deeply satisfied, just satisfied, or poorly satisfied.

Results

A total of 23 patients (9 males and 14 females) with a mean age of 41 years were included in this study. Postoperative pathology revealed clear margins and complete resection of all tumors. Pleomorphic adenoma represented the commonest histopathology (78%). Warthins tumor was found in the remaining five specimens. Transient facial nerve dysfunction occurred only in two patients who recovered spontaneously within 4 months. In addition, one patient developed salivary fistula which was managed conservatively. No evidence of injury to the spinal accessory nerve was reported. The posterior branch of the GAN could be preserved in 21 cases (91%) without compromising adequate respectability of the tumors.

Three patients from the latter 21 patients had numbness at the ear lobe which improved within 6 weeks. The remaining 18 patients maintained adequate sensation at their earlobes.

No patient reported symptoms of Frey’s syndrome such as gustatory sweating and all patients showed no evidence of local tumor recurrence till the end of the follow-up period.

Figure 1e  Front view of the patient. Note the symmetry of the contour of the parotid region on both sides of the face.

Figure 2a  Three months postoperative lateral view for the second patient. Note the hardly visible scar.

Figure 2b  Three months postoperative front view. Note the minimal asymmetry between both parotid regions and both sides of neck.
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The overall aesthetic appearance as assessed by the two surgeons was good in 17 patients (74%), moderate in 6 patients (26%) and no patient had an overall poor score (Figs. 1a–1e, 2a and 2b). The four patients that underwent total parotidectomy scored poorly in terms of symmetry between the reconstructed parotid region and the contralateral normal side. Two other patients developed keloid scars and showed only mild improvement with steroid injections. They scored poorly in terms of the overall scar appearance. Nevertheless, in the latter two groups (six patients); the overall aesthetic appearance was down scored to moderate only. The asymmetry between the external appearances of site of the donor muscle to the contralateral side was minimal in 20 patients (87%) and moderate in three (13%). Indeed, there was no reported affection of movements of the neck or signs of injury to the spinal accessory nerve. On the other hand, patients’ questionnaire about the aesthetic outcome showed that 16 patients (69%) had an overall deep satisfaction with the result (Figs. 1a–1e, 2a and 2b). Two of the four patients who underwent total parotidectomy were just satisfied and two were poorly satisfied. Another patient was just satisfied because of wide scar and moderate neck asymmetry between both sides of the neck. The two patients who developed keloid scars were poorly satisfied because of the keloid scars which showed only mild improvement with steroid injections.

Discussion

The time honored Blair incision was first introduced in 1912, and was then modified by Bailey in 1941 and is commonly referred to as modified Blair’s incision and is one of the commonest incisions that have been used for decades [20].

The standard face lift introduced by Appiani and Delfino was then modified by Terris and associates by extending the incision posteriorly in the postauricular crease to cross the occipital hairline and to descend adjacent to or within the hairline for a distance of 6 cm [8,9]. This incision allows exposure of small to moderate sized lesions of the parotid gland [5].

Anatomic studies have confirmed that the exposure obtained by the Blair’s incision is equal to that obtained by the standard face lift incision [21]. We agree with all the proponents of the face lift approach or its modifications that they normally allow sufficient exposure for resection of benign parotid tumors with the added benefit of a better cosmetic outcome. Nevertheless, in patients with larger parotid lesions or in cases presenting with parapharyngeal tumors, some authors consider that the face lift approach is impractical. [9,10]. Moreover, in patients undergoing extirpation of a recurrent tumor, the original skin incision should be used to avoid further scarring and possible skin necrosis [11]. It was appropriate to approach the recurrent tumors in this study through the previously used classical modified Blair’s incision.

The extent of the contour deformity following parotidectomy varies greatly among patients depending on the tumor size, tumor location and the body habitus [11]. Several designs of the sternocleidomastoid muscle have been used to correct this deformity. The muscle can be used based inferiorly on its lower pedicle (a branch from the thyrocervical trunk) [5,18,19]. It can be partially split along its whole length and mobilized as an open book to be advanced medially as a bipedicled flap, or a partial thickness flap based superiorly on its superior pedicle from the occipital artery [6,11,17,22].

Kim et al. used the superficial portion of the sternocleidomastoid with the parotid fascia connected to it anteriorly and the platysma connected to it inferiorly; the flap was then reflected forward and rotated and sutured to the temporal fascia, filling the defect [3]. Some authors took the whole muscle in very large defects [19].

In the current study we have used the superiorly based, partial thickness muscle flap to correct medium sized depressions following superficial parotidectomies. In terms of postoperative symmetry between both parotid regions, all this subset of patients had a good score (score of 3). Similar results were reported by others [11,17]. The technique is easy, simple and adds only 15 min to the operative time.

In the initial phase of this study, we have used the same technique to reconstruct the resulting defect following deep lobe parotidectomy in four patients. The asymmetry between both sides of the face due to the residual hollowness at the retromandibular area was evident few months after surgery. We have then decided to use only the present technique in superficial (lateral) parotidectomy defects only. The overall subjective satisfaction of patients in the current study was much affected by one poor parameter such as marked asymmetry of both parotid regions or the development of keloid scars. The latter parameters have overshadowed any better satisfaction with the other parameters. This is in contrast to the semi quantitative scoring system by the independent surgeons in which a poor score for one parameter did not result in an overall poor aesthetic score because of a higher score for the other two parameters. Perhaps by combining the outcome of both objective and subjective assessments, a more accurate evaluation will come out. Nonetheless, not all poor consequences such as development of keloids may be known preoperatively in order to be avoided. Chow et al. have recommended using the whole muscle in reconstructing total parotidectomy defects [19]. Harvesting the whole sternocleidomastoid muscle bulk would leave an unsightly donor site defect in the neck and creates an obvious asymmetry between both sides of the neck [15,16]. Asymmetry was only minimal in most patients in the current study as only the superficial part of the muscle was harvested. Similar results were reported by others [11,17]. Moreover, with superficial sternocleidomastoid flap, the risk of injury to the spinal accessory nerve is minimized than if the whole muscle is taken. There was neither an injury reported in the current study nor in other studies using either the superficial inferiorly based or superiorly based design [6,11,17].

We agree with Biglioli et al. that for very large and deep defects free vascularized adipofascial tissues should be used as the subsequent muscle atrophy due to muscle denervation is inevitable [16]. Alternatively, other muscle flaps with larger bulk such as gracilis with 20-30% overcorrection to compensate for the future decrease in volume can be also utilized [15].

Rhee et al. mentioned that whether superiorly based or inferiorly based superficial sternocleidomastoid muscle flap was used, optimal correction of moderate-sized contour defects was achieved, and that the choice between the two techniques was based on surgeon’s preference and can’t be justified on strong scientific evidence [11].

In the current study, we have chosen the superiorly based muscle flap as we believe that the dissection was technically easier. Both designs were used in a single report by Bugis et al. [5].
The latter authors mentioned that the superiorly based flap reaches further than the zygomasuperiorly and mid-masseter anteriorly, but selection criteria was not clearly demonstrated in their study.

However, a prospective randomized trial to evaluate the superiority of one design over the other may have to be carried out.

The sternocleidomastoid flap’s role in minimizing Frey’s syndrome has been controversial. Some authors have questioned this role [17,18,23], while others reports have proven its benefit [6].

In the current study, despite that none of our patients reported complaints suggestive of Frey’s syndrome, neither the duration of follow up in this study nor the performance of an objective testing are sufficient to prove the flap’s potential benefit in this regard.

In conclusion, superficial parotidectomy through facelift incision together with immediate reconstruction of the contour defect with superiorly based superficial sternocleidomastoid flap reconstruction allows adequate and safe resection of most benign parotid tumors with a good aesthetic outcome and minimal donor site morbidity. Further studies should be done to evaluate the superiority of either a superiorly based or an inferiorly based partial thickness muscle design over the other.

References


