

An Audit of Parotid Gland Surgeries in Kano, Nigeria: A Review of 34 Cases

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Abstract

Background: Neoplasms both benign and malignant are the most common indications for parotidectomy. About 70%–80% of all salivary gland tumours are located in the parotid gland with up to 80% being benign. Parotidectomy is a common surgical procedure performed by the otorhinolaryngologist and oral and maxillofacial surgeons. **Aims:** This study aimed to document our experience on parotid gland surgeries, and occurrence of facial nerve palsy. **Materials and Methods:** The records of all patients that had parotidectomy between January 2014 and December 2018 were evaluated. Demographic, clinical and operative data were retrieved and analysed using Statistical Product and Service Solution version 23.0 software (SPSS Inc., Chicago, Illinois, USA). **Results:** A total of 34 cases were reviewed and there were 12 (35.3%) males and 22 (64.7%) females with a male-to-female ratio of 1:1.8 and mean age \pm standard deviation of 39.3 ± 18.4 years. Patients with primary disease constituted the majority 29 (85.3%) in this series. Most of them (26, 76.5%) had superficial parotidectomy. Cervicomastoidfacial incision was the most preferred incision employed among 33 (97.1%) of our patients. Complication following surgery was observed in 12 (35.3%) patients. Majority, 7 (63.6%), had temporary facial nerve paresis. Pleomorphic adenoma was the most common histological diagnosis noted in 19 (55.9%) patients postoperatively. There is a statistically significant association between fine-needle aspiration cytology (FNAC) findings and final histological diagnosis. **Conclusion:** Pre-operative FNAC could be a reliable tool in the evaluation of our patients being prepared for parotidectomy even in our resource-poor setting.

Keywords: Facial nerve palsy, parotidectomy, pleomorphic adenoma

INTRODUCTION

Salivary glands are divided into major and minor glands based on the size of the glands, the largest among being the parotid gland. The parotid gland is a primarily serous gland within which the extratemporal facial nerve and its branches transverse to the sites of innervation. The surgical removal of part or the entirety of the gland is referred to as parotidectomy. While removal of the superficial lobe of the gland is termed superficial parotidectomy, total parotidectomy refers to the removal of the superficial lobe as well as the deep lobe. This is a common surgical procedure performed by the otorhinolaryngologist and oral and maxillofacial surgeons.^[1,2]

Neoplasms both benign and malignant are the most common indications for parotidectomy.^[3] According to the World

Health Organisation, the global annual incidence considering all salivary gland tumours is from 0.4 to 13.5 cases per 100,000 people. However, reports from several regions have shown differences in the incidence and frequency of tumour types.^[4,5]

About 70%–80% of all salivary gland tumours are located in the parotid gland with up to 80% being benign.^[6-8] Pleomorphic adenoma or mixed tumour is the most common benign form, while mucoepidermoid carcinoma is the most common malignant form worldwide.^[6,8]

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Confirmatory diagnosis of parotid gland tumours requires a histologic examination of a specimen obtained via parotidectomy.^[9] However, pre-operative diagnosis is often based on fine-needle aspiration cytology (FNAC) and medical imaging. Most physicians accept FNAC as superior to physical examination and imaging as FNAC could differentiate the lesions as either benign or malignant. This information is very important for surgical planning and patient counselling.^[9,10] Moreover, magnetic resonance imaging is the radiologic examination of choice in cases of suspected malignancy.^[9]

Historically, parotid tumour excision was first reported in 1823 by Bernard M, while Jane and Bailey first popularised identification of the main facial nerve trunk, followed by removal of the superficial and/or deep lobe of the gland during parotidectomy.^[2] Superficial or total parotidectomy remains the traditional standard surgical care for benign parotid lesions with modifications of total parotidectomy for malignant lesions.^[11] Extracapsular dissection has also been proposed as an alternative surgical modality for benign lesions.^[8,11,12]

There are various incisions in use for parotidectomy with the two most common being classically cervicomastoidfacial (Lazy S) incision and the modified rhytidectomy (facelift) incision.^[13] Facial nerve dissection during superficial or total parotidectomy can be done via antegrade or retrograde approach. Surgeons most commonly use the antegrade approach alone worldwide or in combination with retrograde. The nerve is identified as its trunk leaves the stylomastoid foramen using anatomical landmarks such as tympanomastoid suture, tragal pointer and/or posterior belly of the digastric muscle. It is then traced anteriorly to its peripheral branches. However, it is difficult to locate the nerve using this technique in an obese patient, in revision surgeries or in those with large tumours. For such patients, retrograde approach is most useful.^[1,2] The use of nerve stimulators where available can be very helpful in identifying the presence and position of these nerves during surgery. The most common post-operative complication of parotidectomy is facial nerve palsy. Other complications include Frey's syndrome, salivary fistula and haemorrhage.^[2,8,14]

There is paucity of literature on parotidectomies in the study area. This study therefore aimed to document our experience on parotid gland surgeries, and the occurrence of facial nerve palsy.

MATERIALS AND METHODS

This was a retrospective, descriptive study involving patients who underwent parotidectomy at the departments of otorhinolaryngology and maxillofacial surgery of our hospital over a 5-year period between January 2014 and December 2018. The records of all patients that had parotidectomy were evaluated. Patients with insufficient data as well as missing files were excluded from the study.

Aminu Kano Teaching Hospital's Institutional Research and Ethics Review Board approval number NHREC/28/01/2020/

AKTH/EC/2896 was obtained on 2 August 2020, prior to the commencement of this study. Data were retrieved from the case files of the patients, which was obtained from the medical record department. The information was entered into a preformed questionnaire.

Demographic variables of interest included age at diagnosis and sex. Clinical variables of interest included main presenting complaint, duration of presenting complaint, main physical finding, nature of lesion, side of lesion, investigations done and pre-operative haemoglobin level. Operative data of interest included surgical procedure done, incision type, technique of facial nerve identification, intraoperative blood loss and duration of surgery. Post-operative data of interest included occurrence of complications, hospital stay, whether discharged or leave against medical advice, mortality, follow-up, patients' present status and number of surgeries.

Surgical modalities for all the study patients were classified into five groups: extracapsular dissection, superficial parotidectomy, total parotidectomy with facial nerve salvage, total parotidectomy with facial nerve sacrifice and radical parotidectomy. The ear, nose and throat surgeons and maxillofacial surgeons did all the surgeries. The decision on surgical modality was based on several factors some of which included site and size of tumour, primary or recurrent tumour, indication for surgery, pre-operative facial nerve status, FNAC result, computed tomography scan findings where done and presence of pathologically positive nodes. The indication for computed tomography scan included malignant and recurrent diseases, involvement of both superficial and deep lobe and isolated deep lobe disease.

In all cases, neuromonitoring was not performed to identify the facial nerve, which was otherwise done mostly by gentle stroking with instruments (e.g., forceps). Monopolar electrocautery was used for raising of the skin flap and dissection of the anterior border of the sternomastoid and posterior belly of the digastric muscles and for incision of parotid tissue where this was being performed far from branches of the facial nerve. In the vicinity of the facial nerve or its branches, bipolar electrocautery was used to cauterise parotid tissue, which was then divided with scissors. Drains were used based on surgeon's preference.

Facial nerve function was systematically assessed the day after surgery by asking the patient to wrinkle up the forehead, close eyes tightly, purse the lips into a whistling posture and show the teeth. The assessment was done using the House–Brackmann grading system.^[15] Stitches were generally removed within a week after surgery except where otherwise indicated. First post-operative follow-up review after discharge was usually in 2 weeks (histology result was also reviewed).

Statistical analysis was performed with the software Statistical Product and Services Solution version 23 for windows (SPSS, Inc., Chicago, IL, USA). Chi-squared test or Fisher's exact test with a 95% confidence interval was used to define associations. $P < 0.05$ was considered statistically significant.

RESULTS

Of the 49 patients who had parotidectomies within the period under review, only 34 fulfilled the inclusion criteria, having complete clinical records. There were 22 (64.7%) females and 12 (35.3%) males with a male-to-female ratio of 1:1.8. The age ranged from 7 to 85 years, with a mean age of 39.3 years, a standard deviation of ± 18.4 years and a median age of 38 years. The peak age of occurrence was in the age group 31–40 years [Table 1].

Swelling around the parotid region was the most common symptom at a presentation seen in 30 (88.2%) patients. Only 5 (14.7%) of the patients presented with pain. The most common examination finding was mass in the parotid region 29 (85.3%), followed by facial nerve palsy 5 (5.9%). Majority of the patients 24 (70.6%) presented more than a year after the onset of the symptoms with only 2 (5.9%) presenting within 3 months of the onset of the symptoms. Patients with primary disease constituted the majority of 29 (85.3%) in this series. The remaining presented with recurrent disease [Table 2]. The left parotid region in 17 (50%) patients was a slightly more common location of the parotid lesion than the right. Only 1 (2.9%) patient presented with bilateral disease [Table 2]. Majority of our patients (21, 61.8%) had normal haemoglobin level at presentation; the remaining had mild-to-moderate anaemia [Table 2].

Among the 14 patients who had radiological investigation, ultrasound scan was the most commonly requested in 10 (71.4%), followed by fistulography in 2 (14.3%) and computed tomography scan in 2 (14.3%) patients.

Most of our patients 26 (76.5%) had superficial parotidectomy. The least common surgical modality was radical parotidectomy performed on only 1 (2.9%) patient. The most common method for identifying facial nerve during surgery was antegrade in 19 (55.9%) patients followed closely by retrograde technique seen in 15 (44.1%) patients. Cervicomastoidfacial incision was the most preferred incision (33, 97.1%) employed among our patients [Table 3]. Complication following surgery was observed in 12 (35.3%) with majority (22, 64.7%) of the patients having none. Most of our patients (30, 88.2%) had only one surgical procedure with only 4 (11.2%) having repeat surgery. Majority, 7 (63.6%) of our patients, had temporary facial nerve paresis and most of the patients stayed between 6 days and 2 weeks on admission. Twenty-three (67.6%) of our patients were completely cured, while the present status of 11 (32.4%) patients is unknown [Table 3]. Pleomorphic adenoma was the most common histological diagnosis in 19 (55.9%) patients postoperatively, followed by mucoepidermoid carcinoma seen in 3 (8.8%) patients. Warthin tumour (1, 2.9%), myoepithelioma (1, 2.9%) and adenoid cystic carcinoma (1, 2.9%) were among the least common histological diagnoses [Table 4]. Majority of our patients have completed follow-up (16, 47%) and 9 (26.5%) are still on follow-up. However, 9 (26.5%) patients were lost to follow up [Figure 1].

Table 1: Age and gender distribution of patients

Variable	n (%)
Age group (years)	
1-10	3 (8.8)
11-20	2 (5.9)
21-30	5 (14.7)
31-40	10 (29.4)
41-50	4 (11.8)
51-60	6 (17.6)
61-70	3 (8.8)
81+	1 (2.9)
Total	34 (100)
Gender	
Male	12 (35.3)
Female	22 (64.7)
Total	34 (100)

Table 2: Clinical characteristics of patients

Variable	n (%)
Main symptoms	
Swelling	30 (88.2)
Pain	5 (14.7)
Main signs	
Mass	29 (85.3)
Facial nerve palsy	2 (5.9)
Ulcer	1 (2.9)
Others	7 (20.6)
Duration of symptoms	
1-3 months	2 (5.9)
4-6 months	3 (8.8)
7 months-1 year	5 (14.7)
>1 year	24 (70.6)
Total	34 (100)
Nature of lesion	
Primary	29 (85.3)
Recurrent	4 (11.8)
Residual	1 (2.9)
Total	34 (100)
Side of lesion	
Right	16 (47.1)
Left	17 (50)
Bilateral	1 (2.9)
Total	34 (100)
Hemoglobin level	
7.1-9 (moderate)	1 (2.9)
9.1-11 (mild)	12 (35.3)
11.1-14 (normal)	21 (61.8)
Total	34 (100)

Comparing the relationship between the pre-operative FNAC result with post-operative histological diagnosis showed a statistically significant association between FNAC findings and final histological diagnosis (Pearson Chi-square = 15.355 $P = 0.001$). However, Cohen's κ shows agreement between pre-operative FNAC and post-operative

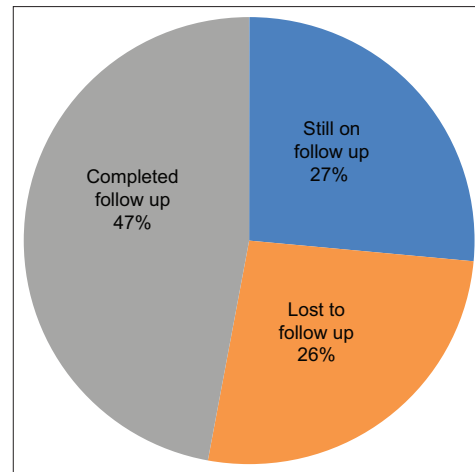
Table 3: Surgical characteristic

Variable	n (%)
Surgical modality	
Superficial parotidectomy	26 (76.5)
Total parotidectomy with nerve salvage	5 (14.7)
Total parotidectomy with nerve sacrifice	2 (5.9)
Radical parotidectomy	1 (2.9)
Total	34 (100)
Facial nerve identification	
Retrograde	15 (44.1)
Antegrade	19 (55.9)
Total	34 (100)
Type of incision	
Cervicomastoidfacial	33 (97.1)
Modified rhytidectomy	1 (2.9)
Total	34 (100)
Complication	
Yes	12 (35.3)
No	22 (64.7)
Total	34 (100)
Type of facial nerve palsy	
Temporary	7 (63.6)
Permanent	4 (36.4)
Total	11 (100)
Number of surgeries	
1	30 (88.2)
2	4 (11.8)
Total	34 (100)
Length of hospital stay	
1-5 days	5 (14.7)
6 days-2 weeks	29 (85.3)
Total	34 (100)
Present status	
Cured	23 (67.6)
Not known	11 (32.4)
Total	34 (100)

Average duration of surgery: 106 min, Median duration of procedure: 120 min, Median blood loss: 120 ml, Average blood loss: 95 ml, Complication rate: 35.3%

Table 4: Post-operative histology of patients

Post-operative histology	n (%)
Pleomorphic adenoma	19 (55.9)
Mucoepidermoid carcinoma	3 (8.8)
Chronic sialadenitis	2 (5.9)
Fistulous tract with chronic inflammation	2 (5.9)
Warthins tumour	1 (2.9)
Acinic cell carcinoma	1 (2.9)
Mikulicz diseases	1 (2.9)
Adenoid cystic carcinoma	1 (2.9)
Myoepithelioma	1 (2.9)
Lymphoreticular	1 (2.9)
Basal cell carcinoma	1 (2.9)
Dermatophytic lymphadenitis	1 (2.9)
Total	34 (100)

**Figure 1:** Follow-up pattern in patients that had parotidectomy

histology which was not beyond chance. ($\kappa = -0.087$, $P < 0.005$) [Table 5].

DISCUSSION

The option of parotidectomy as a surgical procedure for both benign and malignant lesions does not come without significant attention to facial nerve management. This is more so in a resource-poor setting like ours. As it was philosophically put by Sterling Burnell in 1927, 'In seventh nerve paralysis, joy, happiness, sorrow, shock, surprise, all the emotions have for their common expression the same blank stare'.

The female predominance among patients who had parotidectomy in our series is in tandem with other similar reports worldwide,^[3,6-9,16-22] although other authors recorded more parotidectomy among male subjects.^[10,11,23-25] A relatively lower mean age was seen among the patients in this report compared to other similar studies.^[3,6,8,10,11,16,18-24] Findings from similar studies from developing countries, however, are in agreement with ours.^[7,9,17] This is probably due to lower life expectancies and larger population of young adults in these countries. The age of our patients ranged from 7 to 85 years as was similarly reported by other authors.^[9,10,20,23]

Similar to our findings, Diom *et al.*^[9] in Senegal and Al Salamah *et al.*^[24] in Saudi Arabia reported predominance of swelling in the parotid region as the presenting symptom among their patients. Presentation of pain in the parotid gland was comparably less reported in series ranging from 11% to 20.4%, similar to what was found in this study.^[9,24] The mean duration to consultation among patients who underwent parotidectomy in our study and other similar studies in Africa and Asia is commonly more than a year.^[9,24]

About 15% of our patients presented with recurrent disease following initial surgery elsewhere. This is relatively higher than figures of 5.2%–10% reported elsewhere.^[17,21,22] The right parotid gland was more commonly removed in reports of most series worldwide.^[8,10,16,24] In contrast, however, Okoturo

Table 5: Comparing findings of pre-operative fine-needle aspiration cytology with post-operative histology

	Post-operative histology		
	Benign	Malignant	Total
Pre-operative FNAC			
Benign	28	3	31
Malignant	0	3	3
Total	28	6	34

FNAC: Fine-needle aspiration cytology

and Osasuyi^[7] in Lagos, Nigeria, and Maahs *et al.*^[6] in Brazil reported more cases of parotidectomy on the left side, agreeing with our finding. We found bilateral disease in only one patient. This is similar to reports by Al Salamah *et al.*^[24] and Maahs *et al.*^[6] who found bilateral disease in one and two patients, respectively.

Ultrasound scan was commonly used for pre-operative evaluation of our patients as was similarly reported by other authors.^[6,9] The average surgery time in this series was 106 min. This is relatively lower than 146 min and 186.75 min reported by Graciano *et al.*^[19] and Okoturo and Osasuyi,^[7] respectively, in their series.

The most common technique of parotidectomy reported worldwide is superficial parotidectomy.^[6,7,16-18,20,21,23,24] Our review was in consonance with these reports. However, Diom *et al.*^[9] in Senegal reported total parotidectomy as their most common technique of removing the gland. Our current audit showed that antegrade identification of the facial nerve was the most commonly adopted technique in our series. This agrees with the findings of a survey conducted by Adeyemo *et al.*^[1] in Nigeria. Moreover, in a meta-analysis published by Mashrah *et al.*^[2] in 2018, they found that no statistically significant difference exists in terms of transient or permanent facial nerve palsy whether it is antegrade or retrograde identification of facial nerve that is used during parotidectomy, although their findings revealed a 19.30 min reduction in operative time and reduction in loss of blood volume in retrograde compared with antegrade technique.

Cervicomastoidfacial incision is the more common approach for parotidectomy in our series, as was similarly reported by Graciano *et al.*^[19] in Brazil. However, Graciano *et al.*^[13] concluded that the modified rhytidectomy incision is mainly indicated for younger or female individuals. This is probably for cosmetic reasons. Modified rhytidectomy incision is associated with a lower incidence of temporary facial nerve dysfunction. The complication rate in this review was 35.3%, a value higher in comparison with other similar studies.^[6,7,23,24] This may be due to difference in study design and the definition of what constitutes complication in their studies as compared to our series. Authors worldwide have reported a wide variation on the incidence of facial nerve palsy following parotidectomy, ranging from 7% to 56.5%.^[6,8,16-25] This current review found an incidence of facial nerve palsy is 32%. This could be attributed to differences in study design, techniques

of surgery, histology of lesions and use or otherwise of intraoperative neuromonitoring devices. Meanwhile, Graciano *et al.*^[19] reported that immediate facial nerve dysfunction was more severe among patients who had no intraoperative neuromonitoring.

As has been repeatedly reported by researchers worldwide, pleomorphic adenoma and mucoepidermoid carcinoma are the most common benign and malignant parotid neoplasm, respectively, in our series.^[3,6,10,11,16-20,23,24] Pre-operative FNAC reports correlated strongly with post-operative histology in our series as has similarly been shown previously by other authors.^[6,10,18,20,24]

Our protocol was to follow up patients with malignant disease for a period of 5 years and between 6 and 12 months for those with benign disease. Up to 26% of our patients were lost to follow up. This may probably be due to the believe that they are cured in case of benign disease or lose faith in orthodox medicine in case of recurrence, especially with malignant disease. Financial constraints may also be another factor as most of them were farmers living in the rural areas.

The retrospective design of our study, the high number of excluded patients arising mostly from poor and incomplete documentation and small sample size are limitations of this study. A follow-up multicentre study with a larger sample size will allow for a more in-depth review and conclusions.

CONCLUSION

Parotidectomy is most commonly performed among young adult females with benign disease and most had superficial parotidectomy. In addition, FNAC is a useful tool in diagnosis and patient counselling preparatory to parotidectomy. Improvement in surgical skills among surgeons that operate on the parotid gland could reduce the incidence of facial weakness following parotidectomy. A large scale multicentre longitudinal study will provide additional information on the subject of parotidectomy in our environment.

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Conflicts of interest

There are no conflicts of interest.

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