



ORIGINAL RESEARCH PAPER

Medical Science

CYTOPATHOLOGICAL SPECTRUM OF SALIVARY GLAND LESIONS IN A TERTIARY CARE CENTRE

KEY WORDS: Salivary gland FNAC , Pleomorphic adenoma, Parotid Gland, Mucoepidermoid carcinoma

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ABSTRACT

OBJECTIVE- To study the cytomorphological spectrum of salivary gland lesions with clinical correlation.
MATERIAL AND METHODS- This is a retrospective study which was conducted in Gandhi medical college , a tertiary care center in a span of 5 years. The total of 91 cases of various salivary gland lesions' FNAC were recorded with their clinical history. The Pap and H&E stained smears of all cases were re-evaluated.
RESULTS- A total of 91 cases were analysed ranging from 8-80yrs. Out of 91 cases 59 were males and 32 were females . 77 cases were diagnosed to be suffering from benign lesions which included pleomorphic adenoma(48), chronic sialadenitis (18), acute sialadenitis(03) , warthin's tumour(01) and duct adenoma(01). Among 14 cases of malignant lesions most common was mucoepidermoid carcinoma(08) followed by salivary duct carcinoma(04) and adenoid cystic carcinoma(02). In 6 cases reports were descriptive and inconclusive. Parotid gland involvement was noted in 70 cases and in 21 cases submandibular gland was involved.
CONCLUSION- FNAC is an important tool in screening and diagnosing various salivary gland lesions. Pleomorphic adenoma(52.74%) is the most common benign salivary gland lesion which involves mostly the parotid gland. Mucoepidermoid carcinoma (8.79%) is the most common malignant salivary gland tumour followed by salivary duct carcinoma(4.39%).

INTRODUCTION

Salivary gland lesions form about 2-6.5% of all head and neck lesions in adults. Salivary gland swelling is a common and important problem. Acute and chronic sialadenitis, different benign and malignant neoplasms are the common causes which present with salivary gland swelling. Imaging technique is not so helpful in pre-operative diagnosis; microscopical examination is required for diagnosis. Pre-operative core needle biopsy is hazardous and may damage facial nerve, lead to fistula formation or associated with tumour seeding. Fine needle aspiration cytology (FNAC) is however virtually risk-free. [1]

Salivary gland fine needle aspiration cytology (FNAC) is a popular method for diagnostic evaluation of salivary gland masses due to their superficial nature and easy accessibility for the procedure. FNAC assumes greater importance in preoperative evaluation considering the lack of characteristic clinical or radiologic features that may suggest a particular diagnosis. [2]

It is a useful method for evaluating suspicious salivary glands lesions due to its low cost, minimum morbidity, rapid turnaround time, high specificity, and sensitivity and accuracy. The study was done to assess the utility of fnac and cytopathological spectrum of salivary gland lesions in a tertiary care centre

MATERIAL AND METHODS

This is a retrospective study which was conducted in Gandhi medical college , a tertiary care center over a span of 5 years. The total of 91 cases of various salivary gland lesions' FNAC were recorded with their clinical history. The Pap and H&E stained smears of all cases were re-evaluated.

TABLE 2 DISTRIBUTION OF TUMOURS

Non-neoplastic lesions (Total=21)		Benign tumours (total=50)		Malignant tumours (total=14)	
Acute sialadenitis	03 (14%)	Pleomorphic Adenoma	48 (96%)	Mucoepidermoid Carcinoma	08 (57%)
		Warthin's tumour	01 (02%)	Salivary duct Carcinoma	04 (29%)
				Adenoid Cystic Carcinoma	02 (14%)
Chronic sialadenitis	18 (86%)	Duct Adenoma	01 (02%)	Acinic Cell Carcinoma	00
				Adenocarcinoma (NOS)	00
		Oncocytoma	00	Others	00

Pleomorphic adenoma- Mainly myoepithelial cells are in poorly cohesive clusters associated with fibrillary chondromyxoid ground substance . Warthin's Tumour- Oncocytic epithelial cells in monolayered sheets with lymphocytes seen against a amorphous proteinaceous background (H&E) . Mucoepidermoid carcinoma- Variation in cell type : predominantly intermediate cells, some mucin-secreting cells, infrequently squamous epithelial cells(pap) . Adenoid Cystic Carcinoma- Cellular smears with cup-shaped fragments composed of tumour cells. Scanty cytoplasm, high N:C ratio , nuclear moulding. Uniform , round or oval hyperchromatic nuclei , coarse nuclear chromatin . (pap) Salivary Duct Carcinoma- Clearly malignant pleomorphic tumor epithelial cells , single and in clusters with abundant cytoplasm and hyperchromatic nuclei . Inflammatory cells and necrosis in background(H&E) .

OBSERVATIONS & RESULTS

- A total of 91 cases were analysed ranging from 8-80yrs.
- Out of 91 cases 59 were males and 32 were females . The M:F ratio was 1.8:1.
- Parotid gland involvement was noted in 70 cases and in 21 cases submandibular gland was involved. In 06 cases smears were inadequate, unsatisfactory and inconclusive.

TABLE 1 AGE DISTRIBUTION

Age	Benign	Malignant	Sialoadenitis
0-20	05	00	02
21-40	20	00	09
41-60	17	05	05
61-80	08	09	05

TABLE 3 BENIGN SALIVARY GLAND TUMORS

	Parotid Gland	Sub-mandibular gland
Pleomorphic Adenoma	37	11
Warthin's Tumour	01	00
Duct Adenoma	01	00

TABLE 4 MALIGNANT SALIVARY GLAND TUMORS

	Parotid Gland	Sub-mandibular gland
Mucoepidermoid Carcinoma	07	01
Adenoid Cystic	01	01
Salivary duct Carcinoma	03	01

RESULTS

Salivary gland lesions are more common in males.(M:F-1.8:1).Parotid gland is most commonly involved by all type of lesions followed by submandibular gland.Pleomorphic adenoma(52.74%) was the most common benign salivary gland lesion .Mucoepidermoid carcinoma (57%) was the most common malignant salivary gland tumour followed by salivary duct carcinoma(29%) among malignant tumors .Mean age of incidence of malignant salivary gland tumors was around 64yrs with starting from 45yrs.

DISCUSSION

Salivary gland tumors are uncommon, and their epidemiology has not been well described. Salivary gland swelling is a common and important problem. The study was done to assess the utility of fnac and cytopathological spectrum of salivary gland lesions in a tertiary care centre .

Eneroth CM. et al studied salivary gland tumors in the parotid , submandibular gland, and the palate region. Similar study was done by Pinkston JA et al who studied . incidence rates of salivary gland tumors.They conducted a descriptive epidemiologic study of parotid, submaxillary, and sublingual gland tumors . Among 248 incident cases, 84.3% were benign and 15.7% were malignant. Eighty-six percent of cases arose in the parotid gland, and 14% arose in the submaxillary gland. No sublingual gland tumor was identified. The benign mixed tumor was the most frequent tumor (65.6%), followed by Warthin's tumor (29.2%). Mucoepidermoid carcinoma was the most frequent malignant tumor (51.3%). Incidence rates for both benign and malignant tumors increased with age until ages 65 to 74 years and then declined. Benign mixed tumors occurred more frequently in female patients, whereas Warthin's tumors and malignant tumors occurred more frequently in male patients (P < 0.05). Warthin's tumor was rare in black patients (P < 0.001). They concluded that salivary gland tumors are an uncommon but epidemiologically diverse group of tumors. [3,4]

Stanley MW et al studied mucin production by pleomorphic adenomas of the parotid gland .Mucinous salivary gland aspirations represent a special differential diagnostic problem. Considerations include pleomorphic adenoma. Warthin's tumor, chronic obstructive sialadenitis. and low-grade mucoepidermoid carcinoma. The literature is reviewed, and the possible distinction of pleomorphic adenoma from low-grade mucoepidermoid carcinoma is considered.[6]

Seethala RR et al did : a review of the clinicopathologic spectrum and immunophenotypic characteristics in 61 tumors of the salivary glands and upper aerodigestive tract. The mean age at presentation was 60.9 years, with a female predominance (1.5:1). The most common sites were parotid (62.1%), sinonasal mucoserous glands (10.3%), palate (8.6%), and submandibular (8.6%). Most EMCas showed a characteristic nodular/multinodular growth pattern and classic biphasic tubular histology The most important univariate predictors of recurrence were margin status (log rank P=0.006), angiolymphatic invasion (P=0.002), tumor

necrosis (P=0.004), and myoepithelial anaplasia (P=0.038). Immunohistochemistry can aid diagnosis by highlighting the biphasic nature of the tumor.[7]

Di Palma S studied : clinicopathological features of ten cases. malignant myoepithelioma of salivary glands .Malignant myoepithelioma of the salivary gland is discussed in terms of its clinical behaviour, morphological features and the frequent pre-existence of a pleomorphic adenoma Malignant myoepitheliomas arising in recurrent pleomorphic adenomas have a long clinical history, are characterized by multiple recurrences and have to be distinguished from aggressive carcinomas arising in these adenomas. In contrast, the tumours described in the present series arising in pleomorphic adenomas showed local aggressiveness and metastases did not occur until decades after the first treatment. [8]

Orell SR et al studied diagnostic difficulties in the interpretation of fine needle aspirates of salivary gland lesions.Cases of salivary gland lesions (n=325), mainly neoplastic but including a small number of non-neoplastic lesions, investigated by fine needle aspiration (FNA) and with histological correlation, were reviewed. If type-specific diagnoses are made only when all defined diagnostic criteria are present and if any uncertainty is clearly conveyed to the clinician, FNA is a safe and accurate tool in the investigation of salivary gland lesions.[9]

Miliauskas JR,et al in their study of fine-needle aspiration cytological findings in five cases of epithelial-myoeplithelial carcinoma of salivary glands. The cytologic features of five cases of epithelial-myoeplithelial carcinoma arising in major salivary glands (four parotid and one submandibular gland) are presented The differential diagnosis includes adenoid cystic carcinoma, polymorphous low-grade adenocarcinoma, and cellular pleomorphic adenoma.[10]

Simpson RH, Desai S etal studied salivary duct carcinoma in situ of the parotid gland. Salivary duct carcinoma in situ is morphologically similar to breast ductal carcinoma in situ and, although our cases are few, salivary duct carcinoma in situ can possibly be subdivided into luminal and non-luminal cell types, as can analogous mammary neoplasms. Similar study by Young JA.deals with diagnostic problems in fine needle aspiration cytopathology of the salivary glands.The present study cannot determine whether low-grade cribriform cystadenocarcinoma, architecturally similar but immunohistochemically different, is part of the spectrum of salivary duct carcinoma in situ, or whether it represents a separate entity.[11,12]

Fine needle aspiration cytology of salivary gland lesions was also done by Jayaram Get al 247 salivary gland lesions were subjected to fine needle aspiration (FNA) cytology; 179 were designated as neoplastic lesions and 68 as non-neoplastic There was 100% sensitivity for cytodiagnosis of benign tumours. The high sensitivity and specificity of cytodiagnosis makes FNA cytology a valuable diagnostic modality in the evaluation of salivary gland lesions.[13]

Chakrabarti S et al did study of salivary gland lesions with fine needle aspiration cytology and histopathology along with immunohistochemistry .The study was done with 40 cases of salivary gland swelling. After clinical examination, FNAC and histopathological examination along with immunohistochemistry was done and the results were correlated. The sensitivity of this study was found to be 71.43%, specificity 100% and accuracy was 93.10%. This study corroborates well with other studies including immunohistochemical findings. p53 expression was found to be related with nature of the neoplasm. FNAC is an important tool for early diagnosis of salivary gland lesions.[14]

Frable MA, Frable WJ et al did Fine-needle aspiration biopsy of salivary glands. When available, the fine-needle aspiration diagnoses were correlated with histologic diagnoses and long-term patient outcomes. The sensitivity for a neoplasm was 93.3%; the specificity for the absence of a neoplasm was 99%. Diagnostic efficiency was 96.4%, and predictive value of a positive aspiration for a neoplasm was 98.3%. With fine-needle aspiration, surgical excision of salivary gland masses is often unnecessary. [15]

Fine needle aspiration cytology (FNAC) of suspected salivary gland lesions has an established role in preoperative diagnosis and management of patients. However diverse morphological patterns and overlapping features make it a challenging job, to give a precise diagnosis, at times. The aim of the present study by Kotwal M, Gaikwad S et al was to discuss the problems and pitfalls in FNAC of salivary gland lesions and try to find out possible solutions. Certain guidelines can be practiced in order to avoid these pitfalls to a certain extent. MGG staining is a must in FNA of salivary gland lesions. Genuine problems do occur in typing of salivary gland tumours and it is prudent on occasions to limit the cytology report to differential diagnosis. [16]

Atula T et al studied fine-needle aspiration cytology of submandibular gland lesions. They concluded that FNAC can offer valuable information about the type of the submandibular gland lesion, but the decision of operative and other treatment should not be based solely on the result of FNAC. Similar work was done by Choudhury AA, Sultana T et al. They made diagnosis of Parotid Gland Mass by the Fine Needle Aspiration Cytology (FNAC) and its Histopathological Correlation in a 2 Years Study in BSMU, Dhaka. The aim of this study was to assess the sensitivity and specificity of FNAC in the diagnosis of parotid mass. Parotid gland lesions form about 2-6.5% of all head and neck neoplasms in adults. They are easily accessible by FNAC, also cytology can provide a distinction between parotid and non-parotid lesion, benign and malignant lesions, and specific and non specific inflammation. Fine-needle aspiration cytology is useful in the preoperative assessment of parotid tumours as it is more reliable than clinical examination to diagnose malignant parotid tumours. FNA cytology is useful in avoiding surgery (inflammatory lesions) or limiting surgical procedures (benign tumours). [17, 18]

Das DK et al explored the role of fine needle aspiration cytology in the diagnosis of swellings in the salivary gland regions. The present study describes the utility of fine-needle aspiration (FNA) cytology in the diagnosis of these lesions. Ngansangiam S et al in their study sought the accuracy of fine needle aspiration cytology of salivary gland lesions. This study evaluated the accuracy and diagnostic performance of FNA cytology in Thailand. A consecutive series of 290 samples from 246 patients during January 2001-December 2009 were evaluated from the archive of the Anatomical Pathology Department were verified by histopathologic diagnoses. They concluded that Fine needle aspiration (FNA) cytology is well accepted as a safe, reliable, minimal invasive and cost-effective method for diagnosis of salivary gland lesions. [20, 21]

Ito FA, Ito K et al did a retrospective study of 496 cases of salivary gland tumors in a Brazilian population. Salivary gland tumors are uncommon and the microscopical features can be complex. Out of all cases, 335 (67.5%) were classified as benign and 161 (32.5%) as malignant. The majority of the cases occurred in the parotid gland (67.7%), followed by the minor salivary glands (22.8%) and submandibular gland (9.5%). Among the minor salivary gland tumors, the palate was the most frequent location (67%). The tumors affected

more commonly adult patients with peak incidence between 40 and 50 years of age and with a slightly predominance in females. Pleomorphic adenomas were the most frequent tumor representing 54.2% of all cases, followed by mucoepidermoid carcinoma (13.5%), Warthin's tumor (8.5%) and adenoid cystic carcinoma (7.9%). [22]

The diagnosis of salivary gland tumors is complicated by their relative infrequency, the limited amount of pretreatment information usually available, and the wide range of biologic behaviors seen with different histopathologic types. Johns ME et al did a study on incidence, diagnosis, and classification of salivary gland tumors. Most salivary gland neoplasms originate in the parotid, 10-15% arise from the submandibular glands, and the rest occur in the sublingual and minor salivary glands. The probability of a salivary gland neoplasm being malignant is inversely proportional to the size of the gland. The authors discussed two major theories of histogenesis, itemize the various benign and malignant varieties of tumor, the presentation and prognosis for each type, and present a list of factors that influence survival. They also discussed the newest staging system. [23]

Eveson et al did a review of 2410 cases with particular reference to histological types, site, age and sex distribution. The British Salivary Gland Tumour Panel has accumulated 2569 salivary gland tumours. Of these, 2410 were primary epithelial salivary gland tumours and these formed the basis of the present study. The principal site was the parotid and the combined minor (oropharyngeal) glands formed the second largest group. Pleomorphic adenomas formed the largest group of tumours in most sites, but were particularly common in the parotid. The frequency of malignant tumours increased with age after the third decade and was maximal in the eighth decade. Malignant tumours were more common in the submandibular and the minor glands than in the parotid. In the sublingual gland six out of seven tumours were malignant. [24]

Guzzo M et al inferred that most common tumor site is the parotid. Aetiologic factors are not clear. Nutrition may be a risk factor, as well as irradiation or a long-standing histologically benign tumor that occurs at youth. Painless swelling of a salivary gland should always be considered as suspicious, especially if no sign of inflammation is present. Signs and symptoms related to major salivary gland tumors differ from those concerning minor salivary gland tumors, as they depend on the different location of the salivary gland. Surgical excision represents the standard option in the treatment of resectable tumors of both major and minor salivary glands. Neutron, heavy ions or proton radiotherapy may be a treatment option for inoperable locoregional disease. Surgery, irradiation or re-irradiation are treatment options for local relapse, whereas radical neck dissection is indicated for regional relapses. [25]

CONCLUSION:

- In salivary gland masses, FNAC serves to determine the nature of the lesion (inflammatory/neoplastic - benign or malignant) and offers valuable information for planning of subsequent therapeutic management.
- Males bear the brunt of the disease almost twice more than females and parotid gland is home to most of the lesions.
- Pleomorphic adenoma is the most dominant lesion even more than non-neoplastic lesions. Mucoepidermoid carcinoma is the most common malignant tumour but salivary duct carcinoma is also not so rare one.
- Fine-needle aspiration cytology is useful in the preoperative assessment of parotid tumours as it is more reliable than clinical examination to diagnose malignant

parotid tumours. FNA cytology is useful in avoiding surgery (inflammatory lesions) or limiting surgical procedures (benign tumours).

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