PAROTID GLAND TUMOURS: A CLINICOPATHOLOGICAL STUDY

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ABSTRACT

BACKGROUND

Salivary gland tumours are interesting and challenging due to their relative infrequency of incidence, Histopathological (HPE) and behavioural diversity and the regional anatomic relationship with important structures. Salivary gland tumours comprise about 3-4% of all head and neck neoplasms. 70% of these tumours arise in parotid gland, 22% in sub-Mandibular gland and 8% in the rest. Of these tumours 80% of parotid, 50% of sub-Mandibular, 50% of sublingual and 25% of minor salivary glands are benign. Parotid gland is the most common site of salivary gland tumours. Most common parotid tumour is pleomorphic adenoma followed by Warthin's tumour. Most common malignant tumour of parotid gland is muco-epidermoid carcinoma. FNAC of salivary gland swelling is commonly accepted, sensitive and specific technique in the diagnosis of both neoplastic and non-neoplastic lesions of salivary gland. The traditional open biopsy is no longer justified because of risk of tumour spillage and damage to the facial nerve. Treatment of parotid tumours is either by surgery (Superficial/Total parotidectomy) alone or surgery followed by radiotherapy in certain cases. Tumours should be excised, not enucleated.

AIMS OF THE STUDY

To study the demographic profile of patients with parotid gland tumours to study the clinico-pathological features of parotid gland tumours. To evaluate the role of FNAC in the pathological diagnosis of parotid gland tumours and to correlate the FNAC reports with histopathology. To study the various surgical procedures adopted for parotid gland tumours and the incidence of immediate complications after surgery.

MATERIALS AND METHODS

Between November 2007 and November 2009 at the Department of surgery of the Government Medical College, Calicut, Kerala 57 patients with parotid neoplasm were clinically evaluated and among them 32 were females and 25 were males. Nearly 50% of the patients belonged to 2nd and 3rd decades followed by 5th and 6th decades. Preliminary FNAC showed 32 (56.16%) out of 57 as pleomorphic adenoma, followed by Warthin's tumour in 17.54% and Muco-epidermoid carcinoma in 10.53%. The Benign epithelial tumour was observed in 8.77%, monomorphic adenoma in 3.51% and adenoid cystic carcinoma in 3.51% of the patients.

RESULTS

All the patients were subjected to excision biopsy and Histo-pathological study. The Sensitivity of FNAC for benign tumours and malignant tumours was 100% and 80% respectively; Whereas the specificity for benign tumour and malignant tumours was 80% and 100% respectively. The Recurrence rate and post-operative facial weakness were low.

CONCLUSIONS

Sensitivity of FNAC for benign tumour was 100% and for malignant tumour was 80%. Specificity of FNAC for benign tumour was 80% and for malignant tumour was 100%. There were no complications attributed to FNAC.

KEYWORDS

Tumours, Parotid, Benign, Muco-Epidermoid, Acinic Cell Tumours.

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INTRODUCTION

Parotid gland is the most common site of salivary gland tumours. Most of these arise in the superficial lobe.⁽¹⁾ Parotid tumours present as slow growing, painless swelling either below the ear or in the upper aspect of neck.

Rarely these tumours may arise from deep lobe which present as para-pharyngeal masses.⁽²⁾ The utilization of parotidectomy for the treatment of neoplasms has been attributed to Betrandi.⁽³⁾ In the initial efforts to treat tumours of the gland, surgeons were concerned primarily about haemorrhage; patients were inevitably left with major disfiguration if they were fortunate enough to survive a parotid resection. By the mid-19th century, focus had shifted to facial nerve anatomy and techniques that would provide access for resection with facial/cranial nerve VII (CN VII) preservation. From a historical perspective, the first operation to use ether inhalation anaesthesia was a parotid tumour resection performed by Dr. John C. Warren in Boston in 1846.⁽³⁾

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The first total parotidectomy with facial nerve preservation is said to have been accomplished by Codreanu, a Romanian, in 1892.⁽³⁾ During the early years of the 20th century, many authors verified that removal of parotid gland tumours was possible with facial nerve preservation.⁽⁴⁾ Blair, Sistrunk, and others attempted to systematize the surgical approach to the facial nerve to ensure anatomic preservation when feasible, while assuring complete resection of the tumour. The first attempts at facial nerve grafting date. From the early 1950s a major series of FNAC of salivary tumours by Lineberg and Akerman in 1972 established the role of FNAC in salivary gland disease.⁽⁵⁾

The course of the facial nerve through the parenchyma of the gland is highly predictable anatomically; however, parotid tumours pose a special challenge to surgeons because of the diversity of histological subtypes and their remarkable variation in clinical behaviour.⁽⁶⁾ Small benign tumours are quite indistinguishable from their malignant counterparts. Even when benignity of the neoplasm can be established with reasonable certainty, most patients are motivated to have surgical resection due to progressive disfiguration of an enlarging benign tumour.⁽⁷⁾ The present study was conducted to analyze the morphological, clinical features and the role of FNAC and HPE in the management of parotid gland tumours in this part of Kerala.

MATERIALS AND METHODS

The present study was conducted between November 2007 and November 2009 in the Department of surgery of the Government Medical College, Calicut, Kerala. Prior approval from the ethical committee of the institute was obtained before commencing the present study. This is a study of descriptive observations was conducted on patients presenting with swelling of the salivary glands. All the patients were subjected to haematological tests and FNAC of the tumour mass. Patients were subjected to appropriate surgical procedure depending upon the tumour mass.

Patients with parotid gland tumours were first evaluated in surgery OPD with history, clinical examination. FNAC advised for every patient and results were reviewed in the next OPD. All pre op investigations and cardiac and chest evaluation and pre anaesthetic check-up were completed before taking patient for surgery. After parotidectomy patients were shifted to post op wards. Those patients who required close monitoring were shifted to surgery ICU. Each post op patients vital, condition of wound, haemorrhage, presence of facial nerve palsy, general condition were evaluated. Sutures were removed on 5th post op day and discharged on next day.

If any post op complications happened like flap necrosis, wound infection patient was kept in the ward till he/she improves. Patients were advised to review after 2 weeks. The follow up of these patients is done by asking them to report for regular check-up. Study design includes the study of demographic & clinico-pathological features of parotid gland tumours and a comparison between preoperative FNAC with final histopathological diagnosis. Cytology slides are stained with Giemsa and Papanicolaou stain and biopsy slides with Haematoxylin and Eosin (H&E) stain. The confirmation of diagnosis is done by histopathological examination of excised specimen. Galen and Gumbino method is used to calculate sensitivity and specificity of FNAC.

Inclusion Criteria

All patients aged above 13 years of both sexes attending with complaints of swelling of the salivary glands were included. Patients with previous history of surgery were included. Patients with recurrence were included.

Exclusion Criteria

Patients below 13 years of age. Patients with inflammatory parotid swelling and parotid abscesses were excluded. Patients with post traumatic parotid swellings were also excluded.

OBSERVATION AND ANALYSIS

The present Study was conducted in Govt. Medical College, Kozhikode, Kerala between November 2007 and November 2009, during which 57 patients with parotid neoplasm were studied. Out of 57 patients 32 were females and 25 were males. 56.14 % females and 43.86% males. Male to female ratio was 1:1.28 (Table 1).

Sex	No	%
Male	25	43.86
Female	32	56.14

Table 1: The Sex Distribution of 57 Patients

The study showed Parotid Tumours in the age groups of 18 – 70 years. The incidence was found to be highest between 2nd and 3rd decades (50.87%) of life followed by 41 to 50 years (17.54%) and 51 – 60 years (14.04%) groups (Table 2).

Age Group	Male	Female	Total	%
0 – 20	1	1	2	3.51
21 – 30	5	11	16	28.07
31 – 40	5	8	13	22.80
41 – 50	5	5	10	17.54
51 – 60	4	4	8	14.04
61 – 70	5	3	8	14.04

Table 2: Showing the Age Distribution (n=57)

The size of the tumour varied in the present study from 1 Cm to 7 Cms. 70.18% of patients presented with tumour size ranging from 2 – 4 cm. There were no patients with tumour size more than 7 Cms (Table 3).

Tumour Size	No. of Patients
1 cm	2
2 cm	10
3 cm	20
4 cm	10
5 cm	7
6 cm	1
7 cm	1

Table 3: Showing the Incidence of Size of the Tumour (n=57)

Among the 57 patients 47.37% of the patients presented with parotid swelling of duration 6m to 1yr. IN 29.82% of the patients the swellings were present between 2 to 4 years. The maximum duration of the swelling presented in the present study was 8 years (Table 4). There were 2 patients presenting with recurrent parotid swelling after parotidectomy. One of them case was done in this institute and other from outside. Both were pleomorphic adenoma cases (Table 4).

Duration	No. of Patients
2 – 5 m	5
6 – 11 m	14
1 year	13
2 yrs.	8
3 yrs.	6
4 yrs.	3
5 yrs.	5
6 yrs.	1
7 yrs.	1
8 yrs.	1

Table 4: Showing the duration of the Swellings (n=57)

Three patients (5.26%) had preoperative facial nerve palsy; two out of them were with permanent and one with temporary facial nerve palsy. The two patients with permanent facial palsy were having muco-epidermoid carcinoma. 11 (19.29%) Patients showed features of malignancy. The symptoms of presentation of these patients were shown in (Table 5).

Clinical Features	No. of Patients
Pain	6
Rapid growth	1
Hard consistency	6
Fixity	4
Cervical lymph nodes	0
Trismus	1
Facial nerve palsy	3
Metastasis	0

Table 5: Showing the Clinical Features of the Swellings (n=57)

In the present study Imaging modalities used were CT and MRI. 8 patients took CT scan and 1 patient took MRI. 9 patients had deep lobe involvement and 2 patients had facial nerve involvement on CT/MRI (Table 6).

CT/MRI Findings	No. of Patients
Deep lobe involvement	9
Facial nerve involvement	2
Cervical lymph nodes	0

Table 6: Showing the Radiological Signs (n=57).

Among the FNAC reports pre operatively 32 (56.16%) out of 57 were showing pleomorphic adenoma, followed by Warthin's tumour in 17.54% and Muco-epidermoid carcinoma in 10.53%. The Benign epithelial tumour was observed in 8.77%, monomorphic adenoma in 3.51% and adenoid cystic carcinoma in 3.51% of the patients (Table 7).

FNAC	Male	Female	Total	%
Pleomorphic adenoma	12	20	32	56.16
Warthin's tumour	9	1	10	17.54
Mucoepidermoid carcinoma	3	3	6	10.53
Benign epithelial tumour	1	4	5	8.77
Monomorphic adenoma	0	2	2	3.51
Adenoid cystic carcinoma	0	2	2	3.51

Table 7: Showing the FNAC Reports of Swellings (n=57)

Among the 57 patients Superficial parotidectomy was done in 59.6%, Excision of deep lobe in 5.3%, and Total conservative Parotidectomy in 15.8% of the patients. Total radical parotidectomy was done in 5.3% and Excision of the tumour masses in 10.5% of the patients (Table8).

Type of Parotidectomy	No. of Patients	%
Superficial parotidectomy	34	59.6
Superficial parotidectomy with excision of deep lobe tumour	3	5.3
Total conservative parotidectomy	9	15.8
Total radical parotidectomy	3	5.3
Excision	6	10.5
Enucleations	2	3.5

Table 8: Showing the Various Surgical Modalities Done (n=57)

Out of 57 patients studied, 3 patients were presented with preoperative facial nerve palsy. Two with permanent and one with temporary facial nerve palsy. In remaining 54 patients, 13 had immediate post-operative temporary facial nerve palsy. No one had permanent post op facial nerve palsy. 24.07% patients had immediate postoperative temporary facial weakness as new complication. 2 patients had minimal flap necrosis and wound infection. They were treated with antibiotics and excision of necrotic area (Table 9).

	Pre op FN Palsy (3 Cases)	Immediate Post op FN Palsy (13 Cases)
Permanent FN palsy	2	0
Temporary FN palsy	1	13

Table 9: Showing the Facial Palsy Incidence (n=57)

The incidence of pleomorphic adenoma in males it was 13/57 (22.80%) and in females it was 22/57 (38.59%). In case of Warthin's tumour the incidence in males it was 8/9 (88.88%), (Table 10).

Tumour (HPR)	Total	Male	Female	Ratio	Age
Pleomorphic adenoma	35	13	22	1:1.7	18-70
Warthin's tumour	9	8	1	8:1	40-69
Mucoepidermoid carcinoma	6	3	3	1	29-66
Basal cell adenoma	2	0	2	0	26-35
Adenoid cystic carcinoma	2	0	2	0	32-35
Myoepithelioma	1	0	1	0	30
Adenocarcinoma	1	0	1	0	50
Acinic cell carcinoma	1	1	0	0	30
Total	57	25	32		

Table 10: Showing the Incidence Various Tumours and their Sex Incidence (n=57)

The FNAC reports and the Histo-pathological reports were compared in the present study; it showed that there was

100% correlation in case of Muco-epidermoid carcinoma, adenoid cystic carcinoma.

Among the 32 FNAC reports as pleomorphic adenoma 2 turned out to be basal cell adenomas and in 1 the histopathological report was adenocarcinoma (Table 11).

FNAC	HPR
Mucoepidermoid carcinoma (6)	Mucoepidermoid carcinoma (6)
Adenoid cystic carcinoma (2)	Adenoid cystic carcinoma (2)
Pleomorphic adenoma (32)	Pleomorphic adenoma (29)
	Basal cell adenoma (2)
	Adenocarcinoma (1)
Warthin's tumour (10)	Warthin's tumour (9)
	Acinic cell carcinoma (1)
Benign epithelial tumour (5)	Pleomorphic adenoma (4)
	Myoepithelioma (1)
Monomorphic adenoma (2)	Pleomorphic adenoma (2)
Table 11: Showing the Correlation between FNAC Reports and Histo-Pathological Reports (n=57)	

The present study showed the incidence of benign tumours was 82.46% and malignant tumours were 17.54%. The Pleomorphic adenoma was the commonest tumour (61 %) of all tumours and constituted 74.46% of benign tumours. Among malignant parotid tumours mucoepidermoid carcinoma was the commonest tumours. 100% correlation between FNAC and HPE for mucoepidermoid cancer and adenoid cystic carcinoma was observed. One case of pleomorphic adenoma by FNAC turned out to be adenocarcinoma by HPE and one case of Warthin's tumour by FNAC turn out to be Acinic-cell carcinoma by HPR. Both are rare tumours (Table 12).

FNAC	HPR
Benign tumour (49)	Benign tumour (47)
	Malignant tumour (2)
Malignant tumour (8)	Malignant tumour (8)
Table 12: Showing the Correlation between FNAC and HPE (n=57)	

The Sensitivity of FNAC for benign tumour was 100% and for malignant tumour it was 80%. Whereas the specificity of FNAC for benign tumour was 80% and for malignant tumour it was 100% (Table 13).

Tumour	Sensitivity	Specificity
Benign	100%	80%
Malignant	80%	100%
Table 13: Showing the Sensitivity and Specificity		

DISCUSSION

The present study of 57 patients with Parotid gland neoplasm reported in department of General surgery, Govt. medical college, Kozhikode, Kerala between November 2007 and November 2009. Only a few recorded analysis of parotid gland tumours based on significantly large number of cases are published from India. Among them the noted studies are by Narinder Singh et al (255 cases) and Shafkat Ahmed et al (259) cases (Table 14).

Highest Incidence	Present Study	Narinder Singh et al	Shafkat Ahmad Study
Benign tumours	2 nd and 3 rd decade	3 rd and 4 th decade	3 rd and 4 th decade
Malignant tumours	3 rd and 4 th decade	4 th and 5 th decade	4 th and 5 th decade
Table 14: Showing Comparison of Incidence between the Present and other Two Studies			

Parotid gland tumours were observed in the age groups of 18 to 70 years. But the highest incidence was in 2nd and 3rd decade for benign tumours and 3rd and 4th decades for malignant tumours. The average age for benign tumours was 39.23 years for malignant tumours it was close to 32.7 years and 44.1 years for malignant tumours as reported by Narinder Singh et al.⁽⁸⁾ and 35.7 years for benign and 42.4 for malignant tumours as reported by Shafkat Abrnad study (Table 15).⁽⁹⁾

Average	Present Study	Narinder Singh et al	Shafkat Ahrnad Study
Benign tumours	39.23 yrs.	32.7 yrs.	35.7 yrs.
Malignant tumours	44.1 yrs.	42.4 yrs.	42.4 yrs.
Table 15: Showing the Incidence of Benign and Malignant Tumours between the present Study and other Two Studies			

Male to female ratio was 1:1.28. The incidence for benign salivary gland tumours (82.49) is higher than the malignant tumours (17.54%) comparable to by Shafkat Abrnad study in which benign is 86% and malignant is 14%. The duration of symptoms ranged from 2m days to 8 years. The age range is 18 to 70 yrs. The age range reported by Chan et al (1992) was between 25 and 83 years (Table 16).

	Present Study	Shafkat Ahrnad
M:F ratio	1:1.28	1.1:1
Benign	82.46%	86%
Malignant	17.54	14%
Duration of symptoms	2m -8 yrs.	45days -25 yrs.
Age range	18 - 70 yrs.	46 days -80 yrs.
Table 16: Showing the Comparative Incidence of Parotid Tumours according to the Age and Duration of Symptoms		

The commonest symptoms were painless swelling which was present in all cases. Similar observations were made by Loke - Wallance et al and Sharkey study.⁽¹⁰⁾ Loke- Wallance et al study reported the range of tumour size in his series to be 1.8-4 cm whereas Sharkey reported a mean size ranging from 0.5 - 7 cm.¹¹ In the present series, mean tumour size ranged from 1-7cm (Table 17).

	Present Study	Shafkat Ahrnad	Loke Wallance et. al	Sharkey
Common Symptom- Painless swelling	100%	99%	100%	100%
Range of tumour size	1 - 7 cm	0.5- 2.5.5 cm	1.8-4cm	0.5- 7 cm
Table 17: Showing the Comparative Study in Relation to Symptoms and Size of the Tumour				

All the 57 cases were subjected to FNAC, as it was a quick, simple, rapid, inexpensive and harmless procedure. All patients were subjected to surgery. Excised tumour masses were subjected to HPE. The reports by FNAC and HPE were correlated in (Table 12, 13). Sensitivity of FNAC for benign tumour was 100% and for malignant tumour it was 80% and for malignant tumour was 100%. Thus FNAC was observed as a practical, quick, simple, inexpensive and harmless procedure and a useful technique for the diagnosis of the parotid gland tumours in the present study. There were 2 cases of recurrent parotid gland tumours. Both were pleomorphic adenomas. Both the patients had undergone excision/enucleations for pleomorphic adenoma previously within one to two years. Narinder Singh et al reported recurrence in 10 cases in benign tumours and 8 malignant tumours. Our observations are not consistent with most authors may be because of short follow up period in the present study. In a similar study by Shafkat Ahmed the recurrences were 3 among the malignant tumours and 2 among the benign tumour (Table 18).

Recurrence	Present Study	Shafkat Ahmed	Narinder Singh et Al
Benign	2	3	10
malignant	0	2	8

Table 18: Showing the Comparative Study of Recurrence of Tumours Parotid Gland

Pleomorphic adenoma was the commonest tumour (61%) of all tumours and constituted 74.46% of benign tumours. Warthin's tumour was another common benign tumour, about 19.148% of all benign tumours. Similar high incidence of pleomorphic adenoma 83.9% was observed by Masanja study of Kenyan population.^(11,12) (Table 19).

Benign Tumour	Present Study	Masanja Study
Pleomorphic adenoma	74.46% of benign tumours	83.9% of benign tumours

Table 19: Showing the Comparative Study of Incidence of Pleomorphic Adenoma of Parotid (n=57)

Warthin's tumour was also found second commonest benign tumour in other series. Among malignant parotid tumours, Mucoepidermoid carcinoma was the commonest tumour in this study. Mucoepidermoid carcinoma was most common malignant tumour amounting to 60% of malignant tumours and 17.5% of all parotid tumours. Mucoepidermoid carcinoma was found in about 14% of parotid tumours by Hill and about 35% of malignant tumours by Speight and common malignant tumour in other studies.^(13,14) Adenoid cystic carcinoma was another frequently found malignant tumour in the present study. Incidence of Acinic cell carcinoma was identical to other published series.

Malignant Tumour	Present Study	Hill Study	Speight Study
Mucoepidermoid tumour	60% of malignant tumours	14% of malignant tumours	35% malignant tumours

Table 20: Showing the Incidence of Muco-Epidermoid Tumours (Table 20)

In the Cleveland clinic foundation study, 46.1% patients had post-operative transient facial nerve palsy and 3.6% patient had permanent facial nerve palsy.

In our study 3 patients presented with preoperative facial nerve palsy among them two with permanent and one with temporary facial nerve palsy. In the remaining 54 patients, 13 had immediate post-operative temporary facial nerve palsy. No one had permanent post op facial nerve palsy. So 24.07% patients had immediate post op temporary facial weakness as new complication (Table 21).

Facial Nerve Weakness

Facial Nerve Weakness	Present Study	The Cleveland Clinic Foundation Study
Immediate post op transient facial nerve palsy	24.07%	46.1%
Permanent post op facial nerve palsy	0%	3.6%

Table 21: Showing the Comparative Study of Incidence of Facial Weakness

CONCLUSIONS

Parotid Tumours were observed in the age groups of 18-76 years. Male to female ratio was 1: 1.28. The highest incidence was in the 2nd and 3rd decades in benign and 3rd and 4th decades for malignant tumours. 100% patients presented with a swelling or palpable mass. The benign tumours constitute 82.46% and malignant tumours 17.54%. Pleomorphic adenoma was the commonest tumour (61%) of all tumours and constitutes 74.46% of benign tumours. Among malignant parotid tumours mucoepidermoid carcinoma was the commonest tumour. Sensitivity of FNAC for benign tumour was 100% and for malignant tumour was 80%.

Specificity of FNAC for benign tumour was 80% and for malignant tumour was 100%. There were no complications attributed to FNAC. FNAC is very useful in the diagnosis of salivary gland swelling. There were total 2 recurrent cases and both were pleomorphic adenoma. The treatment modalities used were superficial parotidectomy, superficial parotidectomy with excision of deep lobe tumours, total conservative parotidectomy, total radical parotidectomy, excision and enucleations. 24.07% patients had immediate temporary post op facial weakness and no one had permanent post op facial nerve palsy. 3.5% patient had post op flap necrosis and wound infection.

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