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Ranula excision

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A ranula is a pseudocystic lesion of the sublingual gland that is found in the floor of the mouth. A simple ranula is found above the level of the mylohyoid muscle and is usually the result of sublingual duct obstruction. A plunging ranula refers to a pseudocyst that occurs with salivary duct rupture and is found below the level of the mylohyoid muscle. Diagnosis is based on a thorough history and physical examination, with imaging as an adjunct. Complete surgical excision, including the involved sublingual gland, is the treatment of choice.

Introduction

Salivary gland abnormalities can manifest as intraoral or cervical masses or both. A ranula is a cystic lesion that arises from the sublingual gland and is among the most common intraoral salivary gland masses. The term ranula is derived from the Latin word *rana*, meaning frog. Reminiscent of a frog's underbelly, a ranula classically appears as a translucent swelling in the floor of the mouth.

Anatomy

The sublingual gland is the smallest and the only unencapsulated major salivary gland. As a paired almond-shaped structure, each gland is bound by the floor of the mouth mucosa superiorly, mylohyoid muscle inferiorly, mandible laterally, genioglossus muscle medially, and submandibular gland posteriorly. There are no posterior fascial limits to the sublingual glands; thus, lesions that arise from the gland can exit and spread to the submandibular and the parapharyngeal spaces.

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Each gland is drained by 5-15 minor excretory ducts (Rivinus ducts) that carry saliva into the oral cavity through small mucosal folds in the floor of the mouth (plica sublingualis). At times, the ducts can coalesce into a larger duct (Bartholin duct) that drains directly into the submandibular duct and out through the sublingual caruncle. Branches of the lingual and the facial arteries supply the sublingual glands. The sublingual glands produce a constant flow of saliva that is highly proteinaceous in consistency, and they yield 10% of the oral cavity's total saliva output.

A ranula can either be simple or plunging based on the location of the cyst relative to the mylohyoid muscle, with a simple ranula being confined above the mylohyoid and a plunging ranula extending inferior to the muscle. Plunging ranulas are thought to arise secondary to either (1) congenital dehiscence of the mylohyoid muscle that allows herniation of a part of the sublingual gland or the pseudocyst sac into the submandibular space or (2) posterior extension between the mylohyoid and the hyoglossus muscles where there is no fascial boundary.[1]

Etiology

A ranula is the result of sublingual duct obstruction or disruption. Intraoral ranulas are usually the result of salivary duct obstruction with resultant formation of a mucous

retention cyst. Plunging ranulas are typically caused by a collection of mucus that extravasates into adjacent tissue, inducing an inflammatory response that walls off the mucus collection. Thus, as a pseudocyst, it lacks a true epithelial lining. Mucus is thought to collect and escape secondary to sublingual duct obstruction, duct injury, or ruptured acini, which in turn develops because of mucosal inflammation, immunologic abnormalities, sialolith, congenital abnormalities, direct trauma, and rarely, tumor.[1]

Histology

Histopathologic examination of a plunging ranula demonstrates a mucin-containing pseudocyst surrounded by a wall made up of vascularized fibroconnective tissue, resembling granulation tissue with a predominance of histiocytes (macrophages).[2] There is an absence of epithelial tissue in the wall. Biopsy of the cystic wall at the time of sublingual gland excision is recommended to confirm the diagnosis.

Presentation

Ranulas occur most commonly in the second and third decades of life, though there are reports of cases across age groups ranging from 3-61 years.[2] There is a slight female to male predominance of 1.3:1. Classically, simple ranulas present as fluctuant swellings in the floor of the mouth that cause discomfort or speech difficulty. The size or position is unaffected by chewing, eating, or swallowing. Plunging ranulas present as fluctuant cystic neck masses, most commonly in the submandibular space, though they have been described in the ipsilateral or the bilateral parapharyngeal and retropharyngeal spaces and even in the lower neck and the mediastinum.[3] Plunging ranulas can present without an obvious intraoral component in at least 20% of cases. Risk factors for ranula development include prior salivary gland infection, trauma, or surgery in the submandibular space.

Indications for surgery

Indications for surgical excision include airway compromise, rarely present, or speech and swallowing complaints, recurrent infection, or secondary impaired function of the submandibular gland.[4] Active infection and comorbidities that increase general anesthesia risks are relative contraindications to elective excision.

Diagnosis

A complete history and physical examination is the cornerstone of the evaluation of intraoral and cervical masses. Ranulas can be evaluated by inspection and palpation of the floor of the mouth for a fluctuant swelling, often with a bluish hue.

Imaging can be used as an adjunct in diagnosis and surgical planning. Computed tomography and magnetic resonance imaging (MRI) with contrast agent can help distinguish ranulas from other lesions of the floor of the mouth. The differential diagnosis for an intraoral ranula includes foregut duplication cysts, lymphatic malformations, and dermoids. The differential diagnosis of a plunging ranula is broader and includes thyroglossal duct cyst, branchial cleft cyst, epidermoid cyst, laryngocele and lymphatic or vascular malformations, and solid neck masses such as lipomas, dermoids, submandibular gland neoplasms, and lymphadenopathy. On MRI, ranulas appear bright with well-defined borders on T2-weighted images. Imaging can also be used to delineate the relationship of the ranula to adjacent structures, particularly in the case of plunging ranulas.

Treatment

Various surgical and medical options have been reported for the treatment of ranulas, including OK-432 (or bleomycin) sclerotherapy, incision and drainage, marsupialization, and cyst excision with or without sublingual gland removal via intraoral, transcervical, or dual approaches.[5] Recurrence rates are variable but are in excess of 50% for any surgery in which the sublingual gland is not excised.[6] The recurrence rate can be as high as 70% with incision and drainage of the cyst alone and 53% with marsupialization, during which the cyst is deroofed with cautery or laser and the cavity is kept open for drainage by suturing the cut edges together.[6] Irrespective of complete cyst wall excision, excision of the sublingual gland yields a recurrence rate of less than 2%.[6] Sclerotherapy, with the streptococcal preparation OK-432, has emerged as a possible nonsurgical option, but it induces fever and pain in half of patients and may require repeat injections.[7]

Simple oral ranulas are excised through an intraoral approach. Plunging ranulas can be excised through an intraoral or a cervical approach. Excision of the ipsilateral sublingual gland is important through either approach to prevent recurrence. Complete excision of the pseudocyst wall is not necessary, as it represents an inflammatory response to the extravasated mucus and should resorb once the inciting mucus is removed. Moreover, care should be taken with extensive dissection, which can risk unnecessary injury to the nearby lingual nerve and the submandibular duct.[8]

Intraoral approach

The patient is positioned supine on the operating table. Administration of general anesthesia via a nasotracheal tube is recommended. If endotracheal intubation is performed,