E-ISSN: 2616-3470
P-ISSN: 2616-3462

www.surgeryscience.com
2019; 3(4): 521-524
Received: 19-08-2019
Accepted: 21-09-2019

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Clinical profile of patients with chronic salivary gland swellings

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DOI: https://doi.org/10.33545/surgery.2019.v3.i4i.296

Abstract
Parotid gland is the largest of the salivary glands situated immediately inferior and anterior to the lower part of the ear. The gland weighs 14-18gms. The gland is purely serous in nature. It forms an irregular, lobulated, yellowish mass lying below the external acoustic meatus between the mandible and the sternomastoid muscle. It project forwards on to the surface of the masseter, where a small part of it, usually more or less detached, lies between the zygomatic arch above and the parotid duct below. This detached part is the accessory part of the parotid. The materials of the study was obtained from 129 patients who underwent fine needle aspiration of the salivary glands and the study confines itself to patients above the age of 12 years. The instruments for aspiration consisted of a 10 ml disposable syringe filled with a 22 G. or 23 G. needle. The skin at the site was wiped with an antiseptic and the suspected salivary gland swelling was held with one hand in a factorable position. No anaesthesia was used. In all the 22 cases correctly diagnosed as chronic sialadenitis, FNAC showed smears with benign acinar and ductal cells and the background showing sheets of lymphocytes, macrophages or neutrophils. In 2 case misinterpreted as pleomorphic adenoma, there were mono layered Sheets of ductal cells in a background of lymphocytes. In some areas, cells with squamoid appearance were seen. In the case misintrepted as warthins tumour showed amorphous and granular debris with sheets of lymphocytes. The smear showed sheets of oncocytic cells.

Keywords: Chronic salivary gland swellings, FNAC, warthins tumour

Introduction
Salivary gland consists of 2 parotid gland, 2 submandibular glands, sublingual glands and multiple minor salivary glands. The minor glands are seen throughout the entire upper respiratory tract, palate floor of the mouth and base of the tongue.

The parotid is invested in the periparotid facia which support it from zygoma and becomes continuous with masseter facia anteriorly and sternomastoid facia posteriorly, within this facia there are 15 to 20 lymph nodes and their enlargement mimics a parotid tumour. A dozen of lymph nodes are embedded in parotid glandular tissue [1].

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The gland is enclosed within a capsule derived from the investing layer of deep cervical facia, which splits between the angle of mandible and mastoid process to enclose the parotid gland. The part covering the superficial surface is dense and closely adherent to the gland and attached to the zygomatic arch. The deep part of the capsule is attached to the styloid process, mandible and tympanic plate and blends with the fibrous sheath of the muscles related to the gland. A portion of the facia attached to the styloid.

The total quantity of saliva produced in 24 hours is about 1000-1,500m1. About 90% of this is derived from parotid and submandibular glands and is more or less equal amounts.

The salivary gland secretion is controlled by physical and psychic stimulation mediated via the autonomic nervous system. Physical stimulation from the oral cavity and psychic stimulation from taste, smell or sight centers are relayed along the afferent pathways to three superior and inferior salivary nucleus in the medulla.

Afferent pathways utilize both the sympathetic and parasympathetic systems. For the parasympathetic innervations of parotid, pre ganglionic fibre leave the inferior salivary nucleus with the tympanic branch of 9th cranial nerve to the tympanic plexus. This is called jacobson's nerve. This leaves the tympanic plexus as lesser superficial petrosal nerve and travels to the otic ganglion. The fibres relay in the ganglion. Postganglionic fibres proceed to the parotid gland via auriculo temporal branch of mandibular division of the trigeminal nerve. Sympathetic fibres leave the ventral roots of the upper three thoracic segments and ascend in the cervical sympathetic chain of superior cervical ganglion where they synapse. Post ganglionic fibres reach the parotid via the carotid plexus traveling with the middle meningeal artery [3].

Parasympathetic supply of the submandibular gland arise from superior salivary nucleus by the nervous intermedius part of facial nerve and chorda tympani joining the lingual nerve. The fibres travel to the submandibular ganglion and relay there. Postganglionic fibres proceed to the submandibular and sublingual glands via branches of the lingual nerve.

The sympathetic fibres leave the superior cervical ganglion and reach the submandibular gland via fibres running with the facial artery.

The mechanism of salivary secretion requires energy for the production and secretion of organic substances across cell membrane against a concentration gradient [4].

The rate of flow shows a diurnal variation. Reduced production in early morning and increased production in the afternoon. The rate of production is almost zero during sleep. The fluid formation occurs in the acni. Saliva when first formed is isotonic with blood and contains a much larger amount of sodium than potassium. As it passes through the ducts it gradually becomes less and less concentrated, so that in the oral cavity saliva is hypotonic to blood and the sodium concentration falls considerably and potassium level rises. The striated cells of the smaller ducts are responsible for this change. Few mucous secreting goblet cells are present in the parotid gland and ducts. In chronic inflammation appreciable amount of mucus is seen coming from the duct. Cat ions in saliva are Na+, K+ and calcium. Salivary calculi are made up of calcium phosphate and carbonate. Iodine is excreted by saliva [5, 6].

Methodology

The materials of the study was obtained from 129 patients who underwent fine needle aspiration of the salivary glands and the study confines itself to patients above the age of 12 years. The instruments for aspiration consisted of a 10 ml disposable syringe filled with a 22 G. or 23 G. needle. The skin at the site was wiped with an antiseptic and the suspected salivary gland swelling was held with one hand in a factorable position. No anaesthesia was used. The needle was introduced into the swelling sand the plunger of the syringe withdrawn as far as possible creating a vacuum in the system. The needle was moved back and forth in a straight line to obtain sufficient material. Throughout the procedure negative pressure was maintained by retracting the plunger of the syringe. When the aspiration was complete the pressure in the syringe was allowed to equalize before the needle was withdrawn. The syringe was disconnected from the needle, filled with air and reconnected. The contents were expressed onto a glass slide and spread along the slide with the needle itself.

The smears with benign ductual and acinar cells in a background of polymorphs or lymphocytes or histiocytes. The diagnosis of acute sialadenitis was consider when polymorphs were predominant and of chronic sialadenitis when monocular cells were predominant.

A detailed history and clinical examination was done and a clinical diagnosis reached. FNAC was done and patient subjected to surgery accordingly. The histopathology of the specimen comparing with the FNAC was analyzed.

The different statistical data has been tabulated.

Results

Table 1: Distribution of patients according to sex

Sex	No. of patients	% of total
Males	78	60.4
Females	51	39.6
Total	129	100

The youngest patient was 13 years and oldest 78 years.

Table 2: Salivary gland lesions based on histopathology

Histologic type.	No. of cases	% of total
Chronic sialadenitis	31	30.39
Benign tumours	48	47.06
Malignant tumours.	14	13.73
Metastatic tumours.	2	1.96
Others.	7	6.86
Total	102	100

The category "others" include 3 reactive lymph nodes, 2 nonspecific cysts, 2 lipomas.

Table 3: Distribution of malignant histologic types

Histological type	No. of cases	% of malignant tumours
Muco epidermoid carcinoma	8	50
Carcinoma in pleomorphic adenoma	2	12.5
Acinic cell tumour.	2	12.5
Adenoid cystic carcinoma.	2	12.5
Matastatic squamous cell carcinoma	2	12.5
Total	16	100

Among the 16 cases of malignant tumours, 2 were a metastatic tumour.

Table 4: Distribution of benign histologic types

Histological type	No. of cases	% of benign tumours
Pleomorphic adenoma	34	70.83
Warthin's	12	25
Monomorphic adenoma	2	4.17
Total	48	100

Table 5: FNAC report

FNAC report	No. of cases	Percentage.
Chronic sial adenitis	22	70.98
Pleomorphic tumour	2	6.45
Warthin"s tumour	1	3.22
Mucoepidermoid tumour	2	6.45
Inconclusive	4	12.9
Total	31	100

In all the 22 cases correctly diagnosed as chronic sialadenitis, FNAC showed smears with benign acinar and ductal cells and the background showing sheets of lymphocytes, macrophages or neutrophils.

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Sheets of ductal cells in a background of lymphocytes. In some areas, cells with squamoid appearance were seen. In the case misintrepted as warthins tumour showed amorphous and granular debris with sheets of lymphocytes. The smear showed sheets of oncocytic cells.
In the case reported as mucoepidermoid, showed a cellular smear with squamous cells, glandular cells, overlapping epithelial cells and intermediate cells.
25 cases were reported as chronic sialadenitis of FNAC. The corresponding histopathological reports are as follows.

Discussion

The treatment of benign tumours has passed through several phases during the last 30 years. Enucleation practiced earlier carried a high recurrence rate and so it was followed by enucleation and postoperative irradiation.
The superficial conservative parotidectomy was very successful in terms of prevention of recurrence, and the nerve was safe in the hands of skilled operators because the first step in the operation is identification of the facial nerve and it too main branches. It become evident that the procedure was often too extensive, removal of the upper portion of the gland for a small tumour at the lower pole, are unnecessary. Now therefore hemi superficial parotidectomy is often done. That is all the parotid tissue lateral to one main branch, either upper or lower of the nerve. For lesion in the deep lobe total parotidectomy with conservation of facial nerve is advisable.
Parotidectomy may be conservative when all the main branches of the facial here are preserved, semi conservative in which one or more but not all of the main branches are sacrificed, or radical when the entire trunk and distal portion of the facial nerve is sacrificed. Depending upon the part removed, it may be superficial, deep or total, deep parotidectomy is not recommended because of the risk of fistula formation; more over it is difficult to approach deep lobe with the superficial lobe in situ [6].
The basic operation for parotid neoplasm is the superficial or lateral parotidectomy. The procedure will suffice for all superficial lobe begin neoplasms. In addition injection of a 1: 5000 solution of epinephrine into the area of incision and the area of main trunk of the facial nerve will aid in decreasing capillary oozing. A doubly modified Blair incision, a standard parotidectomy incision or some combination of two or sistrunk"s incision may be used depending on the circumstances. Draping should be performed so that the entire face can be visualized.
The only constant location of the facial nerve is at the stylomastoid foramen, posterolateral to the base of the styloid process. In general this is the preferred location to attempt identification of the nerve. Following incision and elevation of the flap the key to rapid identification of facial nerve is mobilization of the posterior surface of the gland off the sternomastoid muscle and the cartilaginous and bony ear canal. The gland is reflected forward until the posterior belly of the digastric can be seen and the tragal pointer has been identified. At this point the styloid process can be readily palpated and the three land marks triangulate the nerve. The main trunk is usually greater that I cm deep to and slightly inferior to the tragal pointer and is surrounded by a small amount of fat [7].
It is a very useful investigation in the diagnosis, of a salivary gland swelling. In experienced hands, this test has good accuracy that exceeds frozen section diagnosis.
The first report of needle biopsy has been traced back to report in 1847 by Kum. The procedure was introduced by Martin and Ellis at the Memorial Hospital in 1925. It flourished during the next 20-30 years but subsequently declined for reasons that are not entirely known. The procedure was revived by Lopez cardio in Netherlands and Soderstorm in Sweden, who used today's technique using a thin needle of 22 G and higher with an external diameter of 0.6 mm or less [8].
It was the Scandinavians who laid the foundation for fine needle aspiration cytology of salivary glands. Eneroth and Zajicek were the first to record the morphological characteristics that helps differentiate between the various types of salivary gland tumours by using fine needle aspiration18. By 1964 Manc had collected 652 fine needle aspiration biopsies at the cytology department, Stockholm, Sweden.
Berge and Soderstrom standardized the technique of fine needle aspiration of the salivary glands. They described appearance of acinar cells and ductal epithelium in the aspiration smear of normal gland and also the patterns obtained in chronic sialadenitis and pleomorphic adenoma.
Even though Stewart and Von Haam expressed great enthusiasm after examining the aspirates from mixed tumours of salivary gland swelling the procedure did not gain Popularity USA. This was due to a suspected risk of dissemination of the tumour cells through the needle tract or efferent lymph or blood vessels resulting in extensions of tumour growth. Engzell conducted a study in Karolinska institute and concluded that there was no evidence of recurrence or local extension of the tumour that might be attributed to the fine needle aspiration cytology.
In 1970 and 1980 s many reports came regarding the accuracy of fine needle aspiration cytology of salivary glands. Webb, Presson and Zettergren reported that both inflammatory and neoplastic salivary gland swellings could be diagnosed with accuracy by fine needle aspiration biopsy. Lindberg and Akerman stated that a cytologic report of malignancy wads most likely correct, provided the cytology was very much familiar with fine needle aspiration biopsy [9].
Kline *et al*. reported that inaccurate diagnosing on fine needle aspiration was due to inexperience and improper technique like aspiration from areas of cystic degeneration. Several reports concerning the accuracy of fine needle aspiration cytology in salivary gland swellings are available. The morphological variability the salivary gland tumours made sampling and interpretation difficult a common problem was that of atypical features in pleomorphic adenoma which raised a suspicion of a low grade malignant tumour. Batsakis felt that fine needle aspiration did not give additional information as part of systemic evaluation. He experienced that the effects of FNA on the tissues could causes difficulty in making final histopathological diagnosis [5].
Immunohistochemistry has been used by certain workers in the diagnosis of aspirates from salivary glands. Ostrzega *et al*, investigated the value of immuno cyto chemical staining for Glial fibrillary Acid protein (GFAP) and found it useful in the diagnosis of pleomorphic adenoma and help to differentiate it from adenoid cysatic carcinoma and low grade mucoepidermoid tumour which is GFAP negative. The GFAP reactivity of salivary gland is related to the myxomatous and chondromatous differentiation in pleomorphic adenoma
Some authors to compare and correlate fine needle aspiration of salivary glands with frozen section of salivary glands. In USA many surgeons prefer frozen section to cytology. Fine needle aspiration has other advantage over frozen section. It does not require general anaesthesia, the smears can be read without the pressure of rapid reporting can be repeated and special stains can be used. Since it gives a pre-operative diagnosis, the surgeon can plan the treatment [10].

Conclusion

- Out of the 129 patients who underwent FNAC, 102 patients underwent surgery for the salivary gland swelling. Among them 25 were inflammatory lesions (298%), while 48 were benign tumours (47.1%).
- Pleomorphic adenoma accounted for 70.83% of the benign tumours.

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