

Sialadenitis-Overview and Clinical Management

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Abstract

Background

Sialadenitis (inflammation of the salivary glands) is commonly caused by salivary calculi or infection, although less common causes such as neoplasia or systemic inflammatory conditions are important to consider and rule out.

Objectives

This article provides an overview of the clinical presentation, workup and management of sialadenitis in the primary care setting, including common differential diagnoses and recommendations on when to refer for specialist care.

Discussion

The three major salivary glands are the parotid, submandibular and sublingual glands. Management of acute sialadenitis involves antibiotics, massage, hydration, sialogogues and removing medications causing salivary stasis. Salivary calculi may require removal via transoral or endoscopic techniques, or gland excision. It is important to consider other causes including viral infections, juvenile recurrent parotitis, or neoplasia. Patients with chronic sialadenitis or where the diagnosis is unclear should be referred to an Ear, Nose and Throat (ENT) specialist.

Keywords: Sialadenitis, Clinical management

Introduction

Sialadenitis (inflammation of the salivary glands) is relatively common. Although the overall frequency of sialadenitis is unknown, the incidence of acute suppurative parotitis has been reported to be around 0.01-0.02% of all hospital admissions. Sialadenitis can be acute or chronic, defined as recurrent episodes of acute sialadenitis [1]. The common aetiologies of sialadenitis includes salivary calculi (sialolithiasis) and infection. Other less common causes such as neoplasia or systemic inflammatory conditions are important to consider and rule out.

The pathophysiology of sialadenitis depends on the type of salivary gland involved. The parotid gland produces watery serous saliva that lacks antimicrobial properties. Salivary stasis from dehydration, anticholinergic medications or duct stenosis, leads to retrograde flow of saliva and bacteria, making the parotid gland prone to acute bacterial sialadenitis. On the other hand, the submandibular gland produces thick mucoid saliva that is more alkaline and has higher concentration of calcium and phosphate, which is prone to the formation of salivary calculi (sialoliths). This causes obstruction of the salivary duct and subsequent inflammation of the duct and gland. Hence, approximately 80% of salivary stones form within the submandibular gland, with the parotid gland only accounting for 10 to 20%, and the sublingual glands about 1% [2].

Anatomy

There are three major paired salivary glands (parotid, submandibular

and sublingual glands), as well as hundreds of minor salivary glands throughout the mucosa of the oral cavity and the oropharynx [3].

The salivary glands serve five major functions:

- Lubrication and protection of the oral cavity
- pH buffering and acid clearance
- Maintenance of tooth integrity
- Antibacterial activity
- Taste and digestion

The parotid glands are the largest salivary glands in the human body. The facial nerve courses and divides into its five terminal branches within the parotid gland tissue. It provides motor innervation to the muscles of facial expression. The parotid or Stensen's duct courses anteriorly over the masseter muscle to pierce the buccinator muscle, opening in the buccal mucosa opposite to the second upper molar.

The submandibular glands are the second largest salivary glands. Adjacent to the submandibular gland and ducts are the lingual nerves, which provide sensation and taste to the anterior two-thirds of the tongue, and the hypoglossal nerves, which are responsible for motor function of the tongue. The submandibular or Wharton's duct arises from the deep surface of the gland and courses anteromedially to open at the base of the lingual frenulum. The sublingual glands are small, paired salivary glands positioned on the inner surface of the mandible adjacent to the midline. They drain directly into the floor of mouth through 8 to 20 ducts [4] (Figure 1).

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Received December 16, 2020; Accepted: January 12, 2021; Published: February 08, 2021

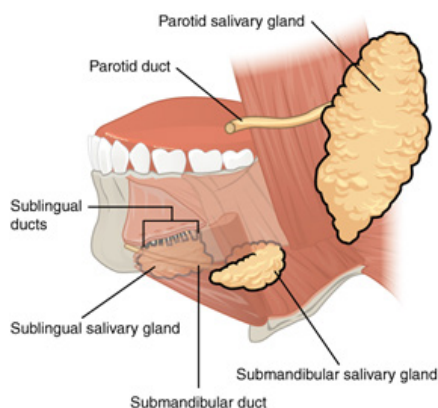


Figure 1. The major salivary glands.

Assessment

Features of sialadenitis include:

- Pain over the affected gland
- Recurrent salivary colic, especially during meal time
- Foul taste in the mouth (due to purulent discharge from salivary gland duct)
- Swelling
- Erythema
- Fever
- Tenderness on palpation of the affected gland
- Purulent discharge from the duct papilla upon bimanual palpation
- Poor salivary flow on gland massage
- Palpable or visible stone in submandibular or parotid duct

Risk factors for sialadenitis include:

- Male sex
- Increasing age
- Smoking
- Dehydration
- Diabetes Mellitus (DM)
- Hypothyroidism
- Renal failure

- Gout (causing sialolithiasis)
- Medications causing salivary stasis (e.g. anticholinergics, antihistamines, diuretics)

The following red flags may indicate a more sinister pathology:

- Salivary gland swelling without pain
- Irregular or hard swelling
- Evidence of nerve involvement (e.g. facial nerve palsy for parotid gland; hypoglossal or lingual nerve palsies for submandibular gland)
- Cervical lymphadenopathy (typically levels I – III)

Investigations

Acute sialadenitis is a clinical diagnosis. Blood tests are not necessary. However, inflammatory markers are usually raised. Culture of purulent duct discharge is important to help direct antibiotic therapy, with the most common organism being *Staphylococcus aureus*. Other causative organisms include *Streptococcus pyogenes*, *Streptococcus pneumoniae* and *Haemophilus influenzae* [5]. Imaging is not generally necessary unless the patient fails to respond to antibiotic therapy, has recurrent sialadenitis or if more sinister pathology such as a tumour is suspected. Ultrasound or computed tomography (CT) is performed to exclude an abscess. CT is also helpful in locating the site, size and numbers of salivary calculi [6] (Figure 2).

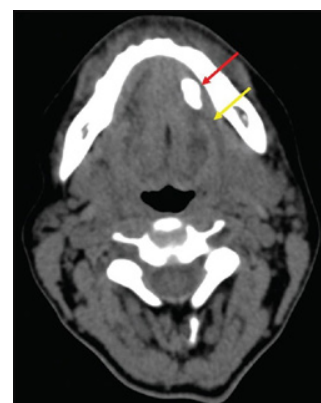


Figure 2. Sialolithiasis-CT. Axial CT image demonstrates a submandibular duct sialolith (red arrow) with dilated proximal duct (yellow arrow)

Ancillary investigations may be considered to investigate other rarer causes of salivary gland pain or swelling. The investigations and their rationale are included in Table 1. These investigations should be considered but should not be routinely performed [7,8] (Table 1).

Table 1. Ancillary investigations

Ancillary investigation	Rationale
Anti-neutrophil antibody (ANA)	Elevated ANA may indicate autoimmune diseases (e.g. Sjogren's syndrome, sarcoidosis)
Erythrocyte sedimentation rate (ESR)	Elevated ESR may indicate autoimmune diseases (e.g. Sjogren's syndrome, sarcoidosis)
Mumps (paramyxovirus) serology	Mumps classically presents with bilateral acute parotitis with systemic viral symptoms (fevers, headache, myalgias etc.)
HIV serology	HIV may be associated with several salivary gland pathologies including Kaposi sarcoma, benign lymphoepithelial cysts (BLECs), diffuse infiltrative lymphocytosis syndrome (DILS) and HIV-associated salivary gland disease (HIV-SGD)
Fine needle aspirate (FNA)	Salivary gland lumps or cervical lymphadenopathy should be investigated for potential malignancy

Management

The main goal of management is targeted towards increasing salivary flow. This is achieved through aggressive rehydration, sialogogues (salivary stimulants such as sucking on lemon slices or drops), bimanual massage and cessation of culprit medications. Corticosteroids may also be considered in the acute setting to decrease inflammation.

As the main infectious agent in acute bacterial sialadenitis is *Staphylococcus aureus*, flucloxacillin is the antibiotic of choice, and is usually given for a total of 10 days [9]. Other antibiotics of choice include clindamycin, moxifloxacin, and vancomycin in the case of Methicillin Resistant *Staphylococcus aureus* (MRSA). In mild cases, patients can be managed as outpatients. However, elderly patients, inability to tolerate oral intake due to pain, or sepsis may warrant hospital admission. Rarely, surgical drainage may be indicated in complicated sialadenitis that has resulted in an abscess.

In the presence of a small palpable stone in the floor of mouth, milking along the duct could sometimes release the stone that is close to the duct opening. Other options include transoral duct incision and marsupialisation of the duct with 2% stenosis rate or preservation and closure of the duct

with 5% stricture formation [10,11]. In chronic sialadenitis, removal of the submandibular gland may be warranted, however surgical removal of the parotid gland for recurrent parotitis is uncommon due to the risk of facial nerve injury.

Sialoendoscopy is a relatively novel endoscopic alternative to open surgery which allows for gland-preserving removal of stones through washout, mini-grasping forceps, wire-basket retrieval or fragmentation using Light Amplification by Stimulated Emission of Radiation (LASER). Sialoendoscopic treatment has been shown to manage sialoliths with improved symptom resolution and safety and is considered once the acute inflammation has settled [10-12]. Other sialoendoscopic techniques such as balloon dilation and saline or steroid irrigation have also been proven successful, especially in the treatment of sialadenitis without sialolithiasis such as duct stenosis or stricture [13-16].

Differential diagnoses

Although sialadenitis is usually readily diagnosed on history and clinical examination alone, other conditions may occasionally present in a similar fashion. A brief list of other differential diagnoses including the common presenting features and management is provided in [17-21] (Table 2).

Table 2. Differential diagnosis of salivary gland pathologies

Condition	History	Examination	Investigation	Treatment
Acute sialadenitis	Painful swelling of salivary gland	Tender enlarged salivary gland	US or CT if suspecting abscess or stone	Gland massage
	Acute onset	Purulent discharge from duct		Antibiotics
	Foul taste in mouth		Sialogogues	
	May be taking medication causing salivary stasis		Hydration	
			Cessation of medication causing stasis	
Chronic sialadenitis	Repeated episodes of painful swelling	Swollen/firm gland	US or CT may demonstrate stone or dilated salivary duct	Gland massage
	Post-prandial salivary colic	Palpable or visible stone in duct		Hydration
		May appear normal	Manual or transoral removal of stone	
			Sialadenoscopy or open resection	
Mumps	Painful parotid swelling, often bilateral	Tender enlarged salivary glands	Paramyxovirus viral serology	Supportive care
	Systemic viral symptoms (e.g. headache, fevers, myalgias)	Evidence of inflammation of other glands (e.g. abdominal pain in pancreatitis, hepatitis)		Notify Department of Health

	Orchitis or inflammation of other glands (e.g. pancreatitis, hepatitis, thyroiditis)			
	Aboriginal and Torres Strait Islanders at particularly high risk			
	Often young to middle aged			
HIV	Unilateral or bilateral swelling Xerostomia	May present with non-tender masses or diffusely enlarged salivary glands	HIV serology	Supportive care Antiretroviral therapy Refer to HIV specialist
Juvenile recurrent parotitis	Recurrent episodes of painful parotid swelling lasting several days Usually unilateral but can be bilateral Occurring in children ages 3 to 6 90% of cases will spontaneously resolve (usually after puberty)	Tender enlarged salivary gland Purulent discharge from duct	Can consider US	Gland massage Antibiotics Sialogogues Hydration Sialoendoscopy or open resection in refractory cases
Salivary gland tumours e.g. pleomorphic adenoma, adenoid cystic carcinoma	Painless and firm swelling Slow growing	Non-tender mass May be fixed to surrounding structures May have evidence of invasion (e.g. nerve palsies) Cervical lymphadenopathy	CT and MRI demonstrate mass, location and surrounding structures FNA to obtain diagnosis	Surgical excision
Salivary gland enlargement/sialosis e.g. parotidomegaly	Painless diffuse swelling Slowly enlarging History of alcoholism or endocrine/autoimmune disorder (e.g. DM, coeliac)	Non tender diffusely enlarged gland	US or CT demonstrate diffuse gland enlargement with no mass or stone	Treat underlying cause Surgical excision

Conclusion and key points

- Acute dehydration may lead to retrograde flow of saliva and bacteria, and subsequent acute sialadenitis, however salivary calculi most commonly form in the submandibular gland, causing chronic sialadenitis.
- The main features are acute pain, swelling and purulent discharge from the duct papilla on bimanual palpation.
- Red flag features include salivary gland swelling without pain, irregular or hard swelling, evidence of nerve involvement or cervical lymphadenopathy.
- Management of sialadenitis includes gland massage, hydration, sialogogues, cessation of medications causing salivary stasis and targeted antibiotics.
- It is important to consider a broad range of differential diagnoses (e.g. mumps, HIV, juvenile recurrent parotitis, salivary gland tumours or sialosis).

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How to cite this article: Eren Tan, Bing Mei Teh. "Sialadenitis- Overview and Clinical Management". *J Gen Pract* (9): (3) (2021) :