

Clinico-Pathological Study and Management of Parotid Gland Tumours Prudhvinath Kurakula¹, Anuj Kumar Patel²

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Abstract

Background and Objective: Salivary gland tumours are rare, generally benign and affect mainly the parotid glands. Although parotid tumours can occur from birth onwards throughout the lifespan, incidence varies with respect to age and sex of the individual. Diagnosis and management of parotid tumours is complicated by their relative infrequency, the limited amount of pre-treatment information available and wide range of biological behavior seen. Parotid tumours are interesting to surgeons, as they are unique in the way they present, that is with a diverse array of clinical patterns and varied histological patterns. So the diagnosis is frequently aided by the use of FNAC. So in this study, subjects presenting with symptoms of parotid gland tumours will be assessed clinically, diagnosed with the aid of FNAC and therapeutic procedures will be carried out accordingly. **Aim & Objectives:** The objectives of the study are 1.To study the age and sex distribution of various types of tumours occurring in Parotid gland.2.To study their various modes of clinical presentation 3.To study the diagnostic accuracy of FNAC.4.To study the various treatment modalities offered. 5. To identify the complications ensuring there in, as a consequence of intervention.**Methodology:** Registered subjects registered in surgery department of Kamineni Institute of Medical Sciences with diagnosis of parotid gland tumours in FNAC report from January 2019 to February 2020 will be taken up for the study. Primary source of information technique will be used as the source of information with "Informed written consent" method for the subject's consent. Subjects presenting with signs and symptoms of Parotid gland swellings in KIMS surgery OPD will be subjected to a detailed history and clinical examination. Long term follow up is necessary to study the tumor recurrence, which was not possible in this study.**Results:** Parotid gland tumours commonly occur between 3-5th decade. Benign tumours are more common in 20 to 50 years. Mean age for benign tumours was 37.51 years and malignant tumours was 35 years. The salivary gland neoplasms more common in females M:F::1:3.6. So out of which 8 patients were male and 22 patients were female. M:F ratio for benign tumours is 1:3.1, and for malignant tumour was 1:0. Parotid gland is the most common site for salivary gland tumours, accounting for 80%. Among parotid tumours 96.67% were benign and 3.33% were malignant. 66.7% of benign tumours presented within 5 years. Facial palsy was the commonest complication observed after surgery postoperatively 8 patients developed facial palsy, out of which 6 were temporary and 2 were permanent. Wound infection developed in 7 patients. FNAC is a good tool in diagnosing salivary gland with exact cytohistological 96.55% for benign tumours and 100% for malignant tumours. Regarding accuracy of clinical examination in diagnosing parotid gland malignancies, the sensitivity is 100% and specificity is 100%. The overall prognosis was fare for all kinds of parotid gland tumours including benign and malignant tumours. There was no mortality that was observed during the course of this study. No recurrence was reported during the course of this study.

Interpretation and Conclusion: Parotid gland tumours are less often encountered in surgical practice. Parotid gland tumours most commonly occur in third and fifth decade. Surgery is the mainstay of treatment of parotid gland tumours and superficial parotidectomy is the most commonly performed surgery for benign as well as low grade malignant parotid tumours. Most important complications of parotid surgery were wound infection and facial palsy. In facial palsy temporary facial palsy is the one which was encountered most. Long term follow-up is necessary as pleomorphic adenomas tend to recur after long time. Since the most common malignant tumours are asymptomatic and long standing benign tumours especially pleomorphic adenoma can undergo malignant change, community awareness, early detection and earliest referral from primary health care set up to tertiary centres are necessary.

Keywords: Pleomorphic adenoma; Warthin's tumour; Acinic cell carcinoma; Adenoid cystic carcinoma; Basal cell carcinoma; Computer tomography; Fine needle aspiration cytology

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Introduction

The major salivary glands include the parotid glands, submandibular

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glands, and sublingual glands. There are also approximately 750 minor salivary glands scattered throughout the submucosa of the oral cavity, oropharynx, hypopharynx, larynx, parapharyngeal space, and nasopharynx[1,2]. Salivary gland neoplasms are rare and constitute 3% to 4% of head and neck neoplasms. Most neoplasms arise in the parotid gland (70%), whereas tumours of the submandibular gland (22%) and sublingual and minor salivary glands (8%) are less common. The ratio of malignant to benign tumours varies by site as well—parotid gland, 80% benign and 20% malignant; submandibular gland and sublingual gland, 50% benign and 50% malignant; and minor salivary glands, 25% benign and 75% malignant[2].

Salivary gland tumours are generally slow growing and have been present for several years before the patients seek medical advice. Because most of them are benign in nature and due to lack of health awareness in our setup, the number of patients seeking the treatment is less. Thus the patients with the malignant tumours present very late and need radical treatment which carries high morbidity[3]. Salivary gland tumours are interesting to the surgeons, as they are unique in the way they present, that is with a diverse array of clinical patterns and varied histological patterns. So there are benign and malignant tumours and again several pathological subtypes in each. There is great deal of confusion existing in the proper management of salivary gland tumours. It is important to detect benign and malignant salivary gland tumours preoperatively to plan the treatment and to prepare the patient as well as surgeon in order to have better surgery for malignant tumours. The primary treatment of salivary malignancies is surgical excision. In this setting, basic surgical principles include the en bloc removal of the involved gland with preservation of all nerves unless directly invaded by tumour. For parotid tumours that arise in the lateral lobe, superficial parotid-ectomy with preservation of CN VII is indicated. If the tumour extends into the deep lobe of the parotid, a total parotidectomy with nerve preservation is performed. Although malignant tumours may abut the facial nerve, if a plane of dissection can be developed without leaving gross tumour, it is preferable to preserve the nerve. If the nerve is encased by tumour (or is noted to be nonfunctional preoperatively) and preservation would result leaving gross residual disease, nerve sacrifice should be considered. Postoperative radiation treatment plays an important role in the treatment of salivary malignancies. The presence of extraglandular disease, perineural invasion, direct invasion of regional structures, regional metastasis, and high-grade histology are all indications for radiation treatment. The likelihood, then of a salivary gland tumour being malignant is more or less inversely proportional to the size of gland. Although benign tumours are known to have been present usually for many months to several years before coming to attention more promptly, probably because of their more rapid growth suggesting the malignant change. Ultimately there are no reliable criteria to differentiate on clinical grounds, the benign from the malignant lesions and morphological evaluation is necessary[4]. Treatment of salivary gland tumours need good surgical skills, sound anatomical knowledge to avoid complication, as there are vital structures with both parotid and submandibular gland. Despite the diverse variety of malignant salivary tumours, it is possible to identify patients with significant adverse prognostic characteristics, which can be detected clinically. The factors such as advanced age, tumour site, treatment modality can predict 5 year survival rate in salivary gland tumours. Survival in parotid malignancy is influenced by multiple factors [5] Patients with multiple poor prognostic features include extraglandular extension, aggressive tumour histology and nodal disease will exhibit poorer survivals and may be candidates for aggressive treatment protocols[6].

Aims & Objectives

1. To study the age and sex distribution of various types of tumours occurring in Parotid gland.
2. To study their various modes of clinical presentation.
3. To study the diagnostic accuracy of FNAC .
4. To study the various treatment modalities offered.
5. To identify the complications ensuring therein, as a consequence of intervention.

Sources of Data

Registered subjects registered in surgery department of Kamineni Institute of Medical Sciences with diagnosis of parotid gland tumours in FNAC report from January 2019 to February 2020 will be taken up for the study. Primary source of information technique will be used as the source of information with —Informed written consent method for the subject's consent.

Method of Collection of Data

Subjects presenting with signs and symptoms of Parotid gland swellings in Kamineni Institute of Medical Sciences surgery OPD will be subjected to a detailed history and clinical examination. Routine investigations will be done .Specific investigations like FNAC and X-Ray mandible/USG will be done for these patients . Patients diagnosed to have Parotid gland tumours will be explained about the treatment options. Consent will be taken for the study appropriately. They will be admitted and treated accordingly. Their personnel details, investigation reports, treatment offered and complications arising out of treatment will be documented using proforma.

Inclusion Criteria

1. Late adolescents and adult subjects admitted to surgical wards of Kamineni Institute of Medical Sciences with FNAC report as parotid tumour.
2. willing to take part in the study

Exclusion Criteria

1. Non-neoplastic swellings of parotid glands.
2. Paediatric cases.

All patients admitted were evaluated by documenting the history, thorough clinical examination, routine laboratory investigations and specific investigations. In history, importance was given to presenting complaints, duration of lump, rapid increased in size, associated symptoms of facial nerve involvement, previous surgical treatment or any medical problem. Particulars regarding physical examination were noted in the proforma . Importance was given to the site, extent of the tumour, deep lobe enlargement and fixity to the surrounding structures, nerve involvement and regional lymphadenopathy. Associated medical conditions like diabetes, hypertension, and anemia were managed and controlled before surgery with physician's advice. As a part of general work up for surgery in all patients, hemoglobin level, bleeding time, clotting time, urine, sugar albumin, microscopy, chest screening. ECG, Blood urea, Serum creatinine, RBS was estimated. Specific investigations like FNAC, X-ray of mandible, were done for all patients in the study group. After evaluation of the tumour by clinical examination and specific investigations, a surgical plan was formulated. The final decision was taken pre operatively by the surgeon. The specimen was sent for HPE. Appropriate antibiotics and analgesics are administered post operatively for all cases. Drainage tube was removed on 3rd day and sutures on 5th day. The adjuvant treatment was decided depending on the final HPE report.

Different modalities of treatment adopted in this study are

Surgery

The follow up period of these patients ranged from 3 months to 1 year. All patients were asked for follow up after 15 days of surgery then every month for first year then every 3 month in second year, to detect morbidity and recurrence. Long term follow up is necessary to study the tumour recurrence, which was not possible in this study.

Results

Following observations were made in 30 patients who presented with parotid gland neoplasms in this study.

Age Incidence

Table 1: Age tumour crossstabulation

Age in Years	Benign	Malignant	Total No of Patients	% of Total
14-20	2	0	2	6.66
21-30	7	0	7	23.33
31-40	6	1	7	23.33

41-50	11	0	11	36.67
51-60	0	0	0	0
61-70	3	0	3	10
TOTAL	29	1	30	100

The age incidence of the patients in the study group ranged from 14-70 years. Most of the patients in this series were in the age group 41-50. Benign tumours were more common in 20-50 years. Malignant tumour was found in only one patient. The mean age was 37.51 years for benign tumours.

Table 2: Tumour sex cross tabulation

Sex	Benign	Malignant	Total	%
Male	7	1	8	26.67
Female	22	0	22	73.33
Total	29	1	30	100

In this series, 8 (26.67%) patients were males and 22 (73.33%) were females. M:F ratio was found to be 1:3.63. M:F ratio for benign tumours was found to be 1:3.18. Only one male patient was found to have malignancy.

Table 3: Symptoms of Parotid gland tumours

Symptoms	No. of Patients	%
Swelling	30	100
Pain	3	10
Facial Palsy	1	3.33
Recurrent Tumour	2	6.66
Parapharyngeal Mass	0	0
Cervical Lymph Node	0	0

Most common symptom in the study group was swelling, which was found in 100% patients. Other symptoms were pain (10%), facial palsy (3.33%) and 2 patients had recurrent tumours (6.66%). One patient had malignant tumour and had swelling, pain and facial palsy.

Table 4: Signs of Parotid gland tumours

Signs	Benign	Malignant
Fixity	0	1
Deep Lobe Involvement	3	0
Facial Nerve Involvement	0	1
Nodal Involvement	0	0
Metastasis	0	0

Skin fixity was found in 1 (3.33%) patient. That patient had malignant parotid gland tumour. Deep lobe involvement was found in 2 patients (6.66%) with benign tumour and 1 patient (3.33%) with malignant tumour. Facial nerve involvement was seen in 1 patient (3.33%) with malignant tumour. Other signs like nodal involvement and metastasis was not found in any patient.

Table 5: Duration of symptoms

Duration	Benign	Malignant	Total
1 Year	5	0	5
1-5 Years	21	0	21
6-10 Years	1	1	2
11-20 Years	2	0	2
21-40 Years	0	0	0
Total	29	1	30

72.4% of patients with benign tumour had symptoms of duration 1-5 years. One patient had malignant tumour with duration of 10 years. Almost 93.33% patients presented within 10 years.

Table 6: Types of surgical treatment adopted in the study

Procedure	No. of Cases	%
Superficial Parotidectomy	27	90
Total Parotidectomy	3	10
Radical Parotidectomy	0	0
Total Excision	0	0
ER+MRND	0	0
Total	30	100

Superficial parotidectomy was the most common surgery performed (90%). 2 patients with benign tumour underwent total parotidectomy (6.66%). 1 patient with malignant tumour underwent total parotidectomy (3.33%).

Table 7: Complication following surgery

Complications	Benign	Malignant
Facial Nerve Palsy (Temporary)	6	0
Facial Nerve Palsy (Permanent)	1	1
Wound Infection	6	1
Hematoma	2	1
Fistula	0	0
Frey's Syndrome	0	0
Recurrence	0	0
Total	15	3

Temporary facial nerve palsy was observed in 6 patients (20%). Permanent facial palsy was observed in one patient with benign tumour (3.33%) and in one patient with malignant tumour (3.33%). Wound infection was found in 6 patients with benign tumours (20%)

and in one patient with malignant tumour (3.33%). Hematoma was observed in 2 patients with benign tumour (6.66%) and in one patient with malignant tumour (3.33%).

Table 8: Frequency of cases diagnosed in FNAC

Tumour	FNAC +VE Number	%	FNAC -VE Number	%
Benign	28	93.33	1	3.33
Malignant	1	3.33	0	0.00
Total	29	96.66	1	3.33

In FNAC exact histological correlation was found in 96.66% of all cases. Among benign tumours, one FNAC report was given as Pleomorphic adenoma, HPE turned out to be Neurilemmoma. There

was only one malignant tumour, FNAC was Mucoepidermoid tumour, HPE also came as low grade Mucoepidermoid tumour.

Table 9: Clinical examination in diagnosis of parotid gland tumours

Diagnosis	Clinical Examination	HPE
Benign	29	29
Malignant	1	1

Clinical diagnosis was able to identify all benign tumours as benign and all malignant tumours. But exact histopathological correlation was found only in 24 cases(80%) of cases.

Table 10: Distribution of various types of parotid gland tumours

Tumour	Total No. of Cases	% of Total
Pleomorphic Adenoma	24	80
Mucoepidermoid Carcinoma	1	3.33
Warthins	3	10
Adenoid Cystic Carcinoma	0	0
Acinic Cell Carcinoma	0	0
Basal Cell Carcinoma	0	0
Benign Lymphoepithelial Tumour	0	0
CA EX Pleomorphic Adenoma	0	0
Oncocytoma	1	3.33
Neurilemmoma	1	3.33
Total	30	100

Pleomorphic adenoma was the most common tumour encountered in the study (80%). 10% of patients had Warthin's tumour. Only one patient had malignant tumour (3.33%), which was low grade Mucoepidermoid tumour.

medical sciences, during the period January 2019 and February 2020 were studied. Detailed analysis has been done and has been compared with statistics available from Indian authors and other authors of the world.

Discussion

In this study, a short series of 30 cases of salivary gland tumours, which were admitted to the surgical units of Kamineni Institute of

Age distribution

Table 11: Average age distribution of parotid gland tumours in various studies

Series	Average age in year	
	Benign	Malignant
Silas OA et al. (2009)[7]	31	58
De Olivera et al. (2002)[8]	43	55
Pablo Augustin Vargas et al. (2002)[9]	47.7	48.8
Present study	37.51	35

Benign tumours often occur at younger age group. Malignant tumours usually occurs in older age group. Since one malignant case

was observed in the present study, average age in this group was 35(which is very low compared to other studies).

Sex distribution

Table 12: Sex distribution of parotid gland tumours in various studies

Series	Male	Female	Total	Ratio (M:F)
Edda AMVuhahulla et al. (2009)[10]	113	148	261	1:1.3
De Olivera et al.(2009)[11]	234	365	469	1:1.6
Silas OA et al.(2009)[12]	86	116	202	1:1.4
Present study	14	16	30	1:1.18

Parotid gland tumours are usually common in females. In this study male:female ratio (overall) was 1:3.6, which was very high compared to other studies.

For benign tumours it was 1:3.18, which is very high compared to other studies and for malignant tumours it was 1:0.

Frequency of benign and malignant parotid gland tumours

Table 13: Frequency of benign and malignant parotid gland tumours in various studies

Series	No. of cases	Benign (%)	Malignant (%)
Pablo Augustin Vargas et al.(2002)[13]	124	80%	20%
De Olivera et al. (2009)[11]	599	78.3%	21.7%
Silas OA et al [14](2009)	202	63%	37%
Arathi Bhatia (1993)[15]	87	59.8	40.2
Present study	30	96.67%	3.33%

Most of the parotid gland tumours are benign tumours. In this study also majority (96.67%) of the patients had benign tumours, which was very high compared to other studies.

Clinical feature

Table 14: Comparison of Clinical features

Sign/symptom	Spiro RH (1986)[16]	Present study
Swelling	100%	100%
Pain – Malignant	10%	3.33%
Facial palsy	22%	3.33%
Cervical lymph node	23%	0%
Fixity to masseter/mandible	-	0%
Deep lobe involvement	-	10%

Almost in all studies swelling was the most common clinical feature. It was present in 100% of cases in this study. Pain was present in 3.33% of cases and facial palsy was found in 3.33% of cases.

FNAC comparison with histopathological diagnosis.

Table 15: Frequency of Diagnostic accuracy of FNAC in various studies

Series	Benign (%)	Malignant (%)
Frable and Frable[17]	91	92
Spiro RH[16]	98	93
Lu BJ et al[18]	91.7	82.4
Present study	93.1	100

Diagnostic accuracy of FNAC was 93.1% for benign parotid gland tumours in the present study, which was comparable to other studies. FNAC was 100% accurate in diagnosing malignancy in this study.

Types of surgery

Table 16: Comparison of various types of surgery in parotid gland tumours

Surgery	Leverstein H[19]	Present study
Superficial parotidectomy	24.89%	90
Partial superficial parotidectomy	53.869%	-
Total parotidectomy	3.27%	10

Superficial parotidectomy was the most common surgery performed in this study. Total parotidectomy was done for 10% of patients of which one case was malignant parotid tumour.

Histological types of tumour

Table 17: Frequency of parotid gland tumours in various studies

Series	Seth GS Medical College, Bombay[20]	Jesus Souza et al[21]	Pablo Augustin Vargas et al[13]	Present study
PA	64	34	67.2%	80%
BCA	6	-	0.8%	-
WT	1	8	10.48%	10%
MEC	5	11	10.48%	3.33%
ACC	2	-	0.8%	-
AdCC	2	-	4.03%	-
Undifferentiated Ca	-	1	-	-
CA Ex PA	-	3	2%	-
Metastatic deposits	-	-	-	-
BLE	-	-	-	-

Most common complication following surgery was wound infection (23.33%), which was very high compared to other studies. Other main complications were facial palsy, both temporary (20%) and permanent facial palsy (6.67%) and of course hematoma formation which was found in 10% cases.

Table 18: Frequency of postoperative complications in various studies

Complication	Owen ERTC et al. (2005)[22]	Shashinder S et al. (2009)[23]	Present study
Facial palsy(temporary/permanent)	38%/9%	35%/4%	20%/6.67%
Salivary fistula	2%	-	-
Wound infection	-	5%	23.3%
Frey's syndrome	11%	-	-
Hematoma	-	1.31%	10%

Table 19: Permanent facial weakness

Source	Permanent facial weakness
JMH Debetes and Munting JDK et al[24]	7%
Mark E Mehle et al[25]	3.9%
Present study	6.67%

In this study only 2 patients had permanent facial weakness (6.67%), which was comparable to other studies. Among them one patient had malignant parotid tumour.

Conclusion

Surgery is the mainstay of treatment of Parotid gland tumours and superficial parotidectomy is the most commonly performed surgery

for benign parotid tumours. Total parotidectomy is needed for benign tumours with deep lobe involvement as well as for malignant parotid tumours. Depending on the stage of the tumour, other modalities of treatment may be adopted for malignant tumours.

The main complications of surgery are wound infection, facial nerve palsy(both permanent as well as temporary) and hematoma

formation. Other complications like Frey's syndrome and salivary fistulas are rarely encountered. Recurrence of tumour is also possible, for which long term follow up is usually required. But in a developing country like India majority of the patients won't come for follow up and is very difficult to calculate the incidence of recurrence. As majority of patients will have swelling without any other symptoms for a long time they usually present very late and chances of malignant transformation is very high. Early detection and treatment is very essential to prevent disease morbidity and mortality.

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