



## Review Article

### **Sialadenitis – A Salivary Gland Disease**

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Sialadenitis is the inflammation of the salivary glands, the glands that produced saliva which is essential for normal functioning and health of mouth. It is initially indicated by a sudden unilateral or bilateral swelling with tenderness and is unable to correlate the development of the swelling with any particular event (e.g., intake of medications, post-prandial events). The duration of the episodes can vary from days to months. Sialadenitis causes range from bacterial or viral infection to autoimmune etiologies. Chronic sclerosing sialadenitis is typically present as a unilateral enlargement of a submandibular gland; there are reports of synchronous involvement of major and minor salivary glands. Clinically, it can be either symptomatic or asymptomatic, and is difficult to differentiate from a tumor. The submandibular gland is said to account for approximately 10 % of all cases of sialadenitis of the major salivary glands. Sjogren's syndrome is chronic autoimmune sialadenitis and presents as bilateral symptomatic stable swellings of the parotid glands. The estimated prevalence of Sjogren syndrome is believed to be 1-3 %. The disease is most commonly seen in patients during their fourth to fifth decades of life. Pleomorphic adenoma is the most common salivary gland tumor arising commonly in parotid gland.

**Key Words:** Sialadenitis, Salivary gland disease, Inflammation

#### **INTRODUCTION:**

Sialadenitis is the inflammation of the salivary glands, the glands that produce saliva in our mouths. Saliva is essential for the normal functioning and health of the mouth. Disorder of salivary glands function can lead to oral disease, for example tooth decay and gum disease. Sialadenitis is usually caused by bacterial or viral infection but the disorder can occasionally be due to other causes, such

as trauma, radiation and allergic reactions. Sialadenitis causes range from simple infection to autoimmune etiologies <sup>(1, 2)</sup>. Although not as frequent as sialadenitis of the parotid gland, it represents an important area of clinical relevance to the otolaryngologist and other specialists <sup>(3)</sup>.

#### **History**

Submandibular sialadenitis takes several forms. The diagnostic workup of any submandibular enlargement begins with a thorough history. This should include

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onset, duration of symptoms, recurrence, recent operative history, recent dental work, and thorough drug history, immunization history (specifically measles mumps rubella [MMR] vaccine), past medical (specifically autoimmune) history, past surgical history, and history of radiation therapy. Inquire as to associated fever or chills, weight loss, presence of a mass, bilaterality or unilaterality, skin changes, lymphadenopathy, keratitis, shortness of breath, oral discharge, dental pain, or skin discharge.

### Introduction of salivary glands

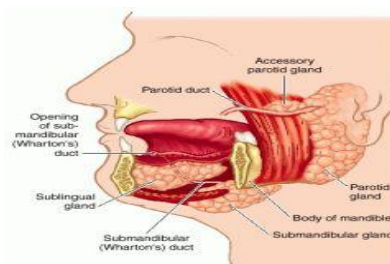
The mucus membrane lining the mouth contains about 750 minor salivary glands called buccal glands occurring throughout the upper respiratory tract – mucosa of lips, cheeks, palate, floor of mouth and retromolar area, oropharynx, larynx, trachea and sinuses. Major salivary glands (3 pairs);

- **Parotid,**
- **Submandibular**
- **Sublingual**

The parotid gland is the largest salivary gland and is found wrapped around the mandibular ramus. The secretion produced is mainly serous in nature and enters the oral cavity via Stensen's duct. The submandibular glands are a pair of glands located beneath the lower jaws, superior to

the digastric muscles. The secretion produced is a mixture of both serous fluid and mucus, and enters the oral cavity via Wharton's ducts. Submandibular glands though smaller than parotid glands produced 70% saliva in oral cavity<sup>(4,5)</sup>.

The sublingual glands are a pair of glands located beneath the tongue to the submandibular glands. The secretion produced is mainly mucous in nature; however it is categorized as a mixed gland. Unlike the other two major glands, the ductal system of the sublingual glands do not have striated ducts, and exit from 8-20 excretory ducts. Approximately 5% of saliva entering the oral cavity comes from these glands. There are over 600 minor salivary glands located throughout the oral cavity within the submucosa of the oral mucosa. They are 1-2mm in diameter and unlike the other glands; they are not encapsulated by connective tissue only surrounded by it. The gland is usually a number of acini connected in a tiny lobule. Problems with dentures are usually associated with minor salivary glands. (Figure 1(I))



**Figure: 1 (I) Different salivary gland**



### Pathophysiology:

The salivary glands serve numerous functions, including lubrication; enzymatic degradation of food substances; production of hormones, antibodies, and other blood group-reactive substances; mediation of taste; and antimicrobial protection. The regulation of salivary flow is primarily through the autonomic system and, most importantly, the parasympathetic division. The exact mechanism of salivary secretion is not completely understood but is believed to be under the influence of a cyclic AMP (adenosine 3',5'-cyclic monophosphate) and a calcium-activated phosphorylation mechanism. The concentration of mucus is higher in the submandibular gland, this increased viscosity, and subsequent relatively slower flow, contributes to the propensity for salivary gland calculi and stasis in certain disease states<sup>(6,7,8,9)</sup>.

### Symptoms of various forms of Sialadenitis:-

#### 1. Bacterial Sialadenitis:

(a) **Acute Sialadenitis** – Symptoms includes inflammation, swelling of glands, pain, fever, malaise, redness of overlying skin, pus from duct. (Figure 1(II))  
 (b) **Chronic Sialadenitis**<sup>(10)</sup> - Occurs commonly in submandibular gland, gland become fibrous, acute exacerbation of the



**Figure: 1 (II) Acute sialadenitis**

inflammation, complete replacement of parenchyma by fibrous tissue, hyperplastic ductal epithelium and cellular debris, sometimes clumps of bacteria are seen. (Figure 1(III))



**Figure: 1 (III) Chronic Sialadenitis**

#### 2. Viral Sialadenitis:

(a) **Mumps (epidemic parotitis)**<sup>(11)</sup> - Children are mainly affected, painful swelling usually on sides of face, difficulty in opening of mouth, fever, headache, body discomfort. In adults orchitis (inflammation of one or both testis), pancreatitis (inflammation of pancreas), meningoencephalitis (inflammation of brain, spinal cord and their meninges), oophoritis (inflammation of one or both ovaries). (Figure 1(IV))



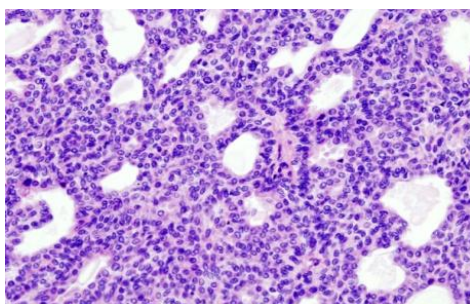
**Figure:1 (IV) Epidemic parotitis ( Mumps)**

**(b) Sarcoidosis Mumps:** In conditions like starvation, diabetes mellitus, HIV patients, lymphocyte infiltration (mainly T- lymphocytes) initially around intra lobular ducts, eventually replacing the whole affected globules. The infiltrate does not cross interlobular CT septa<sup>(11)</sup>.

**(c) Sjogren syndrome –** Chronic auto immune disease of exocrine gland impaired function and destruction of tissue caused by auto immune reaction, dry mouth, and dry eyes. In primary Sjogren syndrome salivary and lachrymal glands are affected. In secondary Sjogren syndrome autoimmune disease like rheumatoid arthritis<sup>(12)</sup>.

**3. Salivary glands tumors<sup>(13)</sup>:**

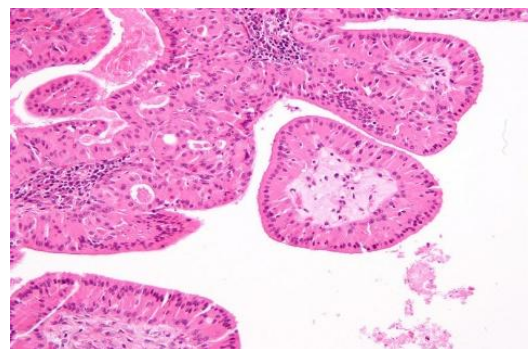
**(a) Pleomorphic Adenoma-**



**Figure:1 (V) Pleomorphic adenoma**

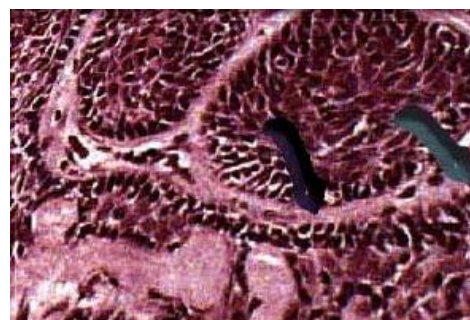
Most common parotid gland tumor. Slowly growing painless rubbery swelling with intact overlying skin or mucosa and cellular composition. (Figure 1(V))

**(b) Warthin tumor (papillary cystadenoma lymphomatosum)<sup>(14)</sup> -** multiple irregular cystic spaces containing mucoid material separated by papillary projection of tumor tissue. (Figure 1(VI))



**Figure:1 (VI) Warthin tumor**

**(c) Basal cell adenoma-** This gets its name from similarity to basal cell layer epithelium. These cells are capable of producing a lot of basement membrane material with uniform pattern either cylindrical or tubular. (Figure 1(VII))

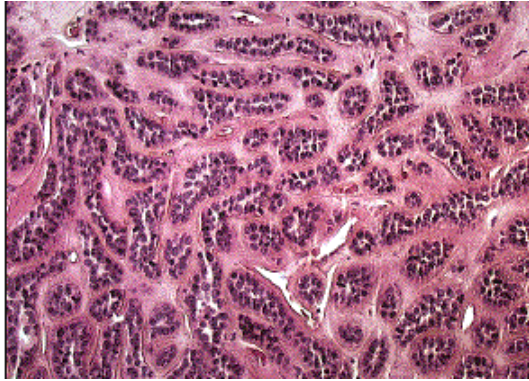


**Figure:1 (VII) Basal cell adenoma**

**(d) Canalicular adenoma (Monomorphic adenoma)-** Consist of anastomosing



strands of epithelial cells arranged in canalicular structures. The most common location is the labial mucosa (upper lip). They do not show invasive growth. (Figure 1(VIII))



**Figure:1 (VIII) Canalicular adenoma**

#### **(4) Carcinoma:**

**(a) Muco epidermoid carcinoma-** Mostly arises in parotid salivary gland. It is similar to Pleomorphic adenoma. Cystic tumor may be fluctuant. More aggressive tumors may cause pain and ulceration. Gets the name from the presence of three cellular components mucous, squamous (epidermoid) and intermediate cells. It can arise at minor salivary gland like palate or major salivary gland like parotid. The more differentiated the tumor the more mucous production. More aggressive tumor tends to be in solid sheets <sup>(15)</sup>.

**(b) Acinic cell carcinoma-** Microscopically non-encapsulated may show invasive pattern. Most common variants consist of sheets or acinar groupings of large polyhedral cells with

basophilic, granular cytoplasm similar to serous acinar cells <sup>(16)</sup>.

**(c) Adenoid cystic carcinoma-** Pain and ulceration are much more common. It is found in minor or major salivary glands, this tumor can infiltrate nerves like facial nerves or other nerves according to its location. Numerous microscopic cyst-like spaces within epithelial islands produce a cribriform or "Swiss cheese" pattern. Epithelial consist of small uniform basophilic cells <sup>(15)</sup>.

**5. Obstructive sialadenitis (Sialolithiasis) <sup>(17)</sup>:** salivary duct obstruction can cause painful swelling of the gland. Pain just before or at meal times due to disruption of salivary flow. There may be dull pain over the affected gland in older patients. (Figure 1(IX))



**Figure:1 (IX) Sialolithiasis**

**Differential diagnosis of submandibular sialadenitis and sialadenosis includes:**

1. Infectious (Acute) cause- bacterial or viral disease
2. Inflammatory cause-Sialolithiasis, radiation- induced disease.



3. Autoimmune cause- Sjogren disease, Lupus.
4. Granulomatous cause- Tuberculosis, tularemia, Sarcoidosis, catscratch disease, actinomycosis,
5. Drug- related cause- Thiourea.
6. Neoplastic (Benign) cause <sup>(18)</sup> - Pleomorphic / Monomorphic adenoma, oncocytoma, ductal papilloma, hemangioma, foreign body, ranula, lymph epithelial cyst.
7. Neoplastic (malignant) cause- Adenoid cystic carcinoma, Muco epidermoid carcinoma, adenocarcinoma, undifferentiated carcinoma, malignant oncocytoma, squamous cell carcinoma.
8. Endocrine cause- Hypothyroidism, diabetes mellitus.
9. Metabolic cause- Vitamin deficiency, cirrhosis, obesity, bulimia, mal-absorption.

#### **Laboratory studies:**

In evaluating the patients with sialadenitis, step should be taken in the following order:

1. History
2. Physical examination
3. Culture
4. Laboratory investigation
5. Radiography
6. Fine needle aspiration biopsy (If indicated)

Laboratory investigations should begin with culture of offending gland (If possible

prior to the administration of antibiotics). Blood cultures should be obtained in the patients exhibiting bacteremia or sepsis. Routine electrolytes and complete blood cell count with differential should be obtained to assess for any evidence of dehydration or systemic infection. Imaging studies: Numerous radiologic techniques are available in sub mandibular imaging.

**(a) Radiography** - One of the simplest is conventional plain radiography. Anteroposterior, lateral and oblique intra oral <sup>(5)</sup> Occlusal views are used. This technique is particularly valuable in evaluating the presence of calculi, which are radio-opaque in 70 % cases.

**(b) Sialography** – It can be used to evaluate Sialolithiasis or other obstructive entities, as well as inflammatory and Neoplastic disease. In this technique a water soluble medium such as meglumine diatrizoate is injected in to the Wharton duct and lateral, oblique and Anteroposterior plain radiographs are obtained in order to assess the ductal arborization. This test is contraindicated in iodine allergy and acute sialadenitis.

**(c) Ultrasonography**- It can be used to differentiate between solid versus cystic lesions of the gland. It is also helpful in identification abscess formation. A study revealed that application of ascorbic acid



as a contrast agent can aid in the ultrasound assessment of obstructive sialadenitis of the parotid and submandibular glands <sup>(20)</sup>.

#### Management scheme for treatment:

| Condition            | Medical management  | Surgical management   |
|----------------------|---|---|
| Acute sialadenitis   | Hydration, antibiotics (oral Vs parenteral), warm compresses, massage, sialogogues, Oral antibiotics such as clindamycin (900mg i.v. q8h or 300mg PO q8h) provides good coverage against typical organisms.   | Consideration of incision and drainage Vs excision of the gland in cases refractory to antibiotics, incision and drainage with abscess formation, gland excision in cases of recurrent acute sialadenitis |
| Chronic Sialadenitis | Hydration, warm compresses and gland massage, antibiotics are indicated in patients exhibiting infection  | Not indicated   |
| Sjogren syndrome     | Hydration, dental hygiene, Rheumatology and dental referral should be sought.   | Gland excision not usually needed unless recurrent acute sialadenitis.  |
| Mumps                | No specific antiviral agent, treatment is symptomatic involving pain killer for reducing fever, adequate hydration is required. Prevention in children by vaccination (MMR-Measles, Mumps and rubella) is given to children at around 1-4 yrs of age. <sup>(19)</sup> | Not indicated.  |

**(d) Computed Tomography scan (CT scan):** It is an excellent method to differentiate intrinsic versus extrinsic glandular disease. It is also extremely valuable in defining abscess formation versus phlegmon. It is limited in evaluating the ductal system unless combined with simultaneous Sialography.

**(e) Magnetic Resonance Imaging (MRI):** It does not allow evaluation of ductal system so is of less utility in sialadenitis or sialadenosis. It is an excellent tool for soft tissue definition and is invaluable in instances of suspected neoplasia <sup>(4, 21, 22)</sup>.

#### Medication:

Treatment for sialadenitis includes-

\*Antibiotics: Clindamycin

\*Warm wet compresses to the area of swelling

\*Non steroidal anti-inflammatory medication for pain: Ibuprofen, Ketoprofen, Naproxen.

\*Narcotic pain medication for moderate to severe pain, short term use only

\*Surgery: Rarely required in order to remove infected tissue.

#### CONCLUSION:

Sialadenitis is the inflammation and infection of salivary glands, characterized by obstruction and constriction of duct by calculus, chronic autoimmune disorder of exocrine glands, non suppurative acute infection etc. Sialadenitis is usually caused



by bacterial and viral infection but the disorder can occasionally be due to other causes, such as trauma, radiation and allergic reactions. Medical care for management of sialadenitis involves a wide range of approaches, from conservative medical management to more aggressive surgical intervention.

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