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Original Research Article

Parotidectomy, complications and management: our experience

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ABSTRACT

Background: Salivary gland neoplasms constitute 0.3% of all malignancies and 2%-6.5% of the head-and-neck tumors. Considering the unique anatomy of the gland and its intricate relationship with the facial nerve, significant complications may arise which can result in varying degrees of morbidity.
Methods: We present here our experience of Parotid surgery done at two institutes, NRS medical College in Kolkata and North Bengal medical College and Hospital in the Darjeling district from 2013 to 2019 in the department of ENT and Head neck Surgery. Patients were subjected to superficial parotidectomy, total conservative and total parotidectomy depending upon the preoperative FNAC report.
Results: 47 patients were subjected to different types of parotidectomies. Pleomorphic adenoma was the most common pathology encountered and facial nerve palsy was the most common post-operative complication in our series, followed by GAN injury, flap necrosis and Frey's syndrome.
Conclusions: This demographic study will help future parotid surgeons to understand various complications encountered during the surgery and management of those aforesaid complications, improving surgical outcome.

Keywords: Parotidectomy, Facial nerve palsy, Parotid fistula, Frey's syndrome

INTRODUCTION

The term 'Salivary gland' was first described by Andreas Vesalius in 1543.[1] Parotid surgery has indeed come a long way since last 500 years; as before the renascence, interventions of the salivary glands were restricted mainly to treat abscesses, ranulas and extraction of stones. German surgeon Lorenz Heister is credited for description of the first parotidectomy in 1765, which he mentioned in his book "A General System of Three Parts".[2] Salivary gland tumors comprises of 0.3% of all malignancies and 2%-6.5% of the head-and-neck tumor.[3] Approximately 64%-80% of all primary epithelial salivary gland tumors occur in the parotid gland and rest in other salivary glands, which makes parotid gland surgery as one of the most commonly done salivary gland surgery by both Otolaryngologists and General Surgeons in the head neck region.[4] Most of the parotid gland neoplasms are benign, as detected pre operatively by fine needle aspiration and thus the patients expect an excellent outcome after the surgery. However, considering the unique anatomy of the gland and its intricate intraglandular relationship with the facial nerve, significant complications may arise which can result in varying morbidity. We present here our experience of Parotid surgery done at NRS medical college and North Bengal medical college and hospital from 2013 to 2019 in the department of ENT and head neck surgery. Our study pertains to the study of complications of parotid surgery, their respective management and a brief review of the literature of the same.

The above-mentioned study was conducted in the Department of Otolaryngology at NRS medical college, Kolkata and North Bengal medical college, situated in the district of Darjeeling. The primary aims and objectives of our study were to study the different types of parotid surgery done in our department and enumerate the different types of pathological entities encountered, also to enumerate different complications encountered and management of the Aforesaid complications.

METHODS

The study was a retrospective observational cohort study, conducted in the department of Otolaryngology and Head Neck surgery at NRS medical College, Kolkata and North Bengal Medical College and Hospital from January 2013 to December 2019. The patients were selected from the OPD pool who had attended with swelling around the ear at varying anatomical location, which was clinically as well as cytologically diagnosed as neoplastic parotid swelling (Figure1).

Figure 1: Neoplastic parotid swelling.

Meticulous preoperative investigations were done like USG neck, USG guided FNAC and radio-imaging in the form of MRI whenever indicated. USG was done routinely in all the cases followed by USG guided FNAC to identify the pathology. MRI was done in three conditions specifically: first, when pathology was clinically suspected to involve the deep lobe, second when there were cases suspected to have facial nerve involvement and thirdly prior to operative planning in cases of revision surgery. Three types of surgical procedures were defined viz superficial parotidectomy, total conservative parotidectomy and total parotidectomy (Figure 2).

The following were our inclusion criteria, any parotid neoplasm not having co morbidities that contradict surgical treatment and non-inflammatory parotid swelling. The exclusion criteria were, inflammatory parotid swelling, patients unfit for surgery and parotid malignancy with distant metastasis.

Forty seven patients with parotid swelling underwent parotidectomy during the above-mentioned period. After appropriate dressing and draping, modified Blair incision was made and SMAS flap was raised. Tragal pointer and tympanomastoid suture was considered as important landmark and antegrade dissection of facial nerve was done. The tumour if confined to the superficial lobe was defined and the tumour along with the remnant of the superficial lobe was removed taking care not to injure the branches of facial nerve.

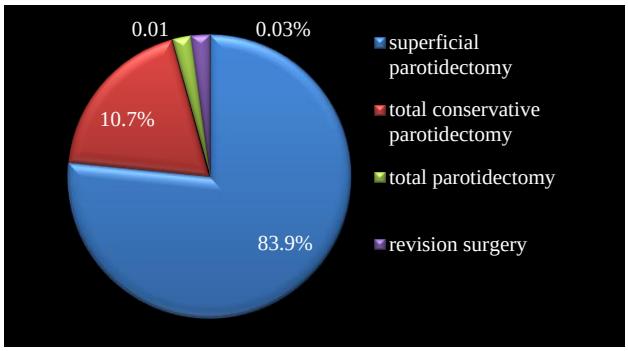

Figure 2: Types of surgery performed.

For tumours involving deep lobe, total conservative parotidectomy was done. Once mobilization was completed, fine vascular sling was placed beneath the facial nerve and was gently retracted. Retromandibular vein was appropriately ligated whenever required. Total parotidectomy with sacrifice of facial nerve was considered in few cases when patient had significant pre-operative facial nerve palsy and pre-operative radio imaging confirmed involvement of the facial nerve trunk. Suction drain was placed and SMAS flap was replaced back. Closure was done in two layers by 3'0 vicryl and 3'0 ethilon. All the Statistical analyses were done using MS Excel and IBM SPSS Statistics software.

RESULTS

We operated upon 47 patients in our series, over duration of 7 years covering two medical colleges in West Bengal. Out of 47 patients, 30 patients were males and 17 patients were females (Figure 3 and 4). The lowest age in our series was 22 years and the oldest age in our series was 69 years (Figure 4).

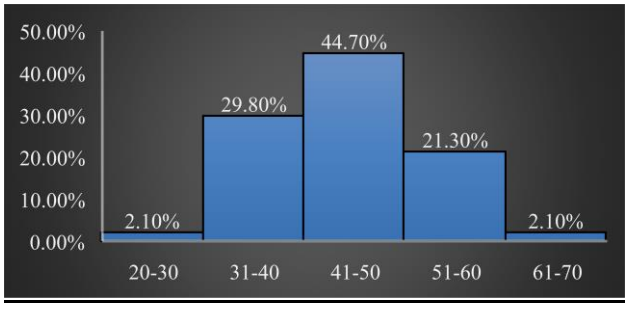

Figure 3: Age distribution of patients operated.

Table 1: The histopathological evaluation of the 47 cases revealed the following detail (n=47).

Histopathological evaluation	Cases
Pleomorphic adenoma	34
Warthin's tumour	4
Parotid cyst	1
Parotid hemangioma	1
Mucoepidermoid carcinoma	3
Adenocarcinoma	1
Adenoid cystic carcinoma	2
Carcinoma ex pleomorphic adenoma	1

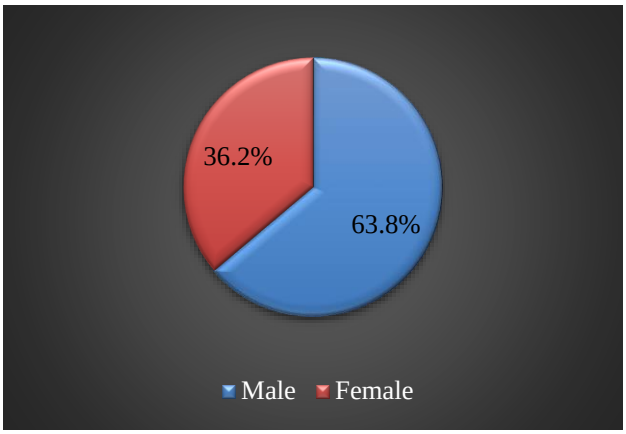

Figure 4: Sex distribution of the cases operated.

All patients were carefully monitored in the post-operative period and data was carefully recorded. Patients were followed up till 6 weeks post-operatively in all the cases in order to monitor for any delayed post-operative complications. The post-operative complications which we encountered in our series are mentioned below in (Figure 5).

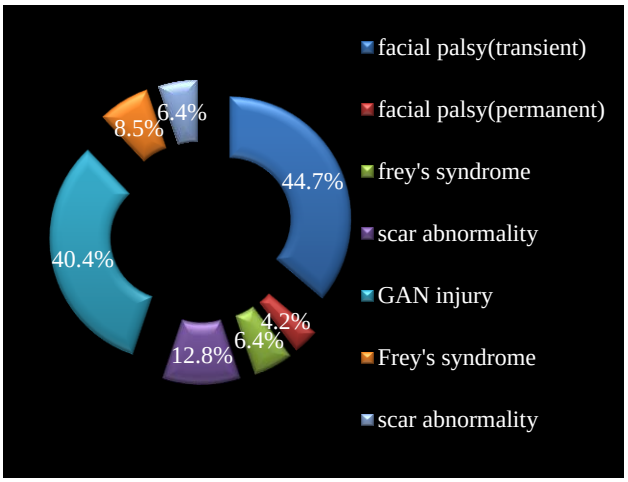

Figure 5: Distribution of complications encountered.

Facial nerve paralysis was undoubtedly the most common complication we encountered in our series (44.6%), followed by great auricular nerve injury resulting in post aural paraesthesia. Out of 21 patients who developed facial nerve palsy, 17 patients had grade III palsy and 2 patients had grade IV and 1 patient each had grade V and grade VI palsy respectively. They were treated by conservative management as discussed subsequently, with only 2 patients having permanent palsy, who incidentally had grade V and grade VI palsy on initial assessment. Per operative injury could be appreciated during the course of dissection in both the cases which developed permanent palsy. In one of the cases the tumour was densely adhered with the nerve and inadvertent injury occurred during the other case during the course of dissection of one of the branches. Marginal mandibular branch of the facial nerve was most commonly involved branch in almost all the cases in our series. Hypoesthesia in the area around the ear lobule was the second most complication in our series and happened due to neuronal injury to the greater auricular nerve, which almost always comes on the way of the dissection after raising the flap.

Flap necrosis with parotid fistula was an important debilitating post-operative complication which we encountered in 6 cases. The skin flap necrosis developed at the tortuous bend adjacent to the tip of the mastoid. If the incision was made in such a manner that the sharp bend could be avoided, that resulted in significant reduction in flap necrosis. All the patients in our series were treated by conservative treatment by regular pressure dressing to treat the parotid fistula. Anticholinergic medication was given in three of the patients and all responded well.

Seroma developed in three of the patients and clinically were indistinguishable from sialocele(collection of saliva from the partially resected parotid gland beneath the flap). They were appropriately treated by repeated aspiration and pressure dressing.

Hypertrophied scar was noted in 3 patients in long term follow up, but the patients did not raise a significant concern for the same. Frey's syndrome was encountered in 4 patients and was suitably treated as detailed in the discussion below. The distribution of complications can be visualized in a doughnut bar (Figure 5).

DISCUSSION

Parotid surgery had been described in the medical literature since many centuries with various modifications and subsequent improvement in the respective surgical techniques. The antegrade dissection of the facial nerve trunk and description of the surgical plane into superficial and the deep lobe was first noted by the famous surgeon, Sir Hamilton Bailey in 1941.[5,6] In 1951, Henry Samuel Shucksmith and in 1952, Hayes Martin described the exact technique which we still do follow during parotid surgery in clinical practice.[7,8]

In our series of 47 patients, M:F were in the ratio of 30:17, that is 1.7:1, which is close to 1.3:1, as noted in a similar study done in our country recently.[9] In the same series, pleomorphic adenoma was noted in 78% of cases, followed by mucoepidermoid carcinoma in 13% and Warthin's tumour in 6.6% of the cases. In our series, we too found pleomorphic adenoma to be the most common of all tumours accounting for 72% of the cases, followed by Warthin's tumour 8% and mucoepidermoid carcinoma 6 % of the cases.[9] We also found parotid hemangioma in 1 of the (Table 1) cases which is in fact an extremely rare neoplasm.

Discussion regarding the complications requires a detailed briefing. In our series we encountered transient facial nerve palsy in 21 out of 47 patients, which accounts for 45% of the cases. This percentage appears variable in different series. Bhagavan et al. reported an incidence of 20.8% post superficial parotidectomy and an incidence of 83.3% post total conservative parotidectomy.[9] This was in contrast to a high incidence of 77.2% after 1-week post op and an incidence of 51.9% after 4 weeks post-operative as reported by Cossio et al in 2018.[10] The facial nerve palsy do not appear to have any correlation with factors like age, sex, side or the duration of symptoms. The surgical expertise and the nature of the tumour were the only variable factors which appeared to influence the outcome. Revision surgery definitely appeared to increase the chance of per operative facial nerve injury due to adhesion which is expected to be due to the primary surgical intervention.

Temporary paresis, however usually resolves according to Laccourreye, within the 18th post-operative month.[11] The incidence of facial nerve paralysis is higher with total, than with superficial parotidectomy, which may be related to stretch injury or as result of surgical interference with the vasa nervorum. Mechanical trauma, such as nerve compression, crushing, and stretching, and electro-coagulation heat damage are possible etiologies. However, nerve compression, crushing, and heat damage are rare with careful parotidectomy. Nerve stretching is the most probable cause. Some studies have demonstrated that nerve elongation of 6% because of stress-strain can cause perineurium tears and result in loss of the compound action potential.[12] Use of nerve monitoring was not done in any of the cases in our series as we don't have the facility in our department.

Injury to the greater auricular nerve was the second most frequent complication we encountered in our series, manifested as impaired sensation around the ear lobule on the affected side in 40% of our cases. According to few authors, preservation of posterior branch of greater auricular nerve may help in preservation of sensory function.[13] However, the true meaning of preserving the GAN is controversial and some authors argued that its preservation during parotid surgery is unnecessary.[14] In our series, we did preserve the posterior division and appreciated the results for the same.

Parotid fistula deserves a brief discussion in this context. We encountered fistula in 6 out of 47 cases accounting for 13% of the total number of cases. Though all the cases were associated with flap necrosis and responded by conservative management, but other modes of therapy need a brief mention. Various forms of treatment have been described for parotid gland fistula, including tympanic neurectomy with or without chorda tympani section, radiotherapy and even completion of the parotidectomy.[15,16] Tympanic nerve section may have a low success rate, however, and it could take a long time to achieve healing of the fistula.[15] Staffieri et al first proposed, in 1999, BTX in the treatment of salivary fistula and sialoceles after conservative treatment failure.[17] The localized cholinergic block achieved with botulinum toxin injections, avoids the side-effects caused by systemic anticholinergic drugs and avoids surgical risks. Inhibition of parotid secretion leads to a temporary block in salivary flow followed by glandular atrophy, thus allowing healing of the fistula.

Frey's syndrome is an important noteworthy complication. This is actually a disease characterized by unilateral sweating and flushing of the facial skin in the area of the parotid gland occurring during meals that becomes evident usually 1-12 months after surgery. This actually develops as a consequence of aberrant regeneration of sectioned parasympathetic secretomotor fibres of the auriculotemporal nerve with inappropriate innervation of the cutaneous facial sweat glands that are normally innervated by sympathetic cholinergic fibres.

Surgical treatment has included cervical sympathectomy, tympanic neurectomy, sternocleidomastoid transfer and dermis-fat grafts and the use of various materials, as inter-positional barriers, but the outcome of these techniques has been disappointing since only temporary relief is achieved. Better results have been reported with some prophylactic measures, including the use of the superficial musculoaponeurotic system (SMAS) as a flap or the superficial temporal artery fascial flap.[18,19]

More recently, good results have been obtained with local injection of botulinum toxin (BTX). The gustatory sweating usually ceases in the treated area, within 48-72 hours. No significant adverse effects have been described and only transient paresis of the orbicularis oris, in very few cases, has been reported in literature.[19] A marked long-lasting improvement, ranging from 11 to 36 months after a single injection, has also been described. We detected an occurrence of only 8.5% of Frey's syndrome which can be explained by the relatively short follow-up time in the individual cases.

CONCLUSION

In conclusion, in our study, parotid pathologies were encountered more in males which required surgical management. Highest parotid cases were encountered in

the age group of 41-50 years. Most common histopathology encountered in HPE was pleiomorphic adenoma. The most common complications encountered were different grades and types of facial nerve palsy. Parotidectomy of various types are surgical procedures done frequently by the both the department of ENT as well the department of General Surgery of various institutes. The extent of surgery depends on the pre-operative FNAC, clinical and radiological assessment and nothing can replace the expertise and anatomical knowledge of a skilful and experienced parotid surgeon.

In fact, this paper is an institutional audit of parotid surgeries done in the Head neck unit of our ENT department during the mentioned time period. Indeed, it was an observation that more the number of cases were operated by the same group of skilled surgeons, less frequent were the complication, which is always expected. In conclusion, this was a demographic study of the various types of parotid surgeries encountered in our practice, their histopathology, their complications and the management of the complications involved. This is also a comprehensive guide to future parotid surgeons to avoid various complications during parotid surgery and how to manage them if complications occur.

Finally, any study is expected to have numerous limitations and our study too have similar constraints. Lack of a proper control group and the small size of the sample are the two most important limitations. The method we used to measure facial dysfunction was the house Brackmann facial nerve grading system (HBFNGS), which although widely used and well-documented in the literature, may present intra-observer variations since it is a subjective scale. Moreover, we didn't use nerve monitor, which theoretically may reduce the incidences of facial nerve complications. Hopefully a larger study in the coming years can definitely enlighten us further regarding parotid surgery and its complications.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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