International Surgery Journal
Mohanapriya T et al. Int Surg J. 2017 Nov;4(11):3617-3621
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20174654

Original Research Article

Mystery in parotid

T. Mohanapriya*, T. P. Karthikeyan, K. Balaji Singh, T. Arulappan

Department of General Surgery, Sri Ramachandra Medical College, Porur, Chennai-600116, Tamil Nadu, India

Received: 21 September 2017
Accepted: 25 September 2017

***Correspondence:**
Dr. T. Mohanapriya,
E-mail: mohanapriyadr@gmail.com

ABSTRACT

Background: Parotid gland is the largest of the salivary glands present in the body. Neoplastic lesions in parotid gland always causes difficulty in tissue diagnosis due to their diversified histology. Lesion in the superficial lobe of parotid is more amenable for clinical diagnosis but deep lobe lesion requires imaging to confirm the diagnosis. Managing parotid swelling seems like a mystery due to these issues.
Methods: There were 30 patients who presented with complaints of swelling in the parotid region. For all these patients detailed history was taken and clinical examination was done and findings noted. Contract enhanced computed tomography (CECT) of the parotid region was done followed by fine needle aspiration cytology (FNAC) and the management was planned accordingly.
Results: All the 30 patients were within the age group of 25 years to 65 years. All the patients presented with swelling in the parotid region. Among the 30 patients, 10 patients had complaints of associated pain in the parotid region. On clinical examination, all the patients had lesion in the superficial lobe of parotid and 2 patients had deep lobe involvement. 1 patient had features of facial nerve palsy. Contrast enhanced computed tomography (CECT) and Fine needle aspiration cytology (FNAC) was done. For all the patients' surgical management was planned accordingly.
Conclusions: Routinely submitting all parotid swelling patients to Fine needle aspiration cytology and computed tomography helps to solve the mystery of diversified histology and presentation.

Keywords: Contrast enhanced computer tomography, Fine needle aspiration cytology, Parotid

INTRODUCTION

Salivary gland tumors are relatively rare and constitute 3% to 4% of head and neck neoplasms. Approximately 80% of salivary gland neoplasms originate in the parotid gland. Parotid gland is the largest of the salivary glands present in the body. Swellings occurring in the parotid gland may be due to infection, inflammation, cysts and neoplasm (benign and malignant). They may present as slow growing lumps or as aggressive tumors and at times facial palsy may be a presenting feature. But, slow growing tumors does not always exclude malignancy. Malignant tumors of the salivary glands show widely different patterns of growth. The most common ones (adenoid cystic, mucoepidermoid low-grade, acinic cell carcinomas) frequently grow slowly. Depth of invasion depends on the grade of the malignancy.[1]

Clinical indicators suggesting a malignant salivary gland tumor are: rapid growth rate, pain, facial nerve involvement, and cervical adenopathy. Most tumours arise in the superficial lobe and present as a slow growing painless swelling. 80% of the tumours of parotid gland are benign. Tumours arising from the deep lobe of parotid are rare. Neoplastic lesions in parotid gland always causes difficulty in tissue diagnosis due to their

diversified histology. Lesion in the superficial lobe of parotid is more amenable for clinical diagnosis but deep lobe lesion requires imaging to confirm the diagnosis.[2] Managing parotid swelling seems like a mystery due to these issues. The main challenge in the management of these tumours is to distinguish them between benign and malignant types and treat them accordingly.

FNAC is a very useful investigation in this regard based on which the surgeon can plan the type and extent of the surgical procedure and counsel the patient regarding the treatment, including the possible need for adjuvant treatment, its associated complications and prognosis. It is an inexpensive investigation, simple to perform and, in appropriate hands, it is quite accurate and morbidity is very low. CT scan is useful in knowing the extent of the lesion especially when the tumour involves deep lobe or has local invasion.[3]

Aim and objectives

To evaluate the role of Fine needle aspiration cytology (FNAC) and contrast enhanced computed tomography (CECT) imaging in planning the management of parotid gland tumours.

METHODS

This is prospective study. The study was conducted with 30 patients who presented to the outpatient department with the complaints of swelling in the parotid region. For all these patients a detailed clinical history that included site of the swelling, duration of the swelling, association of pain, difficulty in opening the mouth, change in size of swelling while eating, associated ear pain was taken and clinical examination was done. In clinical examination, the plane of swelling, consistency, fixity to skin, masseter involvement, deep lobe involvement and facial nerve involvement were assessed and noted.

Routine blood investigations were done. Contrast enhanced computed tomography (CECT) of the parotid region was done to confirm the clinical diagnosis, and to check for facial nerve involvement, deep lobe involvement, masseter muscle involvement and cervical lymphadenopathy. This was followed by fine needle aspiration cytology (FNAC) and the results were tabulated. Management was planned accordingly. Superficial parotidectomy was done for all benign tumours and Total/Radical parotidectomy was done for malignant tumours. For lesion in deep lobe of parotid total conservative parotidectomy was done.

RESULTS

All the 30 patients were within the age group of 25 years to 65 years. The peak incidence was in the age group of 30 to 50 years. All the patients presented with swelling in the parotid region. Among the 30 patients, 10 patients had complaints of associated pain in the parotid region. The pain was not related to salivation or mastication. Duration of the parotid swelling was for more than 5 years to less than 1 month.

On clinical examination, all the patients had lesion in the superficial lobe of parotid and 2 patients had deep lobe involvement. 1 patient had features of facial nerve palsy. Contrast enhanced computed tomography (CECT) and fine needle aspiration cytology (FNAC) was done. For all the patients' surgical management was planned accordingly.

Table 1: Clinical presentation.

Parameter		No. of cases
Complaints	Swelling	30
	Pain	10
Duration	Less than 1 year	16
	1 year to 5 years	12
	More than 5 years	2
Clinical finding	Superficial lobe swelling	30
	Deep lobe involvement	2
	Facial nerve involvement	1

Table 2: Investigations.

Investigation	Result	No. of patients
Fine needle aspiration cytology	Pleomorphic adenoma	12
	Warthin tumour	2
	Positive for malignancy	7
	Inconclusive	9
Computed tomography	Superficial lobe	30
	Deep lobe	2

Table 3: Management.

Management	No. of patients
Superficial parotidectomy	22
Total conservative parotidectomy	6
Radical parotidectomy	2

14 Patients had FNAC reported as benign tumour (Pleomorphic adenoma 12 and Warthins tumour- 2). All these patients had lesion in superficial lobe only in CECT. All these patients underwent superficial parotidectomy. In 9 patients FNAC report was inconclusive.

CECT report in these 9 patients, 8 patients had lesion in the superficial lobe and they underwent superficial parotidectomy and one patient had lesion in the deep lobe and underwent total conservative parotidectomy. In patients with FNAC report positive for malignancy, one patient had facial nerve involvement in CECT and one patient had masseter muscle invasion. Both these patients underwent radical parotidectomy followed by adjuvant radiotherapy. Remaining 5 patients underwent Total

parotidectomy. The final histopathological report was collected and tabulated.

Table 4: Post-operative histopathological diagnosis.

Pathological diagnosis	No. of cases	Procedural undergone
Pleomorphic adenoma	18	Superficial parotidectomy
Monomorphic adenoma	1	Superficial parotidectomy
Warthin's tumour	2	Superficial parotidectomy
Adenoid cystic carcinoma	2	Radical parotidectomy
Muco epidermoid carcinoma	3	Total parotidectomy
Salivary duct Adenocarcinoma	1	Total parotidectomy
Carcinoma Ex pleomorphic adenoma	1	Total parotidectomy
Epidermoid cyst (In deep lobe)	1	Total parotidectomy
Myoepithelioma	1	Superficial parotidectomy

DISCUSSION

Parotid gland tumours have diverse histology. The main challenge in the management of these tumours is to distinguish them between begin and malignant types and treat them accordingly. FNAC is a very useful investigation in this regard. CT scan is useful in knowing the extent of the lesion especially when the tumour involves deep lobe or has local invasion.

Fine-needle aspiration cytology (FNAC) has been widely recognized and well established as an accurate technique in the diagnosis of salivary gland neoplasms. Numerous studies have reported an exceptionally high degree of sensitivity, specificity, and predictive value for FNAC. The overall sensitivity ranges from 85.5%-99% and the overall specificity ranges from 96.3%-100%. In general, diagnostic accuracy is higher for benign than for malignant salivary gland tumors. The most common source of diagnostic error of FNAC is inadequate sampling.

The most frequent problems involve variations in the expected cytology of pleomorphic adenoma. Also, there are several benign-malignant "look-alike" pairs of lesions. The first of these is related to small-cell epithelial neoplasms of low nuclear grade; the most frequent problem is between basal cell adenomas and adenoid cystic carcinoma, particularly the solid (anaplastic) type. The next area contrasts mucoepidermoid carcinoma with its cytologic mimic, benign salivary gland duct obstruction.[4,5.]

Drawbacks of FNAC are the possibility of Infarction, hemorrhage, and needle track tumor seeding, as well as fibrosis after FNAC are commonly cited argument against the routine use of FNAC in patients with salivary gland tumors but studies show that FNAC with a 25-gauge needle is safe.[6] Computed tomography scan is useful in evaluation of malignant or recurrent tumors, for detecting large neoplasms, suspected Para pharyngeal space involvement, or suspected involvement of structures such as the carotid artery that would indicate unresectability. The normal parotid gland has a high fat content and is easily visualized in CT. Therefore, it can demonstrate whether a mass in that region is intraglandular or extra glandular. The strength of CT is in its ability to show calcification, anatomy and bony detail. Although CT has an overall sensitivity for detecting neoplastic lesions approaching 100%, the distinction between benign and malignant lesions is not always clear on CT. But Extension of the tumor beyond the fascial confines of the gland can be adequately seen on CT and should raise the suspicion of malignancy. Bone destruction of the mandible or skull base is best visualized on CT. CT can adequately evaluate the neck for metastatic adenopathy.[7,8]

According to WHO histological classification, salivary gland tumours are classified as benign epithelial, malignant epithelial, soft tissue tumours, hematolymphoid tumours and secondary tumours which are further subclassified.[9] The histologic varieties we have encountered in present study are pleomorphic adenoma, Monomorphic adenoma, Warthins tumour, Myoepithelium, Epidermoid cyst, Mucoepidermoid carcinoma, Adenoid cystic carcinoma, salivary duct adenocarcinoma and carcinoma Ex Pleomorphic adenoma.

Pleomorphic adenoma is the most common tumour of major salivary glands. Average age at presentation is 40 years. Its otherwise known as 'Mixed cell tumour' and arises from intercalated duct cells and myoepithelial cells. Incidence is 90% of benign parotid tumours; 50% of all submandibular gland tumours. A few bilateral tumours have been described. Gross appearance is smooth and lobular with a well-defined capsule. Histologically, it shows incomplete encapsulation with pseudopod extensions, due to this feature, pleomorphic adenoma though being a benign condition requires superficial parotidectomy to avoid recurrence.[10]

Warthin's tumour: Male:female incidence is 7: 1. it is also known as Adenolymphoma, papillary cystadenoma lymphomatosum. It constitutes 6-8% of salivary tumours. Arises in heterotopic parotid tissue occurring within parotid lymph nodes. Average age at presentation is 70 years. 10% is bilateral and upto 21% can be multicentric. Gross appearance of the tumor is smooth with well-defined capsule. Cut sections reveal multiple cystic spaces of different sizes filled with thick, mucinous material. Microscopically, it has a characteristic appearance with a papillary epithelium with a lymphoid stroma projecting into cystic spaces. Solid white areas are sometimes seen and these are due to lymphoid tissue. Usually occurs in the parotid tail. It is never malignant. Treatment is complete surgical excision with recurrence being rare.[11]

An Epidermoid cyst is a cyst with an epidermal lining with granular layer, no adnexa and filled with a cheesy material made up of soggy keratin. While Epidermoid cysts and parotid swelling as separate unrelated entities are quite common, the occurrence of an epidermoid cyst in the deep lobe of parotid gland in very rare. This condition is so rare that only 8 cases have been reported in literature. Since it is a benign condition every effort to preserve the facial nerve and undertake a meticulous dissection to ensure that the patient gets complete disease clearance leaving no chances for a recurrence.[12]

Monomorphic adenoma is a rare benign salivary gland epithelial tumor representing <3% of all tumors. Histological features are Uniform cellularity, lack of myxoid or chondroid features, and a tendency for multicentric origin are features which separate these tumors from pleomorphic adenomas. Monomorphic adenomas have been mistakenly diagnosed and treated as adenoid cystic carcinomas. Close attention to cytologic detail, histomorphology, and growth pattern at the periphery are important in separating these tumors.[13]

Myoepitheliomas of parotid glands are extremely rare, comprising approximately only 1-1.5% of all parotid gland tumours. Their histopathologic features, immunohistochemical profile, and clinical behavior are not well characterized. A majority of the myoepitheliomas described in the literature has been benign, and the malignant counterpart (myoepithelial carcinoma) has been recognized recently. There are no distinctive clinical features and, like most other parotid gland tumors. The rarity of myoepithelioma and the varied phenotypic expression of myoepithelial cells may cause problems in diagnosis. Assessment of cell proliferative activity may be helpful in the differential diagnosis between benign and malignant myoepitheliomas, and that a Ki-67 labelling index of more than 10% is diagnostic of myoepithelial carcinoma.[14,15]

Mucoepidermoid tumour: has equal incidence in both sexes. It constitutes 4-9% of salivary tumours. More than 90% arise in the parotid gland. It is the most common malignant neoplasm of the parotid and most common salivary gland tumour in children. Usually presents in the fifth decade. Gross appearance is Solid or cystic, usually not encapsulated.[16]

Adenoid cystic carcinoma: incidence is slightly more common in females than in males and constitutes 10% of malignant tumours at all salivary sites. It's the second most common malignancy of parotid. It's usually unencapsulated but appears circumscribed. Most probable source of origin is intercalated ducts. Median age at presentation is in the sixth decade. Most often demonstrates infiltration of surrounding normal tissue. Perineural invasion is a typical feature, with high frequency of pain.[17]

Salivary duct adenocarcinoma is a rare and highly aggressive tumor with solid, tubular and cribriform patterns, that closely resemble invasive ductal carcinoma of the breast. It is rare high-grade form, aggressive with frequent metastases. Common in 4th to 6th decade of life, with male preponderance. Risk factors (non- specific for salivary gland tumors) are Radiation exposure and exposure to asbestos, nickel compounds or silica dust. Diagnosing this condition requires a high degree of suspicion and proper investigations to rule out the possibility of secondary adenocarcinoma deposits in salivary gland. It is important to exclude metastatic carcinoma particularly from breast, prostate and lung.[18]

Carcinoma ex pleomorphic adenoma is defined as a carcinoma arising from a primary (de novo) or recurrent benign pleomorphic adenoma. The disease is uncommon and often poses a diagnostic challenge to clinicians and pathologists. Since the presenting symptoms are quite similar to those presenting with a benign pleomorphic adenoma, it is important that clinicians maintain a high level of clinical suspicion, which can be challenging considering the rarity of this cancer.[19]

In present study of 30 patients, only one patient had local invasion on clinical examination. But after doing FNAC and CECT scan, 8 patients were diagnosed with malignant salivary gland tumours and hence total/Radical parotidectomy was performed.

Hence, FNAC and CECT allows better preoperative counseling of patients regarding the nature of the tumor, the likely extent of resection, management of the facial nerve, and the likelihood of adjuvant radiotherapy.

CONCLUSION

Pleomorphic Adenoma is the most common tumour of Parotid gland but the various other histological types and presence of deep lobe involvement and local invasion should be considered, when dealing with parotid swelling and management planned appropriately. Routinely submitting all parotid swelling patients to Fine needle

aspiration cytology and computed tomography helps to solve the mystery in diagnosing and planning the management of parotid tumours.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Byrne MN, Spector JG. Parotid masses: evaluation, analysis, and current management. Laryngoscope. 1988;98:99-105.
2. Nagarkar NM, Bansal S, Dass A, Singhal SK, Mohan H. Salivary gland tumors- our experience. Indian J Otolaryngology Head Neck Surg. 2004;56:31-4.
3. Fernandes GC, Pandit AA. Diagnosis of salivary gland tumours by FNAC. Bombay Hosp J. 2002;4:201-6.
4. Zbaren P, Guélat D, Loosli H, Stauffer E. Parotid tumors: Fine-needle aspiration and/or frozen section. Otolaryngology Head Neck Surg. 2008;139:811-5.
5. Javadi M, Asghari A, Hassannia F. Value of fine-needle aspiration cytology in the evaluation of parotid tumors. Indian J Otolaryngology Head Neck Surg. 2012;64:257-60.
6. Das DK, Petkar MA, Al-Mane NM, Sheikh ZA, Mallik MK, Anim JT. Role of fine needle aspiration cytology in the diagnosis of swellings in the salivary gland regions: A study of 712 cases. Med Princ Pract. 2004;13:95-106.
7. Yousem DM, Kraut MA, Chalian AA. Major salivary gland imaging. Radiology. 2000;216:19-29.
8. Liyanage SH, Spencer SP, Hogarth KM, Makdissi J. Imaging of salivary glands. Imaging. 2007;19:14-27.
9. Barnes L, Eveson JW, Reichart P. World Health Organization classification of tumors. Lyon: IARC Press; Pathology and genetics, head and neck tumours; 2005:209-281.
10. Maynard JD. Management of pleomorphic adenoma of the parotid. British J Surgery. 1988;75(4):305-8.
11. Teymoortash A, Krasnewicz Y, Werner JA. Clinical features of cystadenolymphoma (Warthin's tumor) of the parotid gland: a retrospective comparative study of 96 cases. Oral Oncol. 2006;42:569-73.
12. Baschinsky D, Hameed A, Kehyani S. Fine needle aspiration cytological features of Dermoid cyst of parotid gland: a report of two cases. Diagnostic Cytopathology. 1999;20(6):387-8.
13. Youngberg G, Rao MS. Ultrastructural features of monomorphic adenoma of the parotid gland. Oral Surg Oral Med Oral Pathol. 1979;47(5):458-61.
14. Ellis GL, Auclair PL. Myoepithelioma. Atlas of Tumor Pathology: Tumors of the Salivary Glands. 3rd ed. Washington: Armed Forces Institute of Pathology. 1996;1:57-68.
15. Alos L, Cardesa A, Bombí JA, Mallofre C, Cuchi A, Traserra J. Myoepithelial tumors of salivary glands: A clinicopathologic, immunohistochemical, ultrastructural, and flow-cytometric study. Semin Diagn Pathol. 1996;13:138-47.
16. Stewart FW, Foote FW, Becker WF. Muco-epidermoid tumors of salivary glands. Ann Surg. 1945;122(5):820-44.
17. Jones AS, Hamilton JW, Rowley H, Husband D, Helliwell TR. Adenoid cystic carcinoma of the head and neck. Clin Otolaryngology. 1997;22:434-43.
18. Gal R, Strauss M, Zohar Y, Kessler E. Salivary duct carcinoma of the parotid gland. Cytologic and histopathologic study. Acta Cytol. 1985;29:454-6.
19. Lewis JE, Olsen KD, Sebo TJ. Carcinoma ex pleomorphic adenoma: pathologic analysis of 73 cases. Hum Pathol. 2001;32:596-604.

Cite this article as: Mohanapriya T, Karthikeyan TP, Singh KB, Arulappan T. Mystery in parotid. Int Surg J 2017;4:3617-21.