

Role of Milan system for reporting salivary gland lesions on fine needle aspiration cytology

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Abstract

Background and Objectives: Salivary gland swellings are frequently encountered in OPD. Being situated in accessible location, Fine Needle Aspiration Cytology (FNAC) is a well-established technique for evaluation of these lesions. A prospective study done in patients presenting with swelling of salivary glands, FNAC was performed with 23G needle, smears were stained with H&E. Clinical data, radiological findings were noted. Cytological features were evaluated and classified. Total 50 cases were evaluated. Distribution of cases into different categories was as follows ND (2%), NN (60%), AUS (2%), NB (20%), SUMP (2%), SM (2%) and M (12%). Non-neoplastic lesions were the most common cases observed in this study, whereas Pleomorphic adenoma and Mucoepidermoid carcinoma were the common benign and malignant lesions respectively.

Keywords: Milan system, Salivary gland lesions, FNAC, non-neoplastic, neoplastic

Introduction

Salivary glands are exocrine organs that secrete saliva widely distributed throughout the mouth and oropharynx. There are three pairs of salivary glands-parotid, submandibular and sublingual glands^[1]. Minor salivary glands are about 80-100 in number, and are located throughout the oral cavity-in the buccal mucosa, the soft palate, lateral parts of hard palate and the floor of mouth.

The salivary gland lesions are relatively common clinical problems and range from non-neoplastic lesions like sialadenitis and cysts to benign and malignant tumors of different malignant potential^[2]. The salivary gland tumors account for 2-6.5% of all the head and neck tumors. Age incidence varies widely, extending from children³ to adults over 80 years of age. These glands are usually not subjected to incisional or core needle biopsy, because of the possible risk of fistula formation and tumor seedling^[3].

Cysts and associated lesions with cystic changes are commonly encountered in head and neck region. Pathology of these lesions are diverse and includes developmental, inflammatory, benign and malignant tumors which can be primary or metastatic.

Fine Needle Aspiration Cytology (FNAC) is most widely accepted diagnostic tool for salivary gland lesions, due to their superficial location and easy accessibility^[4]. FNAC is a simple, rapid, minimally invasive reliable diagnostic tool. FNAC have high sensitivity,

specificity and accuracy. Hence the appropriate management could be planned earlier, whether conservative management for non-neoplastic lesions or surgery for malignant tumours^[5].

Till date, ultrasonography is acting as bridge between surgery and pathology. Pre-operative assessment of parotid swelling by cytology and ultrasonography is especially significant in our country where tuberculosis and metastatic squamous cell carcinoma invading lymph nodes surrounding salivary glands mimic parotid swelling.

In most cases, FNA can also differentiate between low- and high-grade carcinomas. Neoplastic salivary gland lesions are usually managed surgically, while non-neoplastic ones are managed conservatively, without surgical intervention. Knowing whether a carcinoma is low- or high-grade can determine the extent of surgery, including decisions on preservation of the facial nerve in case of parotid tumours.

A new reporting system for salivary gland cytology specimens is the subject of this study. It has been developed by an international consortium of experienced health care professionals, and is designated 'The Milan System for Reporting Salivary Gland Cytopathology (MSRSGC)'^[6]. The objective of the MSRSGC is to foster better communication between clinicians and between institutions in order to improve overall patient care. The MSRSGC consists of six diagnostic categories, comprised of "Non-Diagnostic, Non-Neoplastic, Atypia of Undetermined Significance (AUS), Neoplasm category that is split into Benign and Salivary gland neoplasm of Uncertain Malignant Potential (SUMP), Suspicious for Malignancy (SM) and Malignant. It is an evidence-based system derived from the literature which correlates diagnostic categories with risk of malignancy and clinical management strategies^[7, 8].

Methodology

The present study comprises of FNAC of 50 cases of salivary gland lesions. Aspiration was done at the Department of Pathology after a thorough clinical examination of the patient, in each case. The procedure was repeated in cases where the aspiration was acellular or inconclusive.

Study design: Prospective study.

Sample size: 50.

Inclusion criteria

- Patients presenting with palpable salivary gland swelling.

Exclusion criteria

- Non-co-operative patients.
- Patients with non-palpable salivary gland lesions.

Procedure of FNAC

- The patients are informed about the procedure and consent is obtained from the patients for the procedure. The patient is made to take a suitable position on the bed.
- The swelling is palpated first and then the area is cleaned with 95% ethanol-soaked pads.
- The swelling is fixed with the thumb and index finger of one hand.
- 5 ml disposable syringe with the 23-gauge needle attached to it is introduced through the

skin and into the swelling.

- At this point, 10-20 rapid back and forth strokes are made within the lesion.
- Negative pressure is created by withdrawing the plunger about 2-3 CC.
- When material appears in the needle hub, the aspiration is stopped, the negative pressure is released and the needle is withdrawn from the patient.
- Hemostasis is achieved with the gauze and local pressure.

The needle is removed from the syringe, air is drawn into the syringe, the needle reattached and the material is expressed onto a clean glass slide. Smears are gently prepared using a second slide.

Zajdela recommended needle sampling without aspiration based on the observation that the capillary pressure in a fine needle is sufficient to keep the scrapped cells inside the lumen. A 23 gauge needle is held with finger tips and is inserted into the target lesion and is moved back and forth, repeatedly in various directions. The yield is much lesser when compared with aspiration technique.

For H and E staining, the slides are immediately fixed in isopropyl alcohol. All the slides are labelled. In cases of fluid aspiration, slides are made from uncentrifuged and as well as from centrifuged material. Special stains were performed as and when required. The slides were examined light microscopically.

Results

All the 50 cases were categorized as per the MSRSGC classification system, 1 (2%) case was grouped in Category I, 30 cases (60%) in Category II, and 1 case (2%) in Category III, 10 (20%) cases in Category IVa, 1 (2%) case in Category IVb, 1 (2%) case in Category V, and 6 (12%) cases in Category VI. Maximum cases (60%) were of non-neoplastic category, followed by benign neoplasm category (20%).

Table 1: Cytological categories of salivary gland lesions as per Milan system of classification

	Milan System category	Number of cases	Percentage %
I	Non-diagnostic	1	2
II	Non-neoplastic	30	60
III	Atypia of Undetermined Significance	1	2
IVA	Neoplasm: Benign	10	20
IVB	Salivary gland neoplasm of Uncertain Malignant Potential	1	2
V	Suspicious for Malignancy	1	2
VI	Malignant	6	12
	Total	50	100

Category I: Non-diagnostic

The cases were categorized into non-diagnostic when the smears showed less than 60 lesional cells, or hemorrhage obscuring pathological cells and when only the non-mucinous fluid is present.

In present study only 1 case (2%) out of 50 cases was non-diagnostic, which showed very scant epithelial cells and abundant hemorrhage. The procedure (FNA) was repeated in order to obtain sufficient material, however it did not yield any pathological/lesional cells.

Category II: Non-neoplastic

The cases were divided into 3 categories-sialadenitis, sialadenosis and inflammatory cystic lesion.

Sialadenitis

Acute sialadenitis: 5 cases of acute sialadenitis were reported. 2 in 1st decade, 1 case in each of 3rd, 4th and 7th decade. 2 cases were males and 3 were females. 4 cases had parotid gland involvement and 1 case involved the submandibular gland. Smears showed predominantly neutrophils along with few ductal epithelial cells and acinar cells. Background showed few fibrous stromal fragments and few RBCs.

Acute suppurative sialadenitis: 4 cases of acute suppurative sialadenitis/abscess were reported. 3 in 5th decade, 1 case in 6th decade. 4 cases were males and 1 was female. 3 cases had parotid gland involvement and 1 case involved the submandibular gland. Smears showed predominantly neutrophils along with degenerated cells few ductal epithelial cells and acinar cells. Background is dirty and contain few RBCs.

Chronic sialadenitis: 14 cases of chronic sialadenitis were reported. Maximum cases in 4th and 5th decade. The youngest case was of 2-month-old boy and oldest patient was 72 year old man. Majority of the patients were males.

Most commonly affected the parotid gland (10 out of 14 cases), followed by submandibular gland (4 cases). Smears showed plenty of lymphocytes amidst benign epithelial cells and fibroblasts. When neutrophils are admixed with this, it is acute exacerbation of chronic sialadenitis.

Granulomatous sialadenitis: One case of granulomatous sialadenitis was reported in 72 year male with parotid gland involvement. Smears showed ductal epithelial cells and acinar cells along with scattered granulomas comprised of epithelioid cells, lymphocytes and few multinucleate giant cells.

Sialadenosis: 5 cases of sialadenosis were reported. 3 cases were males and 2 cases were females. 2 cases involved the parotid gland and 1 case involved submandibular gland. Smears studied were high to moderately cellular showing hyperplastic salivary gland acini adherent to a thin fibrovascular stroma with benign ductal cells in sheets. Large number of naked nuclei of ductal epithelial cells were seen in the background. Plenty of clusters of enlarged (hypertrophic) acinar cells, normal cytoarchitectural arrangement of acini is maintained. Background shows stripped acinar cell nuclei.

Inflamed cystic lesion: 2 cases were reported. 1 was 32 year female and the other was 45 year male. Both cases had parotid gland involvement. Smears studied from aspirated fluid which revealed occasional small clusters of epithelial cells, lymphocytes, few neutrophils and cyst macrophages were diagnosed as inflamed cystic lesion.

Distribution of non-neoplastic (Milan category II) salivary gland lesions and their incidence

Among 30 non-neoplastic cases, 23 (76.67%) cases were sialadenitis, 5 (16.67%) cases were sialadenosis, 2 (6.67%) cases were of inflammatory cystic lesions.

Table 2: Distribution of non-neoplastic salivary gland lesions and their incidence

Non-neoplastic lesions	Number	Percentage %
Sialadenitis	23	76.67
Sialadenosis	5	16.67
Inflamed cystic lesion	2	6.67
Total	30	100

Discussion

Salivary gland lesions are frequently encountered in OPD. The associated cytohistopathology is extremely varied and complex due to the presence of non-neoplastic lesions, epithelial and non-epithelial neoplasms, metastatic tumors and lymphomas.

Salivary gland neoplasm accounts for 2 to 6.5% of all neoplasms of the head and neck. Salivary gland tumors can arise from either the major salivary glands (parotid, submandibular and sublingual) or the minor salivary glands which are located throughout the submucosa of the upper aerodigestive tract^[9].

64-80% of all primary epithelial tumors occur in the parotid glands, 7-11% occur in the submandibular glands, <1% occur in the sublingual glands and 9-23% occur in the minor salivary glands.

Malignant salivary gland tumors are rare. The most common tumor site is the parotid. Aetiologic factors are not clear. Nutrition may be a risk factor, along with 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.

The mean age at presentation for malignant salivary gland neoplasms is 55 to 65 years while benign lesions typically develop at least a decade earlier, at a mean age of 45 years. Warthin tumors are more common in males^[10].

FNAC is a safe, accurate, and cost-effective method for evaluation of salivary gland swelling and can help in management of the patient by providing nature of the lesion.

Category I cases are non-diagnostic salivary gland aspirates providing insufficient diagnostic material for an informative interpretation. Only 1 case yielded less than 60 lesional cells and was insufficient to report. The procedure was repeated, however the repeat smear was also unsatisfactory. The study conducted by Gaikwad VP *et al.*^[11] had a smaller number of category I cases than present study, whereas study conducted by Kala C *et al.*^[12], Katta R^[13], Wu HH *et al.*^[14] had higher number of cases.

Category II includes inflammatory cases like sialadenitis, sialadenosis. These are the most commonly observed lesions of salivary gland. The studies by Kala *et al.*^[12], Katta R *et al.*^[13], Wu HH *et al.*^[14], Gaikwad VP *et al.*^[11] had lesser percentage of non-neoplastic lesions than present study.

Non-neoplastic lesions were more common than neoplastic lesions in the present study, which was a similar finding seen in study done by Kala *et al.*^[12] where 38.2% were non-neoplastic cases and of 33.4% were neoplastic lesions.

In the present study among the non-neoplastic lesions, chronic sialadenitis was the commonest non-neoplastic lesion accounting for 22.67% of the total cases.

FNAC provides accurate diagnosis of most salivary gland lesions and contributes to conservative management in many patients with non-neoplastic conditions.

In the present study of 50 cases of salivary gland lesions, 30 cases were non-neoplastic lesions. This suggests non-neoplastic lesions outnumbered other categories. This is similar to studies conducted by Kala *et al.*^[12], Katta R *et al.*^[13], Wu HH *et al.*^[14].

Conclusion

- Milan System for Reporting Salivary Gland Cytology is a recently proposed six-tiered scheme to classify salivary gland smears. Despite being heterogeneity and morphological overlap between different salivary gland lesions, this system proposed a tiered scheme which places salivary gland FNAC into well-defined categories that limit the possibilities of false negative and false positive cases.
- Use of Milan System of Reporting Salivary Gland Cytopathology can increase the overall

effectiveness and communication with clinicians and between institutions thus improving the overall patient care.

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