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Primary Lingual Abscess Presenting as Acute Swelling of the Tongue Obstructing the Upper Airway: Diagnosis with MR

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Summary: We report the sudden development of an inflammatory process thought to be of the floor of the mouth with subsequent involvement of the respiratory airway. MR imaging showed an enhancing posterior lingual lesion, consistent with an abscess. Immediate surgical drainage relieved the symptoms. MR imaging allowed accurate diagnosis, which was essential for surgical planning in a condition that was otherwise difficult to diagnose.

Lingual abscess is an acute inflammatory condition uncommon in the Western hemisphere. It is one of the causes of acute swelling of the tongue; and although most of the abscesses involving the anterior two thirds of the tongue are not severe clinical conditions or difficult to diagnose, those involving the posterior one third may obstruct the upper airway and constitute a clinical challenge (1). Radiologic studies of this condition are scant and, to date, no magnetic resonance (MR) characterization has been reported. We discuss the clinical manifestations of a posterior lingual abscess and describe the ability of MR imaging to delineate its particular location (oral cavity and the floor of the mouth), whereas other diagnostic techniques have significant shortcomings in this regard.

Case Report

A 36-year-old woman with no pertinent medical history was admitted to the emergency department because of pain, orolingual swelling, and mild fever of 5 days' duration. Two days previously, cefuroxime had been prescribed without improvement in her condition. Physical examination revealed bilateral submandibular tenderness along with oropharyngeal swelling and intense soreness with palpation. Bimanual palpation showed induration of the floor of the mouth with apparent swelling of both submandibular glands and no evidence of calculi. Tongue mobility was limited, and oropharyngeal inspection disclosed no plaques or purulent areas. No carious teeth were found. A tentative diagnosis of acute bilateral submandibulitis was made, and intramuscular antibiotic treatment with ceftriaxone and clindamycin was initiated. However, the patient's condition worsened during the next few days, with an increase in oropharyngeal swelling, dyspnea, and leucocytosis. An emergency oropharyngeal MR examination at 0.5 T showed a round, poorly defined mass with extensive edema in the posterior portion of the tongue (Fig 1A and B). After intravenous injection of contrast material, thick and irregular ring

enhancement was found (Fig 1C and D). Fat-suppression techniques helped to differentiate the inflammatory process from the preserved parenchyma (Fig 1E). The patient's respiratory condition worsened, and an emergency tracheostomy was performed under general anesthesia.

The lingual abscess was drained by a suprahyoid approach and 20 mL of purulent material was obtained, followed by improvement in the patient's condition. At staining, gram-negative bacilli were observed. Cultures of samples revealed a mixed flora of aerobic and anaerobic organisms of the upper airway. Five days later, the patient was decanulated, and 3 days after that, she was discharged free of symptoms. Two months later, a nuclear technetium scan revealed a thyroid gland that was normal in size, location, and function. Lingual thyroid and other congenital abnormalities were excluded.

Discussion

Acute swelling of the tongue (acute macroglossia) may obstruct the upper airway and become a life-threatening condition. Most of the cases are due to acute hemorrhage, edema, infarction, or abscess (1). Acute hemorrhage of the tongue is rare, but it is a possible cause of acute macroglossia, since the tongue is generously supplied with blood from the lingual artery and its branches. A hematoma from bleeding of these vessels into the substance of the tongue results in rapid and massive swelling. There are three causes of such bleeding: trauma, bleeding within a vascular malformation, and primary or secondary (anticoagulants) hemorrhagic disorders. Acute edema of the tongue is facilitated by its rich blood supply. The two most common antecedents are allergy and angioedema. Acute ischemic necrosis of the tongue is infrequent and often occurs as a complication of giant cell arteritis. Abscess is rare and is not described in most textbooks of oral pathology.

Despite its exposure to many potential pathogens, the tongue is relatively immune to infection. Some of the reasons for this immunity include the tongue's constant mobility, which helps the saliva produce a perpetual cleansing effect; its thick covering of kera-

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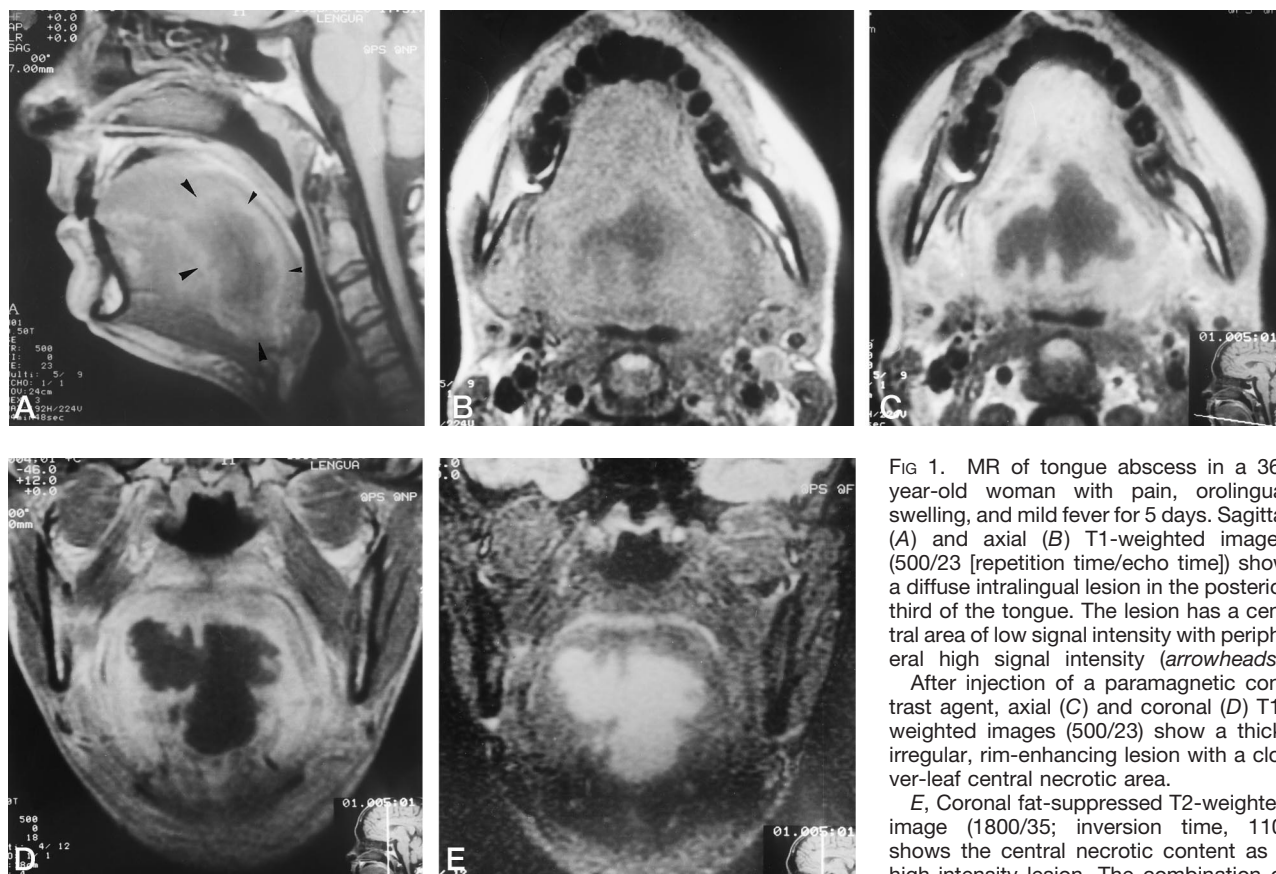


FIG 1. MR of tongue abscess in a 36-year-old woman with pain, orolingual swelling, and mild fever for 5 days. Sagittal (A) and axial (B) T1-weighted images (500/23 [repetition time/echo time]) show a diffuse intralingual lesion in the posterior third of the tongue. The lesion has a central area of low signal intensity with peripheral high signal intensity (arrowheads).

After injection of a paramagnetic contrast agent, axial (C) and coronal (D) T1-weighted images (500/23) show a thick, irregular, rim-enhancing lesion with a clover-leaf central necrotic area.

E, Coronal fat-suppressed T2-weighted image (1800/35; inversion time, 110) shows the central necrotic content as a high-intensity lesion. The combination of

all these sequences helped to differentiate the purulent content from the reactive inflammatory and edematous tongue changes.

tinized mucosa, which is not easily penetrated by microorganisms; the muscle tissue, which constitutes the chief bulk of its parenchyma, with its rich vascular supply; its rich lymphatic drainage; and, finally, the immunologic properties of saliva (3, 4). All these factors make the tongue an unusual site of abscess.

Most of the studies on lingual abscesses have been conducted by Indian researchers (2, 3). Abscesses located in the anterior two thirds of the tongue are easy to diagnose on the basis of physical findings. However, those situated in the posterior third may pose a diagnostic challenge (5), since symptoms are less specific and other inflammatory processes, such as peritonsillitis or infection of the floor of the mouth, may be indistinguishable, as occurred in our case. In this situation, imaging techniques, such as sonography, computed tomography (CT), and, particularly, MR imaging, enable precise identification. The majority of lingual abscesses originate via direct invasion, most commonly from trauma, although, rarely, blood-borne infections are seen. Trauma to the tongue can occur from ragged or carious teeth, ill-fitting dentures, biting (during eating or an epileptic fit), or penetration by a foreign body (eg, a fish bone) (3). Rarely, an infected thyroglossal duct cyst at the base of the tongue may develop into a lingual abscess. The most frequent causative agents are staphylococci and streptococci (3, 4), although other pathogens may be involved. Lingual abscesses occur among all age groups, but most patients are between 30 and 50 years

old, with no sex predilection. The differential diagnosis should also include acute epiglottitis; infected lingual dermoid or epidermoid tumors; other cystic tumors, infected or not; and lymphoma involving the oropharyngeal space, which may promote a similar life-threatening condition.

Typically, clinical signs of acute lingual abscess are onset of tongue swelling, painful swallowing, difficulty in speaking, protrusion of the tongue, and dribbling of saliva, all of which develop within hours or a few days. Dyspnea and dysphagia are the most dangerous complications and should be treated immediately (3). Fever, dehydration, and biological parameters of infection are usually found. Since most lingual abscesses are located in the anterior two thirds of the tongue, they can be managed with medical treatment, since the upper airway is not involved. However, abscesses involving the posterior portion of the tongue may cause progressive dyspnea, and surgical treatment is mandatory. In our patient, this complication was treated by surgical drainage before tracheostomy was performed.

Most abscesses in the anterior third of the tongue are diagnosed clinically and treated successfully with prompt medical therapy. For this reason, diagnostic imaging methods are usually not required. However, when the abscess is located in the posterior third of the tongue or when the cause of acute tongue swelling is unknown, diagnostic imaging techniques may prove invaluable in distinguishing lingual abscess from up-

per respiratory tract involvement. Sonographic depiction of a lingual abscess has been reported (5), with the findings appearing as a hypoechoic lesion surrounded by a hyperechoic ring; however sonography may not always be feasible, since the tongue is swollen and the patient may experience discomfort or acute pain when the tongue is pressed. Moreover, anatomic landmarks are not precise.

MR imaging affords excellent anatomic depiction with high contrast resolution and multiplanar capability, making it the ideal diagnostic imaging tool in critical areas, such as the tongue and the floor of the mouth, because it allows precise localization of the origin of the process. In our case, we observed an intralingual lesion in the posterior third of the tongue with heterogeneous signal on T1-weighted images and lengthening of the T2 relaxation times. Peripheral thick rim enhancement was seen after injection of paramagnetic contrast agent, with intense edema and swelling. Fat-suppressed images, particularly in the coronal plane, helped to easily distinguish the involved tongue from the spared parenchyma.

We believe that in our patient, who was otherwise in good health, the source of infection originated in the lingual tonsil or in an unrecognized apical infection from the first or second molars, similar to cases reported previously (4, 6). MR imaging afforded ap-

propriate surgical planning, since physical examination missed the source of the process.

Conclusion

MR imaging accurately depicted a posterior abscess of the tongue in a patient who presented with acute tongue swelling, fever, and upper airway involvement, and in whom the lesion had been missed at physical examination. Despite extensive investigation, no primary focus or traumatic event was uncovered. Scintigraphy showed a thyroid gland that was normal in size, location, and function, thereby excluding a congenital tongue thyroid rest as the cause of this condition.

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