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Comparison of Postoperative Facial Nerve Palsy in Primary versus Revision Surgery for Parotid Gland Pleomorphic Adenoma

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Abstract: ***Background:*** Pleomorphic adenoma is the most common benign tumor of the parotid gland and is typically managed through surgical excision, most commonly superficial parotidectomy. ***Objective:*** To compare the incidence of postoperative facial nerve palsy in patients undergoing primary versus revision superficial parotidectomy for pleomorphic adenoma of the parotid gland. ***Methods:*** This descriptive case series was conducted in the ENT-II Department of Allama Iqbal Medical College/Jinnah Hospital Lahore from May 2025 to September 2025. A total of 115 patients aged 18–80 years with a confirmed diagnosis of pleomorphic adenoma based on clinical evaluation, FNAC, and radiological imaging were included using a consecutive sampling technique. All patients underwent superficial parotidectomy as either a primary or revision procedure. Preoperative facial nerve function was confirmed to be normal using the House–Brackmann grading system. Postoperative facial nerve function was assessed immediately after surgery using the same grading system. ***Results:*** A total of 115 patients were included with a mean age of 46.8 ± 13.2 years. Among them, 67 (58.3%) were male and 48 (41.7%) were female. Primary superficial parotidectomy was performed in 106 (92.2%) patients, while 9 (7.8%) underwent revision surgery. Postoperative facial nerve palsy was observed in 18 (15.7%) patients overall. The incidence of facial nerve palsy was higher in the revision surgery group (44.4%) compared with the primary surgery group (13.2%), and this difference was statistically significant ($p = 0.03$). ***Conclusion:*** Revision surgery for pleomorphic adenoma of the parotid gland is associated with a significantly higher risk of postoperative facial nerve palsy compared with primary surgery.

Keywords: Postoperative, Facial nerve palsy, Primary surgery Pleomorphic adenoma

INTRODUCTION

Salivary gland tumors, especially pleomorphic adenoma (PA], is one of the frequent benign neoplasms that occurs as a result of the epithelial and myoepithelial cell [1]. This tumor, also referred to by multiple names as, a mixed tumor, branchioma, enclavoma, endochroma [2], and has a wide range of morphological aspects at the microscopic level [3]. The main treatment is surgery, including parotidectomy [4], which is associated with the risk of facial nerve paralysis [5], which affects the quality of life of patients [6]. Although the surgical methods have progressed, there is still ambiguity in the occurrence and outcome of postoperative facial nerve palsy in primary surgeries and revision surgeries in parotid gland pleomorphic adenoma. Paralysis of the facial nerve after parotidectomy may show a condition of transient paresis or, with fewer cases, permanent incapability. The transient nerve of the face paralysis in revised superficial parotidectomy is reported to have a global rate of 15-66 percent, with greater rates in total parotidectomy as opposed to primary superficial parotidectomy [7]. There are few cases of permanent facial nerve paralysis (2.5%-5% occurrences) [8]. The causes of these complications include nerve stretching, compression, ischemia or possibly surgical trauma of vasa nervorum [9]. Additional risks of parotid surgeries are the Frey syndrome, hematoma, keloid scarring, and salivary fistula that further leads to the importance of reducing the number of complications in these surgeries [10].

After initial parotidectomy, general revision surgery rates in pleomorphic adenoma are reported as 8.4% in a 10 year single-centre retrospective study. Tumor recurrence was the most frequent sign indicating revision should be done [11]. The pleomorphic adenoma has been reduced to less than 5% occurrence through the use of better surgical procedures such as superficial or partial parotidectomy which was done to ensure maximum excision of the tumor without compromising the functional and anatomical integrity of the facial nerve [12]. Nevertheless, revision surgeries have up to 15-30% chance of peripheral nerve damage because of scar tissue and anatomical malformation [13]. In up to 76% of cases, temporary dysfunction of the facial nerve may occur, whilst in rare cases, permanent paralysis may occur, including 3% or less, even in expert hands [14]. Revision surgeries thus require specialized surgical plans to reduce these risks and improve patient outcomes. A study conducted in Pakistan by Musani and Zafar [2015] cited that 28 percent of the patients had temporary facial nerve dysfunction after parotidectomy, and the international rate was 26.6 percent [15]. This high rate of revision surgery shows the psychological and quality-of-life effects of these complications [16]. Although the development of surgical procedures and facial nerve-saving strategies has enhanced the outcome, the actual differences between primary and revision surgeries on the occurrence of nerve palsy after the operation are not clearly understood. Although the number of studies carried out to explore the outcome of parotidectomy is rising, there is a significant gap in the literature on the comparative study of the occurrence of postoperative facial nerve palsy between primary and revision surgeries. Past studies have largely addressed recurrence rates, general surgical techniques, and tumor-related factors, as opposed to systematically evaluating nerve outcomes by surgical situation. To narrow this gap, a detailed study is required that provides practical knowledge on the reduction of postoperative complications.

Objective

This study aims to compare the incidence, severity, and recovery timeline of facial nerve palsy in patients undergoing primary versus revision superficial parotidectomy for pleomorphic adenoma. To compare the incidence of facial nerve palsy in primary versus revision superficial parotidectomy for parotid gland pleomorphic adenoma

METHODOLOGY

This descriptive case series was conducted in the ENT-II Department of Allama Iqbal Medical College/Jinnah Hospital, Lahore from May 2025 to September 2025. A total sample size of 115 cases was calculated using a 95% confidence level, 5% margin of error, and an expected proportion of revision surgery of 8.1%. A consecutive sampling method was used in the recruitment of the patients. The patients were sampled based on set inclusion and exclusion criteria. The study included adult male and female patients aged between 18-80 years with a known diagnosis of pleomorphic adenoma according to the fine needle aspiration cytology (FNAC) and radiological imaging procedures including ultrasound, CT scan, or MRI. The patients who had normal superficial parotidectomy as a primary and as a revision procedure were enrolled, whereas the patients who involve extensive resection of the adjacent structures were excluded. Patients were screened out in case they had any amount of preoperative facial nerve dysfunction as judged by the house-Brackmann system. Patients, who refused to sign the informed consent after a thorough explanation of the study protocol, were also not included. As well, individuals who had systemic diseases like diabetes mellitus, hypertension, or neurological conditions that have the potential to impair nerve functioning or recovery were excluded. Other synchronous head and neck tumors in patients identified by clinical examination and preoperative imaging were also not excluded. Additionally, patients classified as unfit based on anesthetic assessment (ASA physical status classification III or higher) were excluded from the study.

Data Collection

Data were gathered at the ENT-II Department of Jinnah Hospital, Lahore, after receiving institutional ethical review board approval and obtaining informed consent from all respondents via a self-administered structured questionnaire. The patients admitted via the outpatient department and diagnosed with parotid gland pleomorphic adenoma and scheduled for superficial parotidectomy were enrolled in the study. Pleomorphic adenoma diagnosis was made based on clinical examination, FNAC, and radiographic imaging, including CT or MRI of the head and neck. In all patients, intact facial nerve function was achieved through preoperative assessment. The standard technique of superficial parotidectomy was used in all surgical operations. During the operation, the superficial part of the parotid gland above the facial nerve branches was removed as one block with the tumor. The identification and preservation of the facial nerve were performed with great care, using standard surgical landmarks. Monitoring of the facial nerve during the surgery was performed by visual observation and careful dissection by the surgeon performing the operation, with assistance from another surgeon. The immediate postoperative assessment of the facial nerve functions was done with the help of the House-Brackmann system. The postoperative cases of facial nerve palsy were then compared between patients who had primary parotidectomy and revision surgery.

Data Analysis

All collected data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics were applied to summarize the data. Age was presented as mean ± standard deviation, while categorical variables such as gender, type of surgery (primary or revision), and postoperative facial nerve palsy were presented as frequencies and percentages. The Chi-square test was used to compare the incidence of postoperative facial nerve palsy between primary and revision surgery groups. A p-value of less than 0.05 was considered statistically significant. Data were further stratified according to age and gender, and post-stratification Chi-square testing was applied to evaluate potential effect modification.

RESULTS

A total of 115 patients undergoing superficial parotidectomy for pleomorphic adenoma were included in the study. The mean age of the participants was 46.8 ± 13.2 years. Most patients were in the 41–60 years age group (52, 45.2%), followed by 18–40 years (39, 33.9%) and 61–80 years (24, 20.9%). Male patients constituted the majority of the study population with 67 (58.3%) cases, while females accounted for 48 (41.7%). Regarding the type of surgical procedure, most patients underwent primary superficial parotidectomy (106, 92.2%), whereas revision surgery was performed in 9 (7.8%) patients.

Table 1: Demographic Characteristics, Surgical Type, and Postoperative Facial Nerve Palsy Among Patients (n = 115)

Variable	Category	n (%) / Mean ± SD
Age (years)	—	46.8 ± 13.2
Age Group	18–40 years	39 (33.9)
	41–60 years	52 (45.2)
	61–80 years	24 (20.9)
Gender	Male	67 (58.3)
	Female	48 (41.7)
Type of Surgery	Primary superficial parotidectomy	106 (92.2)
	Revision superficial parotidectomy	9 (7.8)
Postoperative Facial Nerve Palsy	Present	18 (15.7)
	Absent	97 (84.3)

Comparison of postoperative facial nerve palsy between surgical groups showed that facial nerve palsy occurred in 14 (13.2%) patients undergoing primary surgery and in 4 (44.4%) patients undergoing revision surgery. The difference between the two groups was statistically significant (p = 0.03), indicating a higher risk of facial nerve palsy in revision surgery. Stratification by gender showed that facial nerve palsy occurred in 11 (16.4%) male patients and 7 (14.6%) female patients, with no statistically significant difference between genders (p = 0.78). Similarly, analysis according to age groups revealed facial nerve palsy in 5 (12.8%) patients aged 18–40 years, 9 (17.3%) patients aged 41–60 years, and 4 (16.7%) patients aged 61–80 years, with no significant association between age group and postoperative facial nerve palsy (p = 0.83).

Table 2: Comparison and Stratification of Postoperative Facial Nerve Palsy by Surgery Type, Gender, and Age Group (n = 115)

Variable	Category	Facial Nerve Palsy Present n (%)	Facial Nerve Palsy Absent n (%)	Total n (%)	p-value
Type of Surgery	Primary surgery	14 (13.2)	92 (86.8)	106 (92.2)	
	Revision surgery	4 (44.4)	5 (55.6)	9 (7.8)	0.03
Gender	Male	11 (16.4)	56 (83.6)	67 (58.3)	
	Female	7 (14.6)	41 (85.4)	48 (41.7)	0.78
Age Group	18–40 years	5 (12.8)	34 (87.2)	39 (33.9)	
	41–60 years	9 (17.3)	43 (82.7)	52 (45.2)	
	61–80 years	4 (16.7)	20 (83.3)	24 (20.9)	0.83

Among the 18 patients who developed postoperative facial nerve palsy, the majority had mild dysfunction classified as House–Brackmann grade II, accounting for 9 (50.0%) cases. Moderate dysfunction (grade III) was observed in 6 (33.3%) patients, while moderately severe dysfunction (grade IV) occurred in 3 (16.7%) patients.

Table 3: Distribution of Facial Nerve Palsy According to House–Brackmann Grade (n = 18)

House–Brackmann Grade	Clinical Description	n (%)
Grade II	Mild dysfunction	9 (50.0)
Grade III	Moderate dysfunction	6 (33.3)
Grade IV	Moderately severe dysfunction	3 (16.7)

DISCUSSION

The most frequent benign tumor of the parotid gland is pleomorphic adenoma that is treated mainly by surgical excision, most often superficial parotidectomy. Despite the fact that surgery has a good prognosis and low chances of recurrence when done well, preservation of the facial nerve is one of the most problematic issues in parotid surgery. The facial nerve crosses through the parotid gland and the branches could be in a close relation to the tumor, hence prone to damage during dissection. Facial nerve palsy after the surgery thus is among the most impactful complication of parotidectomy and may severely influence the quality of life and functional outcomes. Postoperative facial nerve palsy was found in 15.7 percent of patients who underwent superficial parotidectomy on pleomorphic adenoma in the present study. The result matches those of other studies recorded previously according to which the facial nerve dysfunction rates were recorded between 10 and 30 percent after surgery on the parotid glands. Facial nerve palsy that was witnessed in the majority of cases in this study were temporary and were associated with mild to moderate dysfunction based on House Brackmann grading. Facial nerve weakness is likely to be transient and caused by manipulation, traction, edema, or neuropraxia of the nerve branches of the facial nerve during dissection. Luckily, the majority of such cases can be resolved slowly throughout the postoperative period of recovery [17].

One of the major results of this study was that the incidence of facial nerve palsy was much higher in revision surgery than in primary surgery. The postoperative facial nerve palsy case rate was 13.2 in patients who have primary parotidectomy performed and it was 44.4 in patients who had revision surgery due to recurrence of pleomorphic adenoma [18]. This difference brings out the greater complexity of revision parotid surgery. Past surgical operations usually lead to fibrosis and scarring of the normal anatomical landmarks and thus identification and conservation of the facial nerve is much more challenging. Furthermore, the recurrent pleomorphic adenoma can manifest through multifocal nodules, which are closely related or attached to the branches of the facial nerves, thus putting the patient at risk of nerve damage during the process of dissection [19].

Increased cases of facial nerve palsy have also been reported in previous research in case of revision surgery. Recurrent pleomorphic adenoma is a serious surgical complication since in the first surgery the tumor capsule can still rupture or in the microscopic extensions the microscopic tumor can be left behind in the parotid tissue causing recurrence. In cases of to revision surgery, the surgeon has to deal with scar tissue and distorted anatomy, and this greatly contributes to the risk of facial nerve dysfunction [20]. These results accentuate that proper and well-thought-out primary surgery is crucial to reduce tumor recurrence and prevent the need of revision surgery. The present study did not indicate statistically significant results for stratifying postoperative facial nerve palsy by age and gender. It indicates that demographics might not be a significant factor in understanding the risk of facial nerve injury during parotid surgery. Rather, surgical variables such as tumor location, extent of dissection, surgeon experience, and prior surgical scarring may be more significant factors in postoperative nerve outcomes [2,4].

The clinical implications of the study's findings are significant. The use of revision parotid surgery requires surgeons to be extremely careful since the chances of facial nerve damage are quite high compared to the first operations. Close inspection of the major branch of the facial nerve, precise dissection techniques, and the conservation of anatomical identifiers are all necessary measures to reduce nerve injuries. Besides it, intraoperative facial nerve monitoring could also be used as an added help to locate nerve branches and minimize the possibility of nerve damage during complicated interventions. There are a number of limitations to this study that ought to be taken into consideration when interpreting the findings. To begin with, the research was conducted in a single tertiary care facility with a relatively small sample size, which may limit the overall applicability of the findings to other populations and healthcare settings. Second, a descriptive case series design is incapable of providing robust causal conclusions about factors related to postoperative facial nerve palsy. Third, comparatively few patients had undergone revision surgery compared with those who had undergone primary surgery, a factor that may affect the statistical power of the comparison between the two groups. Also, the postoperative facial nerve function was measured primarily in the immediate postoperative period, and long-term follow-up was not incorporated to evaluate temporary and permanent cases of facial nerve palsy. Lastly, other possible surgical variables, such as tumor size, the precise position of the tumor in the parotid gland, the surgeon's experience, and the use of intraoperative nerve monitoring, had not been examined and might also be incorporated into postoperative nerve outcomes. The study should be followed by future multicenter studies using larger sample sizes and longer follow-ups to further elucidate the relationship between primary and revision parotid surgery and the occurrence of facial nerve dysfunction.

CONCLUSION

It is concluded that postoperative facial nerve palsy is a notable complication of superficial parotidectomy

for pleomorphic adenoma. The incidence of facial nerve dysfunction was significantly higher in patients undergoing revision surgery compared with those undergoing primary surgery. Revision procedures are technically more challenging due to scar formation and distortion of anatomical landmarks, which increases the risk of nerve injury. Therefore, meticulous surgical technique and careful identification of facial nerve branches are essential, particularly during revision surgery.

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