

A STUDY ON PAROTID SWELLINGS

Alli Muthiah¹, Ramachandran Kandasamy², Anu Ramesh³, Niranjan Kumar Rajeswaran⁴

¹Professor, Department of General Surgery, Government Kilpauk Medical College, Chennai.

²Assistant Professor, Department of General Surgery, Government Kilpauk Medical College, Chennai.

³Senior Resident, Department of General Surgery, Government Kilpauk Medical College, Chennai.

⁴Junior Resident, Department of General Surgery, Government Kilpauk Medical College, Chennai.

ABSTRACT

BACKGROUND

Swellings of the parotid gland are of special interest to a surgeon's keen eye. These lesions are not only involved in diseases isolated to the parotid, but can also present as a part of a generalised systemic disorder, medical or surgical. For a surgeon, the interests lie in the probable origin of the swelling, its involvement of the facial nerve, the variability in behaviour, regarding the operability criteria and its postoperative complications.¹ A comprehensive knowledge of the anatomy of the parotid and the prediction of the swelling behaviour can help not only in the diagnosis, but also in ensuring an apt management of the lesion and the patient.²

This cohort study was conducted to analyse the following in our institution. The incidence of various parotid swellings to discuss accuracy of FNAC in comparison to the histopathological reports. The various surgical modalities of treatment of parotid swellings applied.

MATERIALS AND METHODS

The cohort study, which included 45 patients was conducted at Kilpauk Medical College Hospital and Government Royapettah Hospital from September 2010 to October 2012. Data was collected from the patients after obtaining an informed consent. The demographic details of the patients and history of their swelling was taken. The patients were examined and basic investigations performed. Details regarding the FNAC report, surgical and nonsurgical management were noted. Postoperative complications were documented. The final histopathological report was analysed and compared with the FNAC report.

RESULTS

Parotid lesions are commonest cases in our study. Benign tumours are more common than malignant lesions. This study found to correlate with world statistics. Investigations, clinical findings and treatment correlate well with world statistical records.

CONCLUSION

The analysis of the data of the study conducted at our institution provided us with the following results- Parotid lesions comprised of the most common salivary gland lesions in our hospital. The sex incidence showed a similar distribution among both males and females with the ratio being 1:1.25.³ The mean age of presentation was 49 years and it was seen that the 4th and 7th decades were the predominant age group for occurrence in case of benign and malignant tumours, respectively.⁴ These were found to be consistent with the comparison made with world statistics.⁵ In the case of malignant tumours, the sensitivity and specificity was found to be 87.5% and 100%, respectively.⁶ Completion parotidectomy was performed in 2 cases and both were malignant tumours with recurrence.⁷ Facial nerve palsy and seroma formation were the commonest complication noted postoperatively.⁸ Radiotherapy was the most common nonsurgical modality used and administered more commonly postoperatively.⁹

KEYWORDS

Parotid, Swelling, Study.

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Corresponding Author:
Dr. Ramachandran Kandasamy,
'Panchanathikkulam', East and Post,
Vedaraniyam Taluk, Nagapattinam District-614714.
E-mail: yenchandru@gmail.com
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BACKGROUND

Swellings of the parotid gland are of special interest to a surgeon's keen eye. These lesions are not only involved in diseases isolated to the parotid, but can also present as a part of a generalised systemic disorder, medical or surgical. The patient would present invariably due to the cosmetic problem. For a surgeon, the interests lie in the probable origin of the swelling, its involvement of the facial nerve, the variability in behaviour regarding the operability criteria and its postoperative complications. Patients in these cases present themselves to oncologists and general surgeons

alike for the same.¹⁰ A comprehensive knowledge of the anatomy of the parotid and the prediction of the swelling behaviour can help not only in the diagnosis, but also in ensuring an apt management of the lesion and the patient.¹¹

AIM OF THE STUDY

1. To study the incidence of various of parotid swellings in our institution.
2. To discuss accuracy of FNAC in comparison to the histopathological reports in our institution.
3. To study the various surgical modalities of treatment of parotid swellings applied in our institution.¹²
4. To discuss the postoperative complications in our institution.
5. To compare findings of the above study with world statistics.

MATERIALS AND METHODS

The cohort study, which included 45 patients was conducted at Kilpauk Medical College Hospital and Government Royapettah Hospital from September 2010 to October 2012. Data was collected from the patients after obtaining an informed consent. The study group consisted of 19 males and 26 female patients. The age group ranged from 16 years to 77 years. FNAC was performed in all patients. A total of 7 nonneoplastic, 22 neoplastic and 16 malignant lesions were identified. Forty one patients were operated on and histopathology of specimens was done in 41 cases, which included 4 cases where only biopsy was performed. Postoperative radiotherapy was given in 10 cases while palliative radiotherapy was provided in 4 cases. One case underwent chemotherapy.

Inclusion Criteria

Patients with parotid swellings, neoplastic and non-neoplastic age of 12 years and above.

Exclusion Criteria

1. Patients with parotid lesions due to systemic or metabolic illness.
2. Age less than 12 years.

OBSERVATION AND ANALYSIS

The observation of the study of 45 parotid lesions yielded the following results-

Sl. No.	Lesion	Total Number Cases	%
1.	Non-neoplastic	7	15.55%
2.	Benign	22	48.89%
3.	Malignant	16	35.56%
Overall Incidence			

Sl. No.	Lesion	Male	Female	Total
1.	Non-neoplastic	4.44%	1.11%	15.55%
2.	Benign Tumour	22.22%	26.67%	48.89%
3.	Malignant Tumour	17.78%	17.78%	35.56%
Sex Incidence Distributions				

Analysis of Individual Groups of Lesions Yielded the Following Results-

Sl. No.	Non-Neoplastic Lesions	Males	Females	Incidence
1.	Chronic Sialadenitis	-	1	14.28%
2.	Abscess	13	1	57.14%
3.	Cystic Lesion	1	-	14.28%
4.	Reactive Adenitis	-	1	14.28%
Analysis of Individual Groups				

Sex	Number of Cases	%	Overall %
Male	2	28.57%	4.44%
Female	5	71.43%	11.11%
Sex Incidence			

Sex Incidence among Non-Neoplastic Parotid Lesions

Women were more affected by non-neoplastic parotid lesions than¹³ men having 71.43% of the lesions.

FNAC

In the cytological analysis, it was noted that although there was a higher rate of lesions, which were positive, the true positives were lesser.¹⁴

Lesion Positive	FNAC	Accuracy
Chronic	2	50%
Abscess	5	100%
Cystic Lesion	2	50%
Cytological Analysis		

DISCUSSION

Incidence of non-neoplastic lesions has been found to be rarer in comparison varying with studies and inflammatory disorders being the most common. A. R. Arshad et al have seen that the incidence of nonneoplastic lesions was found to be around 11.8%, whereas Zbaren et al have seen an incidence of 5.7%. Pleomorphic adenoma has been seen to be the dominant lesion affecting the parotid. The treatment of pleomorphic adenoma has undergone a vast change from the initially performed enucleation of the tumour to the present concept of parotidectomy, superficial or total based on the depth of the tumours.

Malignant parotid tumours are treated based on the lesion, its extent of involvement and attempts at preserving the facial nerve unless it is involved is the key concept at present. The concept of change to nerve preservation has brought down morbidity due to the nerve paralysis significantly improving on the cosmesis and quality of life of patients. An understanding of the cause-effect relationship of parotid tumours is still under research though many theories have been proposed regarding them.

WHO Classification of Parotid Neoplasms⁹

1. Malignant tumours.
2. Benign tumours.
3. Acinic cell carcinoma.
4. Pleomorphic adenoma.
5. Mucoepidermoid carcinoma.
6. Myoepithelioma.
7. Adenoid cystic carcinoma.
8. Basal cell adenoma.

Hematolymphoid Tumours

1. Myoepithelial carcinoma.
2. Hodgkin lymphoma.
3. Carcinoma ex pleomorphic adenoma.
4. Diffuse large B-cell lymphoma.
5. Extranodal marginal zone B-cell lymphoma.
6. Carcinosarcoma metastasising pleomorphic adenoma.

Secondary Tumours

1. Squamous cell carcinoma.
2. Small cell carcinoma.
3. Large cell carcinoma.
4. Lymphoepithelial carcinoma.
5. Sialoblastoma.

The exact aetiology of parotid lesions is unknown, but several factors have been implicated including environmental and genetic. Overtime, certain risk factors and clarification of causes have been done proof of cause and effect does not exist in any of these postulated associations and the aetiology of most salivary gland cancers cannot be determined.

Aetiology of Neoplastic Lesions

J.W. Eveson et al⁹ study on neoplastic lesions proposed the following causes.

Viruses

Strong associations between lymphoepithelial carcinomas and Epstein-Barr Virus (EBV) have been made.⁹

Radiation

Evidence to understand compelling links between ionising radiation and parotid tumours have been studied. Follow-up on a long-term basis of atomic bomb victims showed contributory evidence towards an increase in these tumours. Those undergoing therapeutic radiation for the head and neck tumours also have an increased risk.

Occupation

Industrial workers such as those in rubber manufacturing and plumbing industry due to exposure to metal and nickel compounds are prone for parotid tumours. Also, those individuals in the wood working, automobile industries and employed in asbestos mining are prone for increased risk of parotid tumours.

Lifestyle

Though, no association has been found between alcohol consumption, a definite association is found between

Warthin's tumour and smoking. An increased level of risk has also been postulated in those with high cholesterol intake.

Androgen receptors are present in 90% of salivary duct carcinomas. A recent study has also shown this immunoreactivity in carcinoma ex pleomorphic adenoma and basal cell adenocarcinoma and a fifth of cases in the study showed positivity in acinic cell carcinoma, mucoepidermoid carcinoma and adenoid cystic carcinoma.

Parotid Tumours Benign Tumours- Pleomorphic Adenoma

It is also known as benign mixed tumour as originally said by Minssen in 1874 and comprises of multiple histologic components including myxoid, mucoid, chondroid and other elements, hence known for its heterogeneity. These comprise almost 80% of parotid neoplasms.⁹

To distinguish from a malignant transformation features such as cellular atypia, mitosis, perivascular and perineural invasion are relied upon.

They are slow growing painless tumours arising in 90% of cases from the superficial lobe. These tumours are noted to have pseudopods and hence have a tendency to recur if only enucleated.

The epithelial component consists of ductal structures with an associated myoepithelial layer, but also may contain collections of myoepithelial cells that maybe spindled, clear, plasmacytoid or basaloid. The mesenchymal or stromal component is typically myxoid, hyaline or chondroid pleomorphic adenomas have been divided into a myxoid type (>80% mesenchymal-type tissue), cellular type (>80% epithelial-type tissue) and mixed or classic type (generally, an equal mix of components). Treatment is surgical and superficial parotidectomy is done in most cases. Total parotidectomy is done for deep lobe involvement.

Warthin's Tumour

This is also known as papillary cystadenoma lymphomatosum. It is the second most common benign parotid neoplasm associated with a 10% bilateral incidence, male predominance and multicentricity. Also, it is almost exclusively found in the parotid gland. As mentioned earlier, the late encapsulation of the gland and lymphatic tissue trapping during development favours the formation of this tumour. Another salient feature of this tumour is that it contains plenty of mitochondrial rich oncocytes and hence presents as hotspots on radionucleotide with technetium-99m21.

Microscopically, what we see characteristically are two-tiered epithelial layer lining the branching, cystic or cleft-like spaces and immediately subjacent, well-developed lymphoid tissue sometimes forming germinal centres.

Basal Cell Adenoma

They are benign tumours basaloid cells. They tend to occur generally in adults with 75% occurring in the parotid gland. They are usually asymptomatic, slow growing lesions. A

subtype called the dermal anlage tumour maybe multicentric and maybe associated with various adnexal skin tumours. Though four patterns are seen microscopically, the tumour is composed of 2 cell types. Small cells with little cytoplasm typically lie at the neoplasm's edge, frequently show peripheral palisading, and give the tumour its basaloid appearance. The other type being more polygonal basaloid cells with slightly more cytoplasm and round to oval nuclei containing more open chromatin usually lay in the tumour's center. They are immunopositive for pan-cytokeratin S-100, smooth muscle actin and muscle-specific actin, all evidencing myoepithelial differentiation.

Malignant Tumours- Mucoepidermoid Carcinoma

It is the most common parotid malignancy composed of mucous, intermediate and epidermoid (or squamoid) cells. They are noted to be slightly more common in women with a mean incidence around the 5th decade of life. Patients present with a slow growing, painless mass. Hallmark of these tumours is the presence of three different cell types, which can occur in sheets, nests, duct-like structures or cysts. Frequently, intermediate cells predominate ranging from small basal cells with minimal basophilic cytoplasm to larger oval cells with pale eosinophilic cytoplasm. The mucin-producing cells are organised singly or in clusters with pale, foamy cytoplasm, distinct cell membranes and eccentric small nuclei. They line cystic spaces and are positive with mucicarmine or PAS stains 20. Abundant eosinophilic cytoplasm and vesicular nuclei are seen in epidermoid or squamoid cells. Immunohistochemistry is of little utility in the diagnosis of mucoepidermoid carcinoma. Many mucoepidermoid carcinomas possess a t (11;19) (q21;p13) translocation. Tumours that carry the rearrangement are associated with a better clinical outcome. Prognosis is highly dependent on the grade of the tumour. Low-grade lesions are markedly cystic and have abundant well-differentiated mucous cells. High-grade lesions are more solid with squamous and intermediate cells predominating.

Wide local resection has to be done for these tumours. Radiation can be used in cases of recurrence or for palliation in case of unresectable lesions. Prognosis depends upon the grade of the tumour, excellent for low grade (>90%) and poorer for high-grade tumour (about 50%).

Acinic Cell Carcinoma

It accounts for a total of 1%-3% of salivary gland tumours of which it's most common location is the parotid. It is the second most common malignancy. It presents as a slowly growing mass can be occasionally painful. It is seen usually as a single, circumscribed, solid mass and can undergo cystic degeneration. Histological variability is seen. It can be solid or lobular, microcystic, papillary-cystic or follicular. Small tumours due to their well-differentiated state can be missed easily. The characteristic cell seen is the acinic cell, which has the appearance of a salivary acinar cell with

abundant granular, basophilic cytoplasm and a small, round, eccentrically placed nucleus with PAS staining cytoplasmic zymogen granules are seen. A mixture of architectural patterns is seen and characteristic dense lymphoid infiltrate is also seen. Due to lack of tumour infiltration at the tumour periphery, it can be confused as benign. Differential diagnosis includes a normal parotid gland, oncocytoma, clear cell carcinoma and cystadenocarcinoma. Adequate resection is necessary as recurrence is seen in about one-third of cases. It is considered as a low-grade malignancy, but around 10%-15% metastases regionally to lymph nodes or in a distance to lungs and bones. Survival rate is around 80% in 5 years.

Adenoid Cystic Carcinoma

Peak incidence of this tumour is seen in patients between 40 and 60 years of age. It is slow growing and progressive in nature. Perineural invasion is characteristic to this disease and at times it can be the presenting symptom of the disease such as facial nerve palsy. Varying architectural patterns can be seen cribriform, tubular, solid and mixed. Grading is based on the dominant pattern; most commonly seen is cribriform consisting of cell nests arranged around gland-like spaces filled with PAS positive granular basophilic material. The spaces are actually extra-cellular cavities containing reduplicated basal lamina and myxoid material. The tumour cells are basaloid with round to oval, hyperchromatic nuclei without nucleoli and very little cytoplasm. Perineural invasion is common in the tumour periphery. Immunohistochemistry is of little use. Positive reaction for cytokeratins, collagen type IV and laminin and partial reactivity towards myoepithelial markers is seen. This tumour is highly malignant and progressive. Compared to other cancers, this has a lower survival rate of around 62% at five years. Involvement of bone, perineural invasion and solid type of tumours show poorer prognosis.

Malignant Mixed Tumours

This term is broadly used to true malignant mixed tumours, carcinoma ex pleomorphic adenoma and metastatic mixed tumour.

True salivary gland mixed tumour (carcinosarcoma)- This is composed of both carcinomatous and sarcomatous components and is extremely rare, about one third of patients have pre-existing pleomorphic adenoma. It presents around the sixth decade and microscopically it is seen to have an intimate admixture of both components. High-grade duct carcinoma or undifferentiated carcinoma mixed with fibrosarcoma, leiomyosarcoma or liposarcoma is seen.²⁰ These are extremely aggressive tumours treated with wide local excision and radiotherapy. The observation of the study of 45 parotid lesions yielded the following results with overall incidence of 7 non-neoplastic with 15.55%, 22 benign cases of 48.89% and 16 malignant cases of 35.56%. Sex incidence of neoplastic male (4.44%), female (11.11%), benign male (22.22%), female (26.67%), malignant male (17.78%) and female (1.78). Similarly, age group 10-16 were 3 cases, 20-29 were 5

cases, 30-39 were 9 cases, 40-49 were 7 cases, 50-59 were 7 cases, 60-69 were 9 cases and 70-79 were 5 cases. FNAC has been discussed subsequently under the respective lesions. Surgical management were statistically recorded as follows. Superficial parotidectomy was the most commonly performed surgery. Total conservative parotidectomy was the second most common. 25 cases of superficial parotidectomy, 6 cases of total parotidectomy, 1 case of radical parotidectomy, 3 cases of extended radical parotidectomy, 3 cases of incision and drainage, 1 case of excision and 2 cases of completion parotidectomy done.

10 cases underwent postoperative radiotherapy and 4 cases undergone palliative radiotherapy. 1 case underwent chemotherapy. Following postoperative complications are noted as; 20% facial nerve palsy, 20% seroma, 4.44% flap necrosis, 4.44% fistula and 2.22% others. Among the other complications, it was seen that one patient had vocal cord paralysis.

CONCLUSION

The analysis of the data of the study conducted at our institution provided us with the following results-

1. Parotid lesions comprised of the most common salivary gland lesions in our hospital.
2. Amongst the various lesions, it was noted that benign tumours were the most common and the least common were non-neoplastic disorders.
3. The sex incidence showed a similar distribution among both males and females with the ratio being 1:1.25.
4. The mean age of presentation was 49 years and it was seen that the 4th and 7th decades were the predominant age group for occurrence in case of benign and malignant tumours, respectively.
5. The lesions, which were predominant in the non-neoplastic, benign and malignant tumours groups were abscess, pleomorphic adenoma and mucoepidermoid carcinomas, respectively. These were found to be consistent with the comparison made with world statistics.
6. FNAC correlated in a total of 39 out of 45 cases, i.e. 86.67% of the cases. The sensitivity and specificity for detection of benign tumours was found to be 93.75% and 100%, respectively. In the case of malignant tumours, the sensitivity and specificity was found to be 87.5% and 100%, respectively.
7. Patients presenting with facial nerve palsy was seen more amid the malignant tumours.
8. Most commonly performed surgery was superficial parotidectomy. Completion parotidectomy was performed in 2 cases and both were malignant tumours with recurrence.
9. Facial nerve palsy and seroma formation were the commonest complication noted postoperatively.
10. Radiotherapy was the most common nonsurgical modality used and administered more commonly postoperatively.

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