e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 81-86

Original Research Article

A Comparative Analysis of Total and Near-Total Parotidectomy: Surgical Outcomes and Complications

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Received: 04-04-2026 / Revised: 04-05-2026 / Accepted: 05-06-2026

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Conflict of interest: Nil

Abstract:

Background: Parotidectomy remains the standard treatment for a variety of benign and malignant parotid gland lesions. However, the extent of gland excision may influence postoperative morbidity, particularly facial nerve dysfunction. This study compared the surgical outcomes and complications associated with total and near-total parotidectomy.

Material and Methods: A retrospective comparative study was conducted on 94 patients who underwent parotidectomy between January 2018 and December 2024. Patients were divided into a total parotidectomy group (n=46) and a near-total parotidectomy group (n=48). Demographic characteristics, operative parameters, postoperative complications, facial nerve function, and oncological outcomes were analyzed and compared.

Results: The baseline demographic and clinical characteristics were comparable between the groups. Near-total parotidectomy was associated with significantly shorter operative time (136.2±23.4 vs. 154.8±26.5 minutes; p=0.001), reduced hospital stay (4.3±1.2 vs. 5.2±1.4 days; p=0.002), and shorter drain duration (2.8±0.8 vs. 3.4±0.9 days; p=0.001). Temporary facial nerve weakness occurred significantly less frequently following near-total parotidectomy than total parotidectomy (10.4% vs. 28.3%; p=0.028). Overall postoperative complications were also significantly lower in the near-total parotidectomy group (20.8% vs. 43.5%; p=0.019). Permanent facial nerve weakness, Frey's syndrome, salivary fistula, seroma, hematoma, and surgical site infection were less common after near-total parotidectomy, although these differences were not statistically significant. Negative surgical margins (90.9% vs. 91.7%) and local recurrence rates (9.1% vs. 8.3%) were comparable between the groups.

Conclusion: Near-total parotidectomy was associated with reduced postoperative morbidity and improved perioperative outcomes while maintaining oncological effectiveness comparable to total parotidectomy. It may therefore be considered a safe and effective surgical alternative in appropriately selected patients.

Keywords: Parotidectomy; Near-total parotidectomy; Total parotidectomy; Facial nerve dysfunction; Frey's syndrome; Salivary gland tumors.

DOI: 10.25258/ijcpr.18.6.16

Introduction

Parotid gland lesions constitute the majority of salivary gland neoplasms and encompass a broad spectrum of benign and malignant pathologies. Although most parotid tumors are benign, surgical excision remains the primary treatment modality because of the risk of continued growth, local complications, and the potential for malignant transformation in selected lesions [1,2].

Parotidectomy is one of the most frequently performed procedures in salivary gland surgery. The extent of gland resection is determined by tumor location, histopathological characteristics, and the need to achieve adequate oncological clearance while preserving facial nerve function. Current recommendations emphasize complete tumor excision with negative margins, particularly in malignant disease, where total parotidectomy is often considered the standard surgical approach for achieving optimal local control [3].

Despite advances in surgical techniques, preservation of the facial nerve remains a major challenge because the extratemporal facial nerve traverses the parotid gland and is intimately related to its superficial and deep lobes. Facial nerve

dysfunction continues to represent one of the most significant postoperative complications, with varying rates reported depending on tumor characteristics, extent of surgery, and surgeon experience [4].

In addition to facial nerve injury, other postoperative complications such as Frey's syndrome, salivary fistula, hematoma, seroma, and surgical site infection may adversely affect patient outcomes and quality of life. Frey's syndrome, characterized by gustatory sweating and flushing in the parotid region, remains a well-recognized late complication following parotid surgery despite refinements in operative techniques [5].

Increasing attention has therefore been directed toward more conservative parotidectomy techniques that seek to minimize postoperative morbidity without compromising oncological safety. Recent evidence comparing more limited gland resections with conventional approaches has suggested that preservation of uninvolved parotid tissue may reduce surgical complications while maintaining satisfactory disease control in appropriately selected patients [6].

Given the continuing debate regarding the optimal extent of parotid gland excision, the present study aimed to compare the surgical outcomes and postoperative complications associated with total parotidectomy and near-total parotidectomy, with particular emphasis on facial nerve function, perioperative morbidity, and oncological adequacy.

Materials and Methods

Study Design and Setting: This retrospective comparative observational study was conducted in a tertiary care teaching hospital. Medical records of patients who underwent surgical management for parotid gland lesions were reviewed.

Study Population: A total of 94 patients who underwent either total parotidectomy or near-total parotidectomy during the study period were included. Patients were divided into two groups according to the surgical procedure performed:

- Group A: Total Parotidectomy (n = 46)
- Group B: Near-Total Parotidectomy (n = 48)

Inclusion Criteria

1. Patients aged ≥18 years.
2. Histopathologically confirmed benign or malignant parotid gland lesions requiring surgical excision.
3. Patients who underwent primary total or near-total parotidectomy.
4. Availability of complete clinical, operative, and follow-up records.

Exclusion Criteria

1. Revision parotid surgery.
2. Patients with pre-existing facial nerve palsy.
3. Metastatic lesions involving the parotid gland.
4. Incomplete medical records or loss to follow-up before 6 months.
5. Cases requiring intentional sacrifice of the facial nerve due to extensive tumor involvement.

Preoperative Assessment: All patients underwent detailed clinical examination, ultrasonography of the parotid region, and contrast-enhanced computed tomography or magnetic resonance imaging whenever indicated. Fine-needle aspiration cytology was performed preoperatively in all cases to aid surgical planning. Baseline facial nerve function was documented using the House–Brackmann grading system.

Surgical Technique: All procedures were performed under general anesthesia by experienced head and neck surgeons.

Total Parotidectomy: Complete excision of both superficial and deep lobes of the parotid gland was performed with identification and preservation of the facial nerve whenever oncologically feasible.

Near-Total Parotidectomy: Near-complete gland excision was undertaken while preserving a minimal cuff of uninvolved parotid tissue adjacent to critical facial nerve branches to reduce manipulation-related morbidity without compromising surgical clearance. Intraoperative facial nerve monitoring was used whenever available. Closed suction drains were placed in all patients and removed according to postoperative drainage output.

Outcome Measures: The primary outcomes assessed were:

1. Temporary facial nerve dysfunction.
2. Permanent facial nerve dysfunction (persisting beyond 6 months).
3. Frey's syndrome.
4. Salivary fistula formation.
5. Seroma or hematoma.
6. Surgical site infection.
7. Tumor recurrence.

Secondary outcomes included:

1. Operative duration (minutes).
2. Length of hospital stay (days).
3. Histopathological diagnosis.
4. Margin status in malignant lesions.

Follow-Up: Patients were evaluated at 1 week, 1 month, 3 months, and 6 months postoperatively. Facial nerve function was assessed at each follow-up visit using the House–Brackmann grading system. Recurrence was determined through clinical examination and radiological assessment whenever indicated.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) version 26.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Comparisons between the two groups were performed using the independent Student's t-test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. A p-value <0.05 was considered statistically significant.

Results

The demographic and baseline clinical characteristics of the study population are presented in Table 1. The mean age of patients in the total parotidectomy group was 48.7 ± 13.2 years compared with 47.1 ± 12.5 years in the near-total parotidectomy group (p=0.548). Males constituted 56.5% of patients in the total parotidectomy group and 58.3% in the near-total parotidectomy group. The distribution of benign and malignant lesions, tumor size, and laterality was comparable between the two groups, with no statistically significant differences observed (Table 1).

Histopathological examination revealed pleomorphic adenoma as the most common lesion in both groups, accounting for 52.2% of cases in the total parotidectomy group and 54.2% in the near-total parotidectomy group. Warthin tumor was the second most frequent diagnosis. Malignant tumors included mucoepidermoid carcinoma, acinic cell carcinoma, adenoid cystic carcinoma, and carcinoma ex pleomorphic adenoma. The histopathological distribution of lesions is summarized in Table 2.

Comparison of operative parameters demonstrated significantly shorter operative duration in patients undergoing near-total parotidectomy. The mean operative time was 154.8 ± 26.5 minutes in the total parotidectomy group compared with 136.2 ± 23.4 minutes in the near-total parotidectomy group (p=0.001). Similarly, mean hospital stay was significantly reduced in the near-total parotidectomy group (4.3 ± 1.2 days) compared with the total parotidectomy group (5.2 ± 1.4 days) (p=0.002). Drain duration was also significantly shorter among patients who underwent near-total parotidectomy (2.8 ± 0.8 days versus 3.4 ± 0.9 days; p=0.001) (Table 3).

Postoperative complications are detailed in Table 4. Temporary facial nerve weakness was the most common complication and occurred significantly more frequently following total parotidectomy than near-total parotidectomy (28.3% vs. 10.4%; p=0.028). Permanent facial nerve weakness was observed in 8.7% of patients undergoing total parotidectomy and 2.1% of those undergoing near-total parotidectomy; however, this difference did not reach statistical significance (p=0.172). Frey's syndrome was reported in 13.0% and 4.2% of patients in the total and near-total parotidectomy groups, respectively. Salivary fistula occurred in 10.9% of patients undergoing total parotidectomy compared with 4.2% in the near-total parotidectomy group. Rates of seroma, hematoma, and surgical site infection were low and comparable between the groups. Overall postoperative complications were significantly more common in the total parotidectomy group than in the near-total parotidectomy group (43.5% vs. 20.8%; p=0.019) (Table 4).

Assessment of facial nerve function at 6 months postoperatively demonstrated favorable outcomes in both groups. House–Brackmann Grade I function was achieved in 91.3% of patients following total parotidectomy and 97.9% following near-total parotidectomy. Residual Grade III and Grade IV dysfunction was observed only in the total parotidectomy group (Table 5).

Among patients with malignant parotid tumors, negative surgical margins were achieved in 91.7% of cases treated with total parotidectomy and 90.9% of cases treated with near-total parotidectomy. Local recurrence during follow-up was documented in one patient from each group. Disease-free status at the last follow-up was comparable between the groups, with no statistically significant difference observed in oncological outcomes (Table 6).

Table 1: Baseline Demographic and Clinical Characteristics of Study Participants

Variable	Total Parotidectomy (n=46)	Near-Total Parotidectomy (n=48)	p-value
Age (years), Mean ± SD	48.7 ± 13.2	47.1 ± 12.5	0.548
Male, n (%)	26 (56.5)	28 (58.3)	0.857
Female, n (%)	20 (43.5)	20 (41.7)	0.857
Benign lesions, n (%)	34 (73.9)	37 (77.1)	0.718
Malignant lesions, n (%)	12 (26.1)	11 (22.9)	0.718
Tumor size (cm), Mean ± SD	3.8 ± 1.4	3.6 ± 1.3	0.472
Right-sided lesion, n (%)	25 (54.3)	27 (56.3)	0.845
Left-sided lesion, n (%)	21 (45.7)	21 (43.7)	0.845

Table 2: Histopathological Distribution of Parotid Lesions

Histopathology	Total Parotidectomy (n=46)	Near-Total Parotidectomy (n=48)
Pleomorphic adenoma	24 (52.2)	26 (54.2)
Warthin tumor	8 (17.4)	9 (18.8)
Basal cell adenoma	2 (4.3)	2 (4.2)
Mucoepidermoid carcinoma	5 (10.9)	4 (8.3)
Acinic cell carcinoma	3 (6.5)	3 (6.3)
Adenoid cystic carcinoma	2 (4.3)	2 (4.2)
Carcinoma ex pleomorphic adenoma	2 (4.3)	2 (4.2)

Table 3: Intraoperative and Postoperative Outcomes

Variable	Total Parotidectomy (n=46)	Near-Total Parotidectomy (n=48)	p-value
Operative time (minutes), Mean ± SD	154.8 ± 26.5	136.2 ± 23.4	0.001
Hospital stay (days), Mean ± SD	5.2 ± 1.4	4.3 ± 1.2	0.002
Drain duration (days), Mean ± SD	3.4 ± 0.9	2.8 ± 0.8	0.001

Table 4: Comparison of Postoperative Complications

Complication	Total Parotidectomy (n=46)	Near-Total Parotidectomy (n=48)	p-value
Temporary facial nerve weakness	13 (28.3)	5 (10.4)	0.028
Permanent facial nerve weakness	4 (8.7)	1 (2.1)	0.172
Frey's syndrome	6 (13.0)	2 (4.2)	0.127
Salivary fistula	5 (10.9)	2 (4.2)	0.261
Seroma	4 (8.7)	3 (6.3)	0.651
Hematoma	2 (4.3)	1 (2.1)	0.532
Surgical site infection	3 (6.5)	2 (4.2)	0.624
Total complications	20 (43.5)	10 (20.8)	0.019

Table 5: Facial Nerve Function According to House–Brackmann Grade at 6 Months

House–Brackmann Grade	Total Parotidectomy (n=46)	Near-Total Parotidectomy (n=48)
Grade I	42 (91.3)	47 (97.9)
Grade II	2 (4.3)	1 (2.1)
Grade III	1 (2.2)	0 (0.0)
Grade IV	1 (2.2)	0 (0.0)

Table 6: Oncological Outcomes in Malignant Tumors

Variable	Total Parotidectomy (n=12)	Near-Total Parotidectomy (n=11)	p-value
Negative surgical margins	11 (91.7)	10 (90.9)	0.947
Local recurrence during follow-up	1 (8.3)	1 (9.1)	0.934
Disease-free at last follow-up	11 (91.7)	10 (90.9)	0.947

Discussion

The present study evaluated the surgical outcomes and complications associated with total parotidectomy and near-total parotidectomy in patients with parotid gland lesions. The findings demonstrated that near-total parotidectomy was associated with significantly shorter operative duration, reduced hospital stay, shorter drain retention, and a lower incidence of temporary facial nerve dysfunction and overall postoperative complications. Importantly, oncological outcomes remained comparable between the two groups.

The demographic characteristics and pathological distribution were similar between the study groups, thereby minimizing the influence of baseline confounding factors. Pleomorphic adenoma was the most common histopathological diagnosis, consistent with contemporary reports indicating that benign tumors constitute the majority of surgically treated parotid lesions [7].

Facial nerve preservation remains the principal concern during parotid surgery because postoperative nerve dysfunction can significantly affect both functional status and quality of life. In the present study, temporary facial nerve weakness occurred significantly less frequently following near-total parotidectomy than total parotidectomy. Similar observations have been reported by Liu et al., whose meta-analysis demonstrated lower rates of both temporary and permanent facial nerve palsy

with more conservative parotid resection techniques compared with more extensive gland excision [8]. Likewise, Ruas et al. identified facial nerve dysfunction as one of the most frequent complications following parotidectomy and emphasized the importance of minimizing nerve manipulation during surgery [9].

Permanent facial nerve weakness was uncommon in both groups and did not differ significantly. This finding is consistent with the report by Salih et al., who observed relatively low rates of permanent facial paralysis following parotid surgery when meticulous nerve identification and preservation techniques were employed [10]. Similar favorable outcomes have also been reported in studies utilizing intraoperative facial nerve monitoring during parotidectomy [11].

The significantly shorter operative time observed in the near-total parotidectomy group may be explained by the reduced extent of gland dissection and less extensive exposure of distal facial nerve branches. A comparative study by Liu and colleagues demonstrated that less extensive parotid resections were associated with shorter operative duration and lower surgical morbidity while maintaining satisfactory tumor control in selected benign lesions [12]. These observations support the findings of the present study.

Frey's syndrome remains a recognized late complication following parotid surgery. Although the difference was not statistically significant in our study, Frey's syndrome occurred less frequently after near-total parotidectomy. Roh reported that preservation and appropriate closure of residual parotid tissue may reduce the development of Frey's syndrome by limiting aberrant parasympathetic reinnervation of overlying sweat glands [13]. The lower incidence observed in the present study may therefore be attributable to the preservation of a small amount of uninvolved glandular tissue.

Other postoperative complications, including salivary fistula, seroma, hematoma, and surgical site infection, were numerically less frequent in the near-total parotidectomy group. Although statistical significance was not achieved for individual complications, the cumulative complication rate was significantly lower. This overall reduction in morbidity is consistent with contemporary evidence suggesting that conservative parotid surgery may decrease tissue trauma and postoperative wound-related complications [8,12].

An important finding of the present study was the comparable oncological effectiveness of both procedures. Negative surgical margins and local recurrence rates did not differ significantly between the groups. These findings suggest that near-total parotidectomy can provide adequate disease control in appropriately selected patients while reducing postoperative morbidity. Nevertheless, extensive malignant tumors, deep lobe involvement, and lesions with suspected facial nerve infiltration continue to require more radical surgical approaches to ensure optimal oncological clearance [14].

The present study has several limitations. Its retrospective design introduces the possibility of selection bias, and the relatively modest sample size may have limited the ability to detect significant differences in less common complications. Furthermore, the duration of follow-up may not have been sufficient to identify all late recurrences. Prospective multicenter studies with larger cohorts and longer follow-up periods are warranted to further clarify the role of near-total parotidectomy in contemporary parotid surgery.

Conclusion

Near-total parotidectomy demonstrated favorable surgical outcomes with significantly shorter operative duration, reduced hospital stay, and a lower incidence of temporary facial nerve dysfunction and overall postoperative complications compared with total parotidectomy. Although rates of permanent facial nerve weakness, Frey's syndrome, and salivary fistula were lower following near-total parotidectomy, these differences were not statistically significant. Importantly, both surgical approaches achieved comparable oncological outcomes with similar rates of negative surgical margins and tumor recurrence. These findings suggest that near-total parotidectomy may represent a safe and effective alternative to total parotidectomy in appropriately selected patients, offering reduced postoperative morbidity while maintaining adequate disease control.

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