ISSN: 3049-7361

Research Article

Journal of Clinical Surgery and Anesthesia

Clinical Outcomes and Complications of Parotidectomy for Pleomorphic Adenoma Tumour

Sameh Mezri[1,2], Jihene Gharsalli[1*], Mariem Haddeji[1] and Khemaies Akkari[1,2]

[1]ENT department of military hospital of Tunis, Tunisia
[2]University of Tunis El Manar, Tunisia

[*]Corresponding author
Jihene Gharsalli, ENT department of military hospital of Tunis, Tunisia.

Received: September 02, 2024; **Accepted:** September 10, 2024; **Published:** September 16, 2024

ABSTRACT

Objective: To evaluate the clinical and surgical outcomes in patients treated for pleomorphic adenoma (PA) of the parotid gland.

Methods: This retrospective study covered 100 PA cases from 2000 to 2018, all confirmed by histopathology and with at least 24 months of follow-up. Statistical analysis was performed using Student's t-test, Pearson's Chi-square test, and Fisher's exact test, with a significance level of 0.05.

Results: The average patient age was 42±12 years, with an even sex ratio. Parotid swelling was the main symptom (94%), with an average tumor size of 2.5 cm. Most tumors were in the superficial lobe (94 cases), and there were 3 bilateral cases. Surgical approaches included superficial exofacial parotidectomy (55 cases), total parotidectomy (25 cases), partial exofacial parotidectomy (14 cases), and enucleation (6 cases). Complications occurred in 49 patients, with postoperative facial paralysis (FP) being the most common (20%). Total parotidectomy had a higher transient FP rate (24%) compared to exofacial parotidectomy (11%). Four recurrences were noted, mainly after enucleation or exofacial parotidectomy.

Statistical analysis showed significant associations: exofacial parotidectomy had the highest complication rate (47%) and was linked to permanent FP ($p=0.02$). Total parotidectomy was associated with Frey's syndrome ($p=0.01$), partial exofacial parotidectomy with salivary fistula ($p<0.001$), and enucleation with tumor recurrence ($p<0.001$).

Conclusions: Superficial exofacial parotidectomy is common but associated with complications. Total parotidectomy is linked to Frey's syndrome, while partial exofacial parotidectomy and enucleation have specific risks of salivary fistula and recurrence. Careful selection of surgical technique is crucial to minimize complications and recurrence.

Keywords: Pleomorphic Adenoma, Parotid Gland, Facial Nerve, Recurrence, Parotidectomy

Introduction

Pleomorphic adenoma (PA) is a benign mixed tumor composed of epithelial and myoepithelial cells. The parotid gland is the most common location for PAs, accounting for 60% of cases, with the majority (80%) found in the superficial lobe [1].

PA is a benign tumor that grows slowly but has a 3-4% risk of becoming malignant [1,2]. This risk increases over time, reaching up to 10% after 15 years, making surgery necessary [1].

Surgery for PA of the parotid gland is debated [3-6]. Some advocate for complete removal, while others recommend a less invasive approach. This choice affects potential complications, including recurrence, degeneration, and facial paralysis (FP).

Our study aims to evaluate the outcomes of each surgical technique regarding tumor recurrence and postoperative complications.

Materials and Methods

We conducted a longitudinal retrospective study including 100 cases of PAs of the parotid gland operated on. The data collection covered the period from January 2000 to January 2018. Included patients were those who underwent primary surgery for PA of the parotid gland, had histopathological confirmation, and had a minimum postoperative follow-up of 24 months. Excluded patients were those with a history of surgery in the parotid region

Citation: Sameh Mezri, Jihene Gharsalli, Mariem Haddeji, Khemaies Akkari. Clinical Outcomes and Complications of Parotidectomy for Pleomorphic Adenoma Tumour. J Clin Surg Anesth. 2024. 2(3): 1-5. DOI: doi.org/10.61440/JCSA.2024.v2.17

(including the parotid gland, intra-parotid lymph nodes, cysts, etc.), incomplete or unusable medical records (missing surgical report, histopathological examination report, or postoperative clinical examination data), less than 24 months of postoperative follow-up, and those who did not consent to the study.

The evaluation of transient postoperative facial paralysis was conducted using the Freyss test, while the grading of House and Brackmann was the scale adopted for permanent facial paralysis.

We used the Student's t-test to compare quantitative variables, assuming equal variances and the Pearson's Chi-square test (χ^2) and Fisher's exact test (if theoretical counts were less than 5) to compare qualitative variables, with a significance level of 0.05.

Results

The patients' clinical presentation is represented in Table 1.

Table 1 : Summary of clinical presentation of the population

Patients' characteristic	Result
Age	42±12 years
Sex-ratio	1
Average consultation delay	31.9 months
reason for consultation	Parotid swelling (94% of cases) (Figure1)
Average tumor size	2.5 cm
Location	Bilateral tumor in three cases

Figure 1: Photos of a patient presenting a swelling of the left parotid

All our patients underwent radiological exploration. Cervical ultrasound was, most commonly, used as initial radiological exam (92% of cases). MRI was requested for 84 of our patients, supplemented by diffusion and perfusion sequences in 32 of them. CT scan was performed for two patients; one was claustrophobic and the other one had a pace-maker. This assessment led to a suspected diagnosis of PA and allowed the classification of the tumor based on its location: PA of the superficial lobe in 94 cases and the deep lobe in six cases. The appearance of the tumor was characterized in 64 cases, by hypointensity on T1-weighted images (T1WI), hyperintensity on T2-weighted images (T2WI), and heterogeneous enhancement after gadolinium injection (Figure 2).

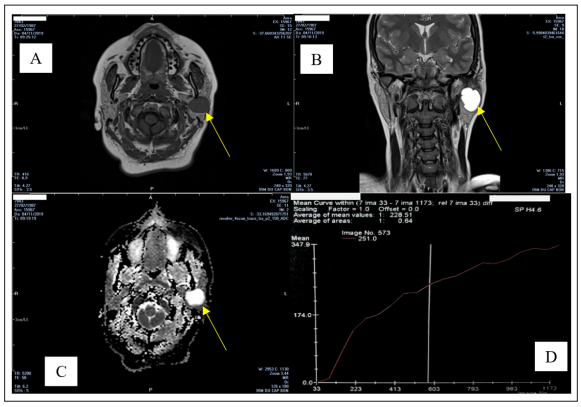

Figure 2: Pleomorphic adenoma of the left parotid gland (yellow arrow) with hypointensity on T1WI (A), hyperintensity on T2WI (B), hyperintensity on diffusion (ADC > 1,2) (C) and type a curve on perfusion (D)

Superficial exofacial parotidectomy was chosen in 55 cases. The remaining cases were divided as follows: 25 total parotidectomies, 14 partial exofacial parotidectomies (Cover figure), and six enucleations.

The resection was judged macroscopically complete in 98% of cases. Intraoperative frozen section analysis was performed in 94% of cases, supporting a PA diagnosis in 46% of cases. Histopathological examination confirmed the histological nature of the tumor in all cases (Figure 3).

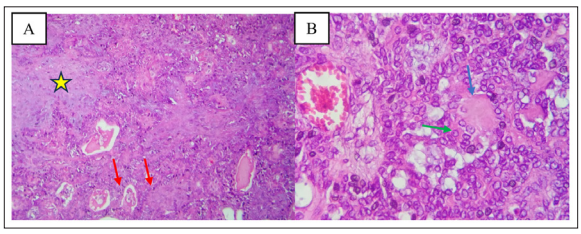

Figure 3: Hematoxylin and eosin stain at low magnification (x100) (A): Pleomorphic adenoma featuring an epithelial component (red arrows) within a chondromyxoid matrix (yellow star) and at high magnification (x400) (B): Dual epithelial (green arrow) and myoepithelial (blue arrow) components.

The minimum follow-up period for our patients was 24 months. Forty-nine complications were recorded: 20 cases of peripheral FP, six cases of Frey's syndrome, two cases of salivary fistulas, four cases of auricular lobule anesthesia, ten cases of retromandibular depressions, two keloid scars, and four recurrences. No malignant transformations were observed in our serie.

Postoperative FP was the most common complication, affecting 20% of patients and accounting for 41% of all complications. Among 20 cases of postoperative FP, 14 were transient (70% of cases). The lower territory (cervical branch of the facial nerve) was the most affected (10 out of 14 cases). FP was permanent in six patients (6% of all cases and 30% of postoperative FP cases).

Regarding transient FP, there were eight cases of mild paralysis with a score between 20 and 30 according to the Freyss test, and moderate paralysis (score between 10 and 20) in nearly one-third of the cases (5 cases). Severe paralysis (score <10) occurred in one case. Partial exofacial parotidectomy resulted in two cases

of transient PFP. Additionally, 24% of total parotidectomies were complicated by transient PFP compared to 11% of exofacial parotidectomies.

Patients were treated with systemic corticosteroids for an average duration of seven days. Ten patients underwent facial motor physiotherapy. The paralysis resolved within five to 21 days after surgery

Concerning permanent FP, 4 cases were classified as grade III according to the House and Brackmann classification. The other two permanent facial paralyses were classified as grade IV and grade V, respectively.

In 83% of cases (5 cases), permanent facial paralysis followed an exofacial parotidectomy, while it complicated only one total parotidectomy.

The tumors were larger than three centimeters in four cases (2/3 of cases). In one case, identifying the facial nerve trunk was described as challenging due to bleeding (the patient was on anticoagulants), and in another case, the tumor had capsular rupture.

Two of our patients underwent surgery to improve the sequelae of facial paralysis, classified as grades IV and V in the House and Brackmann classification. The first patient underwent tarsorrhaphy to address ophthalmologic complications, while the second patient underwent canthopexy and myoplasty with temporal muscle transposition in the same operation. The results were deemed partially satisfactory.

Frey's syndrome was secondary to a total parotidectomy in 2/3 of the cases. The average time of onset was 4.8 months. Therapeutic abstention was opted in all cases.

Salivary fistula, followed a partial exofacial parotidectomy in both cases. The outcome after drainage and compressive dressing, showed the disappearance of the fistulas.

A depression in the retro-mandibular region was noted in 10 cases (10% of patients), primarily affecting men. In all cases, the tumor was larger than 3 cm. Retro-mandibular depression followed exofacial parotidectomy in six cases (60%) and total parotidectomy in the remaining cases. Two patients had the surgical cavity filled with a sternocleidomastoid muscle (SCM) flap.

Permanent anesthesia of the ear lobe region was reported by 4% of patients. Two cases followed a total parotidectomy and two an exofacial parotidectomy.

A keloid scar was reported in two cases following partial exofacial parotidectomy. These patients received intradermal injections of corticosteroid, with a satisfactory result in one case.

Four cases of tumor recurrence were noted following either an enucleation (50%) or an exofacial parotidectomy (50%). These patients were aged 25, 39, 59, and 62 years. These recurrences were observed after an average of 5.5 years. Intraoperatively, a minimal tumor residue was left in one case due to its intimate relationship with the facial nerve, and a capsular rupture was noted in another case. Two of these patients underwent successful reoperation.

Statistical comparison of complications after each surgical technique revealed significant associations:

Exofacial parotidectomy had the highest complication rate with 23 adverse events (47% of complications). A statistically significant association was observed between exofacial parotidectomy and permanent FP (five out of six cases, $p = 0.02$).

Eighteen complications followed total parotidectomy, accounting for two-thirds of Frey's syndrome cases in our series ($p = 0.01$).

More minimalist techniques were less commonly performed, but a statistically significant association was found between salivary fistula and partial exofacial parotidectomy ($p<0.001$).

Enucleation was responsible for 50% of recurrence cases, with a statistically significant correlation ($p<0.001$).

Discussion

PA is the most frequent benign tumor of the parotid gland (70%), typically presenting as a painless swelling [7]. Surgical treatment is necessary due to the risk of malignant transformation, reported between 1.4% and 6.4% [2,7]. The best surgical technique for superficial adenomas remains debated. We examined postoperative complications and recurrence among different techniques.

FP is the most dreaded complication due to its functional and aesthetic impacts. Transient FP can recover within six months, caused by nerve stretching, trauma, or edema [8,9]. It occurs in 8%-65% of surgeries, more frequently after total parotidectomy [1,3,4,10]. In our series, 24% of total parotidectomies had transient FP, compared to 11% of exofacial parotidectomies. Permanent FP, less common at 3%-4%, is due to severe nerve trauma or ischemia [9]. Risk factors include total parotidectomy and repeated surgeries [4-6]. Continuous intraoperative facial nerve monitoring reduces FP risk, severity and improves recovery [11].

Frey's syndrome, another reported complication, presents as redness and sweating during meals due to aberrant nerve reinnervation. It emerges 6-12 months postoperatively and complicates 35%-60% of parotidectomies [9,12]. In our study, it occurred in 16% of total parotidectomies and 4% of superficial exofacial parotidectomies.

Earlobe hypoesthesia, indicating great auricular nerve damage, occurs in about 30% of cases [13]. Symptoms often improve within a few years [14]. In our series, four patients had permanent earlobe anesthesia.

Salivary fistulas, occurring in about 4% of patients, are a main risk in partial exofacial parotidectomy [15]. Two cases in our series were associated with this technique (14% of partial exofacial parotidectomies) with a strong statistical relationship ($p<0.001$). Most resolve with conservative treatment; resistant cases are treated with botulinum toxin A[16].

Retromandibular depression, an aesthetic complication, correlates with the volume of the removed tissue. Techniques

like temporalis fascia flap and vascularized fat grafts can reduce depression [17].

Keloid scarring is a late complication causing aesthetic concerns, treated with corticosteroid injections.

Recurrence of PA typically occurs within 5-10 years post-surgery, sometimes extending beyond 20 years [18]. Recurrence increases malignancy risk and complicates reoperation, often leading to permanent FP [18]. Factors influencing recurrence include patient age (higher risk under 40), tumor characteristics (deep lobe involvement, contact with facial nerve, size >3 cm), and initial excision quality [6,19-21]. Residual disease was more common with patients who underwent enucleation [21]. Capsular rupture significantly increases recurrence risk [22]. Our study confirmed these findings; with 50% of recurrences occurred in patients under 40, a minimal tumor residue was left in one case due to its intimate relationship with the facial nerve, and a capsular rupture was noted in another case.

PA can transform into adenocarcinoma or myoepithelial carcinoma in 1.4%-6.2% of cases, with risk increasing over time and with recurrences [2]. Carcinoma ex-PA can occur in 1.5% of cases at 5 years and 9.5% of cases at 15 years [23]. The risk is higher in recurrences and incomplete initial treatments, supporting extensive initial surgery [24]. No malignant transformations were observed in our serie.

Conclusions

Despite the development of new surgical techniques, no clear consensus has emerged regarding the choice of parotidectomy type for PAs.

PAs of the parotid gland, although benign, require surgical treatment to prevent recurrence and malignant transformation. The choice of treatment must consider factors such as patient characteristics, tumor location, and size.

Recent studies support less invasive surgery. Extracapsular dissection without facial nerve dissection is recommended for small, superficial pleomorphic adenomas, provided that simultaneous facial nerve monitoring is available.

Acknowledgements: none.

Conflicts of Interest: There was no conflict of interest.

Funding: This research received no specific grant from any funding organization.

Authors' Contributions

Sameh Mezri: Conception and design, Analysis and interpretation of the data, Supervision, Review and editing
Jihene Gharsalli: Conception and design, Acquisition of the data, Analysis and interpretation of the data, Drafting of the article
Mariem Haddeji: Conception and design, Acquisition of the data, Analysis and interpretation of the data, Drafting of the article
Khemaies Akkari: Critical revision of the article for important intellectual content, Final approval of the article

Ethical Consideration

This study was approved by the Institutional Ethics Committee (please specifiy name of the Military Hospital of Tunis (71/2024).

The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Written informed consent was obtained from each participant/patient for study participation and data publication.

References

1. Bonfils P. Tumeurs des glandes salivaires. EMC - Oto-rhino-laryngologie. 2007. 2: 1-18.
2. Olsen KD, Lewis JE. Carcinoma ex pleomorphic adenoma: A clinicopathologic review. Head & Neck. 2001. 23: 705-712.
3. Kilavuz AE, Songu M, Pinar E, Ozkul Y, Ozturkcan S, et al. Superficial parotidectomy versus partial superficial parotidectomy: a comparison of complication rates, operative time, and hospital stay. Journal of Oral and Maxillofacial Surgery. 2018. 76: 2027-2032.
4. Schapher M, Koch M, Agaimy A, Goncalves M, Mantsopoulos K, et al. Parotid pleomorphic adenomas: factors influencing surgical techniques, morbidity, and long-term outcome relative to the new ESGS classification in a retrospective study. Journal of Cranio-Maxillofacial Surgery. 2019. 47: 1356-1362.
5. Xie S, Wang K, Xu H, Hua RX, Li TZ, et al. PRISMA Extracapsular Dissection Versus Superficial Parotidectomy in Treatment of Benign Parotid Tumors: Evidence From 3194 Patients. Medicine. 2015. 94: e1237.
6. Mantsopoulos K, Scherl C, Iro H. Investigation of arguments against properly indicated extracapsular dissection in the parotid gland. Head & Neck. 2017. 39: 498-502.
7. Pawar RT, Nitnaware AZ, Patel SV, Rekhade TS. Clinical profile and management of pleomorphic adenoma of head neck: our experience. International Journal of Otorhinolaryngology and Head and Neck Surgery. 2019. 5: 1615.
8. Laskawi R, Schott T, Mirzaie-Petri M, Schroeder M. Surgical management of pleomorphic adenomas of the parotid gland: a followup study of three methods. Journal of oral and maxillofacial surgery. 1996. 54: 1176-1179.
9. Guntinas-Lichius O, Gabriel B, Peter Klussmann J. Risk of facial palsy and severe Frey's syndrome after conservative parotidectomy for benign disease: analysis of 610 operations. Acta Oto-Laryngologica. 2006. 126: 1104-1109.
10. Achour I, Chakroun A, Rhaiem ZB, Charfeddine I, Hammami B, et al. Chirurgie de l'adénome pléomorphe de la parotide. Revue de Stomatologie, de Chirurgie Maxillo-faciale et de Chirurgie Orale. 2015. 116: 129-131.
11. Liu H, Wen W, Huang H, Liang Y, Tan X, et al. Recurrent pleomorphic adenoma of the parotid gland: intraoperative facial nerve monitoring during parotidectomy. Otolaryngology–Head and Neck Surgery. 2014. 151: 87-91.
12. Liu HT, Jiang WP, Xia G, Liao JM. Evaluation of the effectiveness of superficial parotidectomy and partial superficial parotidectomy for benign parotid tumours: a meta-analysis. Journal of Otolaryngology-Head & Neck Surgery. 2023. 52: 40463-41023.

13. Marshall AH, Quraishi SM, Bradley PJ. Patients' perspectives on the short- and long-term outcomes following surgery for benign parotid neoplasms. J Laryngol Otol. 2003. 117: 624-629.
14. Min HJ, Lee HS, Lee YS, Jeong JH, Cho SH, et al. Is it necessary to preserve the posterior branch of the great auricular nerve in parotidectomy? Otolaryngology Head and Neck Surgery. 2007. 137: 636-641.
15. Upton DC, McNamar JP, Connor NP, Harari PM, Hartig GK. Parotidectomy: ten-year review of 237 cases at a single institution. Otolaryngology Head and Neck Surgery. 2007. 136: 788-792.
16. Chow T, Kwok S. Use of botulinum toxin type A in a case of persistent parotid sialocele.
17. Zwetyenga N, Audion M, Gardet H, Siberchicot F. Parotidectomie conservatrice pour tumeur bénigne: résultats sur la qualité de vie à long terme. Revue de Stomatologie, de Chirurgie Maxillo-faciale et de Chirurgie Orale. 2015. 116: 18-22.
18. Société Française d'Oto-Rhino-Laryngologie et de Chirurgie de la Face et du Cou. Prise en charge de l'adénome pléomorphe. Recommandations pour la pratique clinique. Paris: SFORL. 2020.
19. Wittekindt C, Streubel K, Arnold G, Stennert E, Guntinas-Lichius O. Recurrent pleomorphic adenoma of the parotid gland: analysis of 108 consecutive patients. Head & Neck: Journal for the Sciences and Specialties of the Head and Neck. 2007. 29: 822-828.
20. Malard O, Wagner R, Joubert M, Delemazure AS, Rio E, et al. Prognostic factors for secondary recurrence of pleomorphic adenoma: a 20-year, retrospective study. The Journal of Laryngology & Otology. 2013. 127: 902-907.
21. Espinosa CA, Fernández-Valle Á, Lequerica-Fernández P, de Villalaín L, de Vicente JC. Clinicopathologic and surgical study of pleomorphic adenoma of the parotid gland: analysis of risk factors for recurrence and facial nerve dysfunction. Journal of Oral and Maxillofacial Surgery. 2018. 76: 347-354.
22. Zbären P, Stauffer E. Pleomorphic adenoma of the parotid gland: Histopathologic analysis of the capsular characteristics of 218 tumors. Head & Neck. 2007. 29: 751-757.
23. Antony J, Gopalan V, Smith RA, Lam AK. Carcinoma ex pleomorphic adenoma: a comprehensive review of clinical, pathological and molecular data. Head and neck pathology. 2012. 6: 1-9.
24. Chen CP, Wang SJ, van Zante A, Yom SS. Stepwise regional and distant progression of recurrent pleomorphic adenoma. J Otolaryngol Head Neck Surg. 2011. 40: 5-10.