

Salivary Gland Infections: An Overview of Sialadenitis

1.0 Contact Hour

Presented by:

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Salivary Gland Infections: An Overview of Sialadenitis

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Objectives:

1. Define sialadenitis and be able to list the signs and symptoms.
2. Describe the anatomy and physiology of the parotid, submandibular and sublingual salivary glands.
3. List the functions of saliva.
4. Explain who Henrik Sjögren was and his contribution to modern medicine.
5. List what would be included in your differential diagnosis of sialadenitis.

Sialadenitis is a relatively common problem seen in medical clinics. Sialadenitis can affect any of the salivary glands and can be caused by multiple factors such as salivary duct obstruction, autoimmune factors and bacterial infection. Health care providers should be able to diagnose and treat simple salivary problems, and know when to refer more complicated issues to an otolaryngologist.

Anatomy and Physiology

The major salivary glands consist of the submandibular, parotid and sublingual, while there are approximately 600 – 1000 minor salivary glands scattered along the lips, pharynx, hard palate and the mucosa of the oral cavity.¹ The parotid gland is the largest salivary gland with the submandibular gland as the second largest, weighing about one-half that of the parotid.² Wharton's duct, the duct of the submandibular gland, exits the floor of the mouth near the frenulum of the tongue, while Stenson's duct, the duct of the parotid gland, exits near the second upper molar. The length of Wharton's duct is 5 cm, while Stensen's duct is 4-6 cm in length. Innervation of the parotid gland comes from the glossopharyngeal nerve, while the submandibular gland is innervated by the lingual nerve. The sublingual gland lies just deep to the mucosa of the floor of the mouth between the mandible and the genioglossus muscle. and, unlike the parotid and submandibular glands, lacks a single dominant duct. It is drained by about ten small ducts which exit the gland and open along the sublingual fold on the floor of the mouth. The ducts of the sublingual gland are too small for the injection of contrast, making a sialogram of this gland presently impossible.¹

The function of the salivary glands is to secrete saliva, which has numerous functions. Some of these functions include: ³

- Moistens the oral mucosa. The mucin layer on the oral mucosa is thought to provide important, if not the most important, nonimmune defense mechanism in the oral cavity
- Moistens dry food and cools hot food
- Provides a medium for dissolved foods to stimulate the taste buds
- Buffers oral cavity contents with a high concentration of bicarbonate ions
- Assists digestion with the use of alpha-amylase which breaks 1-4 glycoside bonds, while lingual lipase assists in the breaking down of fats
- Controlling the bacterial flora of the oral cavity
- Because saliva is high in calcium and phosphate, it assists in mineralization of new teeth and the repair of lesions of the enamel which can precede caries
- Saliva forms a protein coat which contains antibacterial compounds that protect the teeth; therefore, any pathology that may interfere with the production of saliva generally leads to serious dental caries

Intraoral complications of the salivary glands leading to decreased saliva production can include: ⁴

- Candidiasis
- Oral Lichen Planus
- Burning Mouth Syndrome
- Recurrent aphthous ulcers
- Dental caries

The concentration of the mucous from the submandibular gland is higher than mucous secreted by the other glands; the increased viscosity and therefore slower flow may contribute to its predisposition to form sialoliths during certain disease states. ²

The main focus of this paper will be on the parotid gland and the submandibular gland.

Parotitis

The parotid glands are located in the parotid compartment. This compartment is a triangular space which also contains CN VII and its branches, sensory and autonomic nerves, the external carotid artery and its branches, the posterior facial vein and the parotid lymphatics. ³ The parotid gland also contacts the mandibular ramus and the masseter muscles which massage the gland during chewing, injecting saliva into the oral cavity. The normally rapid flow of saliva through the duct prevents oral bacteria from ascending the duct to cause infection. ⁵ All this squeezed into a little space makes any surgery in this area challenging.

Bacterial Parotitis

Bacterial parotitis may occur if Stensen's or Wharton's duct is obstructed by a salivary stone. Some books and articles describe that chronic infection may result after an acute infection, but the evidence is scarce. In most instances, the chronic disease is autoimmune with superimposed bacterial infections and should not be designated as a chronic bacterial infection.⁵

Acute Viral Parotitis

Acute viral parotitis, known as mumps, is caused by the paramyxovirus. Universal immunizations, which began in 1977, have caused this disease to all but disappear in developed countries. Prior to the development of immunizations against the virus, disease resulted in up to 70% of those exposed. Though benign in most cases, mumps was occasionally complicated by pancreatitis, orchitis or deafness.⁵

Autoimmune Parotitis

In 1933 a Swedish ophthalmologist, Henrik Sjögren, published a paper describing his first cases of keratitis sicca,⁶ which today is part of a syndrome carrying his name. He explained that the disease affected postmenopausal women with arthritis, an elevated sedimentation rate, fever and hypochromic anemia. Sjögren revived the Schirmer test for measuring tear secretion and popularized the Rose Bengal staining technique for the diagnosis. The Schirmer tear test involves placing a strip of filter paper beneath the lower eyelid and wetting of the paper is measured in five minutes. Less than 10 mm is abnormal, while less than 5 mm is indicative of sicca syndrome. Rose Bengal stain stains damaged corneal epithelium and indicates keratoconjunctivitis.⁷

Sjögren syndrome is classified as either a primary condition (primary Sjögren syndrome) or is associated with an autoimmune disorder such as lupus erythematosus or rheumatoid arthritis (secondary Sjögren syndrome). The disease most commonly appears in women. The prevalence of parotitis in women over men with those with rheumatoid arthritis is 3:1, while the prevalence of parotitis in women over men in patients with Sjögren syndrome is approximately 9:1.⁵

Clinical Presentation

Chronic sialadenitis is mainly caused by infection secondary to sialolithiasis.⁸ Acute sialadenitis due to bacterial infection is usually a result of retrograde passage of organisms which is common in the elderly following surgery, dehydration, trauma, irradiation, salivary calculi and tumors.⁹

Physical Examination

Physical examination will usually reveal a swollen parotid gland with overlying erythema. Palpation will elicit extreme discomfort if an acute process is occurring, while a nontender gland is usually present in chronic autoimmune parotitis. Massaging the gland from posterior to anterior in normal glands will express clear saliva. With bacterial sialadenitis, purulent saliva is expressed with the most common causative organisms being *Staphylococcus aureus* or *Streptococcus viridans*. Chronic parotitis due to autoimmune issues will result in clear saliva with small yellow curds.⁵

Differential Diagnosis

The differential diagnosis of sialadenitis would include:

- Bacterial infection
- Viral infection
- Inflammatory causes
- Autoimmune causes
- Benign neoplasm
- Malignant neoplasm
- Endocrinopathies

Laboratory

Several laboratory tests may be of assistance in diagnosing problems diagnosing the cause of sialadenitis:

1. Culture and sensitivity of the saliva may show pathogenic organisms
2. Blood tests may be needed to verify anemias, rheumatoid arthritis and other causative factors
3. Rose Bengal staining and Schirmer tear test may be considered

Other Tests

1. CT and MRI are commonly used to image the parotid, submandibular and/or the sublingual salivary glands
2. Sialography is used to demonstrate the anatomy of the drainage system **5**
3. Ultrasonography is very useful in determining if calculi are present and, if so, their location.⁸ Ultrasonography is much easier to perform than sialography and seems to be replacing sialography.⁵

Procedures

Prior to performing procedures, the patient should be asked the following four questions about salivary function:¹⁰

1. Do you sip liquids to aid in swallowing dry foods?
2. Does your mouth feel dry when eating a meal?
3. Do you have any difficulties swallowing any foods?
4. Does the amount of saliva in your mouth seem too little?

If the causative factors are still questionable, the following procedures may be considered:

1. Fine needle aspiration
2. Incisional biopsy
3. Incision and drainage
4. Parotidectomy

Referrals

1. Any patient with rheumatoid suspicions should be referred to an ophthalmologist to rule out and/or treat keratitis and/or uveitis
2. Dental referral to prevent and/or manage caries and periodontal disease
3. Rheumatologist to manage any rheumatological factors

Medications

1. Sialagogues such as pilocarpine (Salagen©) increase the flow of saliva
2. Antibiotics may be required based on the results of culture and sensitivity
3. NSAIDs to manage rheumatological pain
4. Disease-modifying antirheumatic drugs (DMARDs), such as methotrexate, are used for polyarthritis not responsive to NSAIDs.⁷

Non-medical Therapy

The use of artificial saliva may help with the dry mouth often associated with sialadenitis. Chewing gum may also be helpful, but advise your patient to use sugarless gum so as to minimize the change of causing dental caries.

On the Horizon

Ellies, et al., have had some success with the use of botulinum toxin type A (Botox®) injected into the salivary glands to decrease the salivary secretion sometimes associated with acute sialadenitis. The effect of toxin application lasted for approximately three months and no side effects were observed. Further research into this procedure is needed to determine if this is an effective treatment for hypersalivation.¹¹

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