

Clinical Study and Management of Parotid Tumors

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Abstract

Introduction: The parotid gland is the most common site for salivary gland tumors. 70-80% of salivary gland neoplasms occur in the parotid gland, of which 80% are benign, 20% are malignant of which 80% of the benign tumors are pleomorphic adenomas.

Aims and Objectives: (1) To know the incidence of parotid gland tumors with respect to age and sex. (2) To study the various modes of clinical presentation of parotid tumors. (3) To evaluate the various modes of surgery and outcome of surgical management of the parotid gland tumors at Mahatma Gandhi Memorial (MGM) Hospital, Warangal.

Materials and Methods: This study was conducted from November 2012 to May 2014, over a period of 1-year and 6-month. 30 patients admitted to MGM Hospital, Warangal, with parotid gland neoplasms are included in this study. Inclusion criteria all patients with parotid swelling due to parotid tumors from 13 years of age of MGM Hospital, Warangal. Exclusion criteria all pediatric patients, tumor-like conditions and infectious causes of swelling are excluded.

Results: (1) Age incidence in parotid tumors, (2) clinical presentation of parotid tumors, (3) incidence in relation to duration of mass, (4) surgical treatment adopted in the study, (5) distribution of HPE diagnosis of tumors, (6) fine needle aspiration cytology (FNAC) and histopathology correlation, (7) correlation of FNAC with histopathological examination, (8) incidence of benign and malignant parotid tumors, (9) distribution of benign tumors, (10) distribution of malignant tumors.

Discussion: In this study, the most patients were in the 3rd and 5th decade of life. Malignant tumors were common in the 4th and 5th decade. Malignant tumors were encountered more in the older age group in comparison to benign ones.

Conclusion: A total of 30 cases admitted to MGM Hospital attached to Kakatiya Medical College from November 2012 to May 2014 over a period of 1½ years were included in this study.

Key words: Parotid Tumour, Fine Needle Aspiration, Histopathological Examination

INTRODUCTION

The parotid gland is the most common site for salivary gland tumors. 70-80% of Salivary gland neoplasms occur in the parotid gland, of which 80% are benign, 20% are malignant of which 80% of the benign tumors are pleomorphic adenomas.

Parotid tumors are generally slow growing and have been present for several years before the patient seeks 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 malignant tumors present very late and need radical treatment which carries high morbidity.

Swelling is the most common symptom in parotid tumors. Most of the malignant tumors present with pain. Most of the benign tumors exhibit a slow growth pattern and malignant tumors Exhibit a rapid growth pattern.

Fine needle aspiration cytology (FNAC) is a good tool in diagnosing parotid gland tumors. Neural involvement is common in adenoid cystic carcinoma. Surgery is the main stay of the treatment for parotid tumors.

During the period from November 2012 to May 2014, 30 cases of parotid tumors have been admitted to Mahatma

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Gandhi Memorial (MGM) Hospital, Warangal. 12 cases are presented in detail for the purpose of this dissertation.

Aims and Objectives

- 1 To know the incidence of parotid gland tumors with respect to age and sex
- 2 To study the various modes of clinical presentation of parotid tumors
- 3 To evaluate the various modes of surgery and outcome of surgical management of parotid gland tumors at MGM Hospital, Warangal.

MATERIALS AND METHODS

This study was conducted from November 2012 to May 2014, over a period of 1-year and 6-month. 30 patients admitted to MGM Hospital, Warangal, with parotid gland neoplasms are included in this study.

Inclusion Criteria

All patients with parotid swelling due to parotid tumors from 13 years of age of MGM Hospital, Warangal.

Exclusion Criteria

All pediatric patients, tumor-like conditions and infectious causes of swelling are excluded from the study.

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.

Regarding physical examination, particulars mentioned in the proforma were noted. Importance was given to the site, extent of the tumor, deep lobe enlargement and fixity to the surrounding structures, facial nerve involvement, and regional lymphadenopathy. Associated medical conditions such as diabetes, hypertension, and anemia were managed and controlled before surgery with physician's advice.

As a part of general workup for surgery in all patients, hemoglobin level, bleeding time, clotting time, urine, sugar albumin, microscopy, and chest screening. Electrocardiogram, blood urea, serum creatinine, random blood sugar were estimated. Specific investigations like FNAC were done for all patients in the study group.

Sialography is not done for any of these patients because it may cause inflammation or infection. Extravasation of the dye may cause a severe inflammatory reaction preventing

a clear demarcation of tumor margins and may also delay the planned surgical procedure.

After evaluation of the tumor by clinical examination and specific investigations, a surgical plan was formulated. The final decision was taken per operatively by the surgeon. The specimen was sent for histopathology for final diagnosis. The adjuvant treatment was decided depending on the final histopathological report.

Different modalities of treatment adopted in this study are as follows:

- Surgery alone
- Surgery and postoperative radiotherapy.

Different surgical procedures adopted in this study are as:

- Superficial parotidectomy
- Total conservative parotidectomy.

The follow-up period of these patients ranged from 3 months to 1 year. Long-term follow-up is necessary to study the tumor recurrence, which was not possible in this study.

RESULTS

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

Age Incidence in Parotid Tumors

The age incidence of the patients in the study group ranged from 13 to 72 years. The malignant tumors occurred between the age group of 36-72 years. Most patients in this series were in the 4th decade of life. The mean age was 37.6 years for benign tumors and 50.7 years for malignant tumors (Table 1).

Sex Distribution of Parotid Tumors (Table 2)

Out of 30 patients parotid tumours, 18 patients were Male, 12 Patients are female.

Side of the Tumor

About 60% of parotid tumors occurred in the left parotid gland in this study (Table 3).

Clinical Presentation of Parotid Tumors

All patients presented with swelling in the parotid region. Features of rapid growth, pain and associated facial paralysis were considered as signs of malignancy. Hard in consistency is noted mostly in a malignant tumor. Out of 30 patients, 5 patients presented with pain (16.67%) in swelling, out of which 5 were malignant.

Table 1: Age incidence in parotid tumors

Age group	Total number of cases	Percentage	Pleomorphic adenoma	Warthins tumor	Basal cell adenoma	Oncocytoma	Malignant mixed tumor	Acinic cell carcinoma
13-20	2	6.67	2		1			
21-30	8	26.67	5	1				
31-40	7	23.33	7				1	
41-50	9	30.0	6	1			2	1
51-60	2	6.67	1					
61-70	1	3.33				1		
71-80	1	3.33					1	
Total	30	100	21	2	1	1	4	1

Table 2: Sex distribution of parotid tumor

Sex	Number of cases	Percentage	Pleomorphic adenoma	Warthins tumor	Basal cell adenoma	Oncocytoma	Malignant mixed tumor	Acinic cell carcinoma
Male	18	60	11	2	1	1	2	1
Female	12	40	10				2	
Total	30	100	21	2	1	1	4	1

Pain occurred in 100% of the patients with malignant tumors. Deep lobe enlargement was seen in two patients in this series. No patient had fixity to masseter/mandible. No patient had facial nerve paralysis at presentation (Table 4).

Incidence in Relation to Duration of Mass

All patients presented with swelling in the parotid regions of which most cases (66.6%) presented within 5 years after noticing the swelling (Table 5).

FNAC Diagnosis of Tumors

In this study, the number of cases of pleomorphic adenoma cases diagnosed by FNAC was 26 which is the most common benign parotid tumor and among malignant tumors malignant mixed tumor has the highest incidence of two cases (Table 6).

Surgical Treatment Adopted in the Study

Surgery was performed in 30 patients, the type of surgery was chosen according to clinical impression, FNAC and per-operative findings. Superficial parotidectomy was performed in 25 patients (83.33%), conservative total parotidectomy in five patients (16.67%). In this study, radical parotidectomy and RND was not done in any of the patients (Tables 7-9).

In this study, after subjecting the specimens of tumor tissue for HPE among the benign tumors the number of cases of pleomorphic adenoma was 21 followed by warthins tumor - 2 cases among malignant tumors malignant cases, malignant mixed tumor were four cases followed by acinic cell carcinoma 1 case (Table 10).

FNAC and Histopathology Co-relation

All 30 cases subjected to FNAC and were reported as parotid tumors. After surgical excision or biopsy, all

Table 3: Distribution of side of the tumor

Side of the tumor	Number of cases (n=30)	Percentage
Right side	12	40
Left side	18	60

Table 4: Clinical Presentation of parotid tumours.

Signs and symptoms	Number of cases	Overall (%)
Swelling	30	100
Pain	5	16.67
Fungating mass	0	0
Symptoms of facial palsy	-	-
Cervical lymphadenopathy	-	-
Deep lobe involvement	2	6.66
Fixity to masseter/mandible	-	-

Table 5: Incidence in relation to duration of the mass

Signs and symptoms	Number of cases	Overall (%)
1-12 months	5	16.67
1-5 years	15	50
6-10 years	9	30
11-15 years	1	3.33

specimens were studied histopathologically and the table below shows correlation between FNAC reporting and histopathological diagnosis (Table 11).

FNAC showed 28 cases to be benign and 2 cases to be malignant but on HPE benign tumors are 24 and malignant tumors are 6 in number.

In this study, FNAC correctly diagnosed benign from malignant in 93.3% of the cases.

Overall pleomorphic adenoma, constituted 70% of the tumor and among malignant tumor, malignant mixed tumor constituted 13% of the tumors in the series (Table 12).

In this study, among the benign tumors pleomorphic adenoma constituted 84% of the benign tumors and among the malignant tumors, malignant mixed tumor constituted 80% of the malignant parotid tumors (Tables 13 and 14).

Recurrent Tumor

One recurrent tumor was operated in this series. It was acinic cell tumor.

Adjuvant Treatment

Radiotherapy was given to five patients, with a malignant tumor of the parotid gland, five patients were given postoperative radiotherapy. Out of these, four patients had a malignant mixed tumor and another one had acinic cell tumor. One patient received radiotherapy developed xerostomia, which was treated conservatively. No patients were given chemotherapy in this series.

Table 6: Distribution of FNAC diagnosis of tumors

Diagnosis	Number of patients	Percentage
Pleomorphic adenoma	26	86.7
Warthin's tumor	1	3.33
Acinic cell carcinoma	1	3.33
Malignant mixed tumor	2	6.7

FNAC: Fine needle aspiration cytology

Table 7: Types of surgical treatment adopted in the study

Procedure	Number of cases	Percentage
Superficial parotidectomy	25	83.33
Conservative total parotidectomy	5	16.67

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Table 9: Complications following surgery

Complications	Pleomorphic adenoma	Warthins tumor	Basal cell adenoma	Oncocytoma	Malignant mixed tumor	Acinic cell carcinoma	Total
Immediate post-operative facial nerve weakness	4	1	0	1	1		7 (28.33)
Permanent facial nerve weakness	3		0	1	1		5 (16.66)
Parotid fistula	2	0					2 (6.66)
Wound infection	2					2	4 (13.33)
Frey's syndrome	1						1 (3.3)
Seroma	-	-	-	-	-	-	0
Bleeding/hematoma	-	-	-	-	-	-	0
Hypesthesia of cheek/ear lobule	-	-	-	-	-	-	0

Follow up

In this series follow-up ranged from 3 months to 1 year. To know the recurrence of a tumor long-term follow-up is necessary which was not possible in this study. In spite of repeated postal reminders, most of the patients in this study did not respond. During the study period, none of the operated patients came back with recurrent diseases.

DISCUSSION

In this study, most patients were in the 3rd and 5th decade of life. Malignant tumors were common in the 4th and the 5th decade. Malignant tumors were encountered more in the older age group in comparison to benign ones. The mean age group was 37.6 years for benign tumors and 50.7 years for malignant tumors. Whereas mean age for benign tumors is 51 years and mean age for malignant tumors is 40 years in the study by Lim *et al.* (Table 15).

Males were affected more than females in both benign and malignant tumors. The duration of swelling was from 8 months to 12 years. The history of the duration of the swelling is not significant, as long-standing benign tumor may turn malignant.

Sex ratio of both benign and malignant tumors has been 3:2 in the present study, compared to a near equal distribution of tumor in both sexes in other studies. However, there a general male preponderance as seen in the study by Suwala *et al.* and Kawata *et al.* (Table 16).

In the present series, left sided tumors are more common than on the right side. Similar observations are made by Suwala *et al.* and Marcello Donati *et al.* (Table 17).

Discussion on Clinical Features of Parotid Tumors

All patients presented with a history of swelling in the parotid region. 16.67% of the patients presented with pain in the swelling. No patient presented with facial nerve palsy. In this series, 100% of the patients with malignant parotid disease presented with pain. No patient presented with cervical lymph node metastasis.

Table 10: Distribution of HPE diagnosis of tumors

Diagnosis	Number of patients	Percentage
Pleomorphic adenoma	21	70
Warthins tumor	2	6.66
Basal cell adenoma	1	3.33
Oncocytoma	1	3.33
Malignant mixed tumor	4	13.33
Acinic cell carcinoma	1	3.33

HPE: Histopathological examination

Table 11: Correlation of FNAC with histopathological examination

Diagnosed as benign		Diagnosed as malignant	
FNAC	Biopsy	FNAC	Biopsy
28	24	2	6

FNAC: Fine needle aspiration cytology

Table 12: Incidence of benign and malignant parotid tumors

Individual tumors	Number of patients (n=30)	Percentage
Pleomorphic adenoma	21	70
Warthins tumor	2	6.66
Basal cell adenoma	1	3.33
Oncocytoma	1	3.33
Malignant mixed tumor	4	13.33
Acinic cell carcinoma	1	3.33

Table 13: Distribution of benign tumors

Benign tumors	Number of cases (n=25)	Percentage
Pleomorphic adenoma	21	84
Warthins tumor	2	8
Basal cell adenoma	1	4
Oncocytoma	1	4

Table 14: Distribution of malignant tumors

Malignant tumors	Number of cases (n=5)	Percentage
Malignant mixed tumor	4	80
Acinic cell carcinoma	1	20

The presence of facial nerve paralysis, skin infiltration or ulceration, and metastatic neck nodes were found only in patients with malignant tumors. A history of pain, hardness, and fixity, found in 30-50% of parotid cancers were significant indicators of malignancy as seen by Lam *et al.*⁷

Accuracy of FNAC

In this study, FNAC correctly diagnosed benign from malignant in 93.3% of the cases.

Superficial parotidectomy was performed in 25 patients (83.33%), conservative total parotidectomy in 5 patients

Table 15: Discussion on age incidence in parotid tumors

Author	Mean age for benign tumors (years)	Mean age for malignant tumors (years)
Lim <i>et al.</i> ²	51	40
Present study	37.6	50.7

Table 16: Discussion on sex incidence in parotid tumors

Author	Males:female ratio
Suwala <i>et al.</i> ³	1.01:1
Pietniczka-Zaleska <i>et al.</i> ⁴	0.7:1
Kawata <i>et al.</i> ⁵	1.06:1
Present study	3:2

Table 17: Discussion on incidence of side of the tumor

Author	Side of the tumor	
	Right (%)	Left (%)
Suwala <i>et al.</i>	40	60
Marcello Donati <i>et al.</i> ⁶	43.7	56.3
Present study	40	60

Table 18: Study on types of surgical treatments adopted in the study

Author	Superficial parotidectomy (%)	Total conservative parotidectomy (%)
Corcione <i>et al.</i> ⁸	12.7	50.9
Patey <i>et al.</i> ⁹	55.88	35.2
Present study	83.3	16.7

(16.67%). In this study, radical parotidectomy and RND was not done in any of the patients (Table 18).

Preservation of the facial nerve and serious postoperative complications can be minimized following superficial and/or total conservative parotidectomy as seen in the study by al-Naqueeb *et al.*¹⁰

Radiotherapy was given to five patients with malignant tumors of the parotid gland. Five patients were given postoperative radiotherapy, and four patients are presented with malignant mixed carcinoma and one patient presented with recurrent Pleomorphic adenoma it turned out to be acinic cell carcinoma. In the management of malignant tumors, the usefulness of radiotherapy as an adjuvant to surgery has been accepted by all authors.

Chemotherapy is of doubtful benefit in the management of malignant parotid tumors and in this study it has not been given a trial (Table 19).

Table 19: Discussion on complications following surgery in parotid tumor

Complications	Bova.R <i>et al.</i>	Klintworth N <i>et al.</i>	Mantsopoulos K <i>et al.</i>	Present study
Immediate postoperative facial nerve weakness (%)	20	6	22.8	23.3
Permanent facial nerve weakness (%)	3.5	2	9.8	16.6
Parotid fistula (%)	-	2	-	6.6
Wound infection (%)	2.3	-	-	13.3
Frey's syndrome (%)	-	-	11.3	3.3
Seroma (%)	6.6	5	-	-
Bleeding/hematoma (%)	3.5	0.8/3	-	-
Hypoesthesia of cheek or ear lobule (%)	-	10	-	-

Temporary Facial Weakness

In this study, post-operative facial nerve weakness occurred in 7 patients (23.33%) And in 3 patients facial nerve weakness recovered completely over 6 months. Reported incidence of immediate post-operative facial weakness varies between 6 and 23% as per western literature. Normal function usually returns within 3-6 months but it may take up to 1 year. It may be caused by nerve ischemia, fatigue from excessive stimulation, stretching or hematoma formation.

Permanent Facial Weakness

In this study, postoperatively 16.6% (No. 5) of the patients developed permanent facial weakness, which is more compared with the western literature (3 patients with malignant mixed tumor and 1 patient with acinic cell pleomorphic adenoma). Reported incidence of permanent facial weakness in 2-9.8%, as per western literature.

Mehle *et al.* and Lacourrey *et al.* have reported 46% and 65% incidence of immediate post-operative facial weakness. Permanent facial weakness was 4% in both the series. Permanent facial weakness is slightly higher compared to western literature (Table 20).

Parotid Fistula

Parotid fistula occurred in 2 patients with pleomorphic adenoma who had undergone superficial parotidectomy, healed spontaneously within 3 months which is more compared to Klintworth *et al.* and Bova *et al.* As these cases are less frequently done in MGM hospital the number of parotid fistulas is more.

Wound Infection

Wound infection occurred in 4 patients due to poor nutritional status of the patients due to low socio-economic status of the patients, incidence of infection is more compared to other studies. Infection healed with antibiotic treatment.

Frey's Syndrome

There has been a single case of Frey's syndrome which is less compared to Mantusopoulos *et al.* In the studies

Table 20: Studies on permanent facial nerve weakness

Author	Permanent facial weakness (%)
JMH Debetes and JDK Munting <i>et al.</i> ¹	7
Mehle <i>et al.</i> and Laccourreye <i>et al.</i>	4
Present study	16.67

Table 21: Discussion on distribution of benign and malignant tumors

Author	Benign tumors (%)	Malignant tumors (%)
Van Niekerek <i>et al.</i> ¹¹	80.2	19.8
Dunn <i>et al.</i> ¹²	69.2	30.8
Suwala <i>et al.</i> ³	88	12
Present study	83.3	16.7

carried out by Klintworth *et al.* and Bova *et al.*, cases of Frey's syndrome are nil as cases of parotid are done less frequently in MGM hospital. It was managed conservatively (Table 21).

Benign parotid tumors amount to 83.3% in the present study, whereas malignant parotid tumors amount to 16.7%. Similar observations were seen with other studies (Table 22).

Among benign tumors pleomorphic adenoma is the most common tumor amounting to 70% of all parotid tumors, which is slightly more compared to other studies. Whereas Warthin's tumor is less compared to other studies as the incidence is more in older white men.

Among malignant tumors, the incidence of the malignant mixed tumor is more-13.3% and a similar observation is made by Przewoźny *et al.* which is 20.6%.

In this study, pleomorphic adenoma was the most common tumor encountered constituting 70% of the parotid tumors. Among the benign parotid tumors Pleomorphic adenoma constituted about 84%, Warthin's tumor constituted about 8% of the benign parotid tumors. Among malignant tumors, the most common was malignant mixed tumor

Table 22: Discussion on distribution of individual tumors

Author	Pleomorphic adenoma (%)	Warthin's tumor (%)	Basal cell adenoma (%)	Oncocytoma (%)	Malignant mixed tumor (%)	Acinic cell carcinoma (%)
Przewoźny <i>et al.</i> ¹³	65.5	24	4.2	-	20.6	-
Lee <i>et al.</i> ¹⁴	61.6	13.2	-	-	-	-
Eddey <i>et al.</i> ¹⁵	60.14	15.94	-	2.63	-	2.63
Present study	70	6.6	3.33	3.33	13.3	3.3

constituting 80%, Acinic cell carcinoma constituting 20% of the malignant tumors.

CONCLUSION

- Thirty cases admitted to Mahatma Gandhi Memorial Hospital attached to Kakatiya Medical College from November 2012 to May 2014 over a period of 1½ years were included in this study
- Incidence of parotid tumors is highest in the 3rd to 5th decade constituting 65% of patients
- Male to female ratio for parotid tumors is 3:2
- Benign tumors of the parotid constituted about 83.33% and malignant tumors constituted 16.66% of the parotid neoplasms in the study
- All patients presented with swelling in the parotid region
- Pain was the second most common symptom. The pain was noticed in 16.67% of the patients. Pain in the swelling occurred in 100% of the malignant tumors
- None of the patients in this series presented with facial nerve weakness or cervical lymph node metastasis
- Nearly, 6.66% of the patients presented with enlargement of the deep lobe of the parotid gland
- Pleomorphic adenoma was the most common tumor in this series constituting 70% of the overall parotid tumors
- Pleomorphic adenoma was the most common benign tumor constituting 84% of the benign tumors
- Malignant mixed tumor was the most common malignant tumor constituting 80% of the malignant parotid tumors
- FNAC was done in all patients. In this study, FNAC correctly diagnosed benign from malignant in 93.3% of the cases
- Sialography is seldom indicated in parotid gland neoplasms because it may cause inflammation or infection. Sialography was routinely done previously in patients with parotid gland neoplasms; Extravasation of the dye may cause a severe inflammatory reaction, preventing a clear demarcation of tumor margins and may also delay the planned surgical procedure
- The treatment of choice for parotid neoplasms is mainly superficial parotidectomy. This may be followed by radiotherapy if the tumor is malignant

- In this study, all patients with malignant tumors were given post-operative radiotherapy. No patient with benign tumors of the parotid was given radiotherapy
- No patients in the study were given chemotherapy
- Most common post-operative complication is facial nerve weakness
- The incidence of permanent facial nerve weakness was 16.6%. This is more comparable to western standard (2-9.8%) This has occurred mainly in patients with malignant tumors. In this study, no form of facial nerve repair was done
- In view of the late presentation, in this series, which can adversely affect in malignant tumors, increased community awareness for early referral is mandatory
- The adequacy of treatment cannot be commented because of the short follow-up of these patients in the study. The study group in this series is small, as compared to large series in western literature; so statistical data in this series may not represent the actual data quoted in the western literature.

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