

# Investigation of Salivary Gland Pathology

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Date of Receiving: Nov 2016

Date of Submission: Nov 2016

Date of Acceptance: Dec 2016

## Abstract

Salivary gland pathology is diverse in nature and mainly inflammatory or neoplastic. Salivary gland tumours present as painless enlarging masses. Most of the tumours are located in parotid glands and many of them are benign. The management of these tumours is difficult just like the diagnosis of benign and malignant tumours. Fine Needle Aspiration Cytology (FNAC) and Magnetic Resonance Imaging (MRI) scans provide some useful information in diagnosis, but most of the tumours will require surgical excision as a means of coming to a definitive diagnosis. Surgical approach is adequate for benign tumours and early low grade malignancies whereas post operative radiotherapy is needed for more advanced and high grade tumours with regional lymph node metastasis. The role of chemotherapy remains largely palliative. This article throws light on some of the more important aspects in the investigations of salivary gland pathologies.

**Keywords:** Biopsy, Investigations, Salivary Gland, Scintiscan, Ultrasound, FNAC

## 1. Introduction

Salivary glands are group of exocrine glands secreting saliva that reaches oral cavity through their ducts. Pair of Parotid gland, Submandibular gland and Sublingual gland form the major salivary glands and intraoral salivary glands form the minor salivary glands. Saliva is important for maintenance of healthy hard and soft oral tissues. The different pathologies of salivary glands can be inflammatory, infectious, idiopathic or neoplastic conditions. The investigations include conventional radiology with or without contrast sialography, Computerised Tomography and Fine Needle Aspiration Cytology. The final diagnosis can only be established from excisional pathologic specimen<sup>1</sup>.

## 2. Discussion

The main investigations of salivary gland pathologies are as follows:

### 2.1 Technique Of Imaging

#### 2.1.1 Radiography and Sialography

Ductal pathologies like inflammatory or degenerative diseases can be detected by Sialography even though many new imaging techniques are currently available. Ductal narrowing can be Focal or diffuse and can be demonstrated and conservative management can be given using sialography. The exact size and location of salivary ductal stones can also be obtained by this. <sup>[2]</sup> Space occupying lesions cannot be detected or localized using this.

#### 2.1.2 Computerized Tomography (CT) and Magnetic Resonance Imaging (MRI)

Stones within the salivary duct or salivary gland can be visualized by CT scan. Very small stones may not be seen as in plain radiography as the spacial resolution is not very good. Larger stones and anatomy of ducts can be assessed by MRI<sup>2</sup>

Indications of CT or MRI are as follows:

## 2.2 Major Glands

- Tumours in the deep lobe of parotid gland.
- Tumours of parotid with superficial and deep lobe involvement.
- Tumours involving features of malignancy or facial weakness.
- Parotid masses seen congenitally.
- Masses of submandibular gland showing neural involvement or attachment to mandible.
- Recurrent tumours.

## 2.3 Minor Glands

- Palatal masses showing nose or sinus involvement.
- Any tumour without clear margins.

## 2.4 Ultrasound

Ultrasound scans of major salivary glands are done subcutaneously and are simple. But they may be prevented by bone over it and the images may not help surgeons in operation. Stones that are radiolucent can also be seen using this. Small and high frequency intra oral probes are used for examination<sup>2</sup>.

## 2.5 Scintiscanning

Scintiscanning involves expensive and bulky equipment and is of less value in diagnosis of Salivary gland tumours. The important diagnostic methods include sialography, Computerized Tomography (CT), nuclear Magnetic Resonance Imaging (MRI) and ultrasound.

# 3. Histopathology and Related Methods

## 3.1 Fine Needle Aspiration Cytology (FNAC)

FNAC is a safe and economic procedure with acceptable diagnostic accuracy. Preoperative evaluation and identification of various salivary gland lesions can be done to a good extent using this. Risk of open biopsy can be avoided in this in parotid tumours. It lacks representation of the lesion and a small malignant change can be missed too. Lymphocyte rich lesions like warthin's tumour, Tuberculosis and HIV associated lymphoepithelial lesions

should be borne in mind. Benign and malignant salivary gland tumours can be identified and differentiated using this to over 90% accuracy. Immunohistochemistry helps in improving the diagnosis of salivary gland pathologies.

## 3.2 Frozen Sections

Frozen sections help in identifying whether the lesion is benign or malignant, the grade of the tumour and whether the margins are tumour cell free.

## 3.3 Histochemistry

Histochemistry is used in salivary gland tumour diagnosis though it has limited applications. Presence of mucin helps in the differentiation of high grade mucoepidermoid carcinoma from poorly differentiated squamous cell carcinoma<sup>1</sup>. Reticulin pattern helps in the diagnosis of lymphomas using silver staining. Phosphotungstic Acid Haematoxylin (PTAH) can be used to confirm the nature of oncocytic cells and for the identification of crystals and other inclusions.

## 3.4 Immunohistochemistry

Differentiation of carcinomas from lymphomas and sarcomas can be done by immunohistochemistry. It can be used also for distinguishing B lymphomas from T lymphomas and non-neoplastic lymphoproliferative lesions from lymphomas.

## 3.5 Electron Microscopy

Electron microscopy has less importance in diagnosing primary salivary gland tumours. It can help in the diagnosis of metastatic lesions of salivary gland. Diagnosis of many subtypes of salivary gland tumours becomes difficult as they are not commonly seen.

# 4. Salivary Gland Function Test

## 4.1 Flow Rates

Flow of saliva can change and can go unnoticed by the patient. It can be studied in persons with Xerostomia. Sjögren's syndrome can be diagnosed with the study of salivary flow rates and auto antibody studies. This is done by cannulation of the parotid duct, stimulation with 10% citric acid and by measuring the amount of saliva over a

standard period. The rate of stimulated parotid flow for normal adults over 40 years of age is 1.5 mL/min. If the saliva flow rates is equal to or less than 0.5 mL/min it indicates significant xerostomia<sup>1</sup>.

## 4.2 Sialochemistry

Composition of saliva changes in Sjögren's syndrome. Study of Chemistry of saliva changes and it has more value in the diagnosis of systemic diseases such as cystic fibrosis. Consumption of drugs like lithium can be monitored by its level in saliva.

## 4.3 Other Salivary Systemic Disease and its Tests

### 4.3.1 Bacteriology

Acute bacterial sialadenitis can be studied by investigation of bacteria. Penicillinase-resistant staphylococci causes disease in many patients. Saliva can be collected from the duct of the affected gland and can be studied and then antibiotic treatment given. Viruses like Epstein Barr virus can be identified and it is reported in saliva.

### 4.3.2 Haematology

When a surgery of salivary gland is planned, blood examination should be done and hemoglobin levels are estimated. Sometimes the blood investigations help in the diagnosis of salivary gland diseases. Sjogren s syndrome can be diagnosed by increased erythrocyte sedimentation rate and normocytic normochromic anemia and HIV Associated salivary gland lesion can be diagnosed with lymphopenia.

### 4.3.3 Immunological Tests

Sjogren's syndrome can be differentiated from benign lymphoepithelial lesion by studying autoantibodies<sup>1</sup>.

Lymphoma is more in patients with rheumatoid arthritis compared to normal persons. Immunodeficiency detection is only of theoretical value in patients with HIV-related salivary gland disease.

### 4.3.4 Biopsies, Imaging and Culturing

Diagnosis of salivary gland swellings can be done by clinical features, imaging techniques and histopathological analysis. Smaller lesions like mucocoeles can be diagnosed after doing excisional biopsies. Larger tumours should go for clinical staging and incisional biopsies and surgery should be planned after that<sup>3</sup>. Sialograms can be done with radio opaque iodine and extra oral radiographs and can be used to study major salivary glands and changes in their architecture. Functions of major salivary glands can be assessed by radioactive isotope scintiscans (e.g., T99 pertechnetate). Magnetic resonance imaging and Computerized Tomography (CT) scans will also help to identify salivary gland tumors. Salivary gland infections can be diagnosed with culture and treated using antibiotics<sup>1</sup>.

## 5. Conclusion

Pathologic conditions of salivary glands are numerous. These tests are used for the diagnosis of various pathologies.

## 6. References

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