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Submasseteric abscess

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Abstract
The masseteric space is an important tissue compartment of the neck, but disease in it is difficult to diagnose and treat. In this paper a case of a young adult male with an abscess of the submasseteric space is presented. Diagnosis was established by computed tomography (CT) of the neck, but the severity of the lesion was not accurately estimated. Surgical intervention was performed and a large quantity of pus was drained. A detailed medical history and clinical examination of the patient as well as CT are important tools in the accurate diagnosis and efficient treatment of the disease.

Key words: Neck; Masseter Muscle; Abscess

Introduction

The masseteric space is an important compartment of the neck, but disease in it is difficult to diagnose and treat. Submasseteric abscess located in the submasseteric portion of this space is an infrequent and, at times, diagnostically perplexing occurrence, but computed tomography (CT) scanning has greatly increased our diagnostic capabilities, changing the prognosis of the disease.[1]

The masseteric (or masticator) space is a general term used to describe the entire area of the mandible and muscles of mastication.[2] This space lies anterolaterally to the parapharyngeal space. It is formed by the splitting of the superficial layer of the deep cervical fascia, enclosing the mandible and primary muscles of mastication. The contents of the space include the masseter muscle, the ramus and posterior part of the body of the mandible, the tendinous insertion of the temporalis muscle, the medial and lateral pterygoid muscles and the inferior alveolar nerve and vessels. The masseteric space is enclosed by attachments of the superficial layer of the deep cervical fascia to the mandible, zygoma, pterygoid muscles and cranial base. Two separate compartments are formed by the cervical fascia, one superficial enclosing the masseter muscle and one deep, enclosing the pterygoid muscles. The masseteric space includes three areas: the inferior temporal space, the pterygomaxillar space and the submasseteric space. The latter is a potential space (Figure 1) created by the fact that the masseter muscle does not attach to the superior half of the lateral ramus, leaving a narrow cleft extending from the anterior border of the ramus between the masseter muscle and the lateral surface of the ramus backwards and upward to its posterior limitation by the fibrous parotidomasseteric fascia.[3] Anteriorly, the space is bounded by the inner surface of the masseteric fascia, as it sweeps around the anterior aspect of the ramus, where it is in close relation to the retromolar fossa. The confining superior and inferior borders are respectively the zygomatic arch and angle and the inferior border of the ramus, where the masseter muscle is attached.

Although the superiorly situated temporal space communicates freely with the masticator space, the four major adjacent spaces, the buccal, submandibular, parapharyngeal and sublingual, do not. Since the submasseteric space is small and practically without a natural anatomical outlet, the onset of an abscess is rapid and the indurated swelling is painful and symptoms are severe. The semi-elliptical-

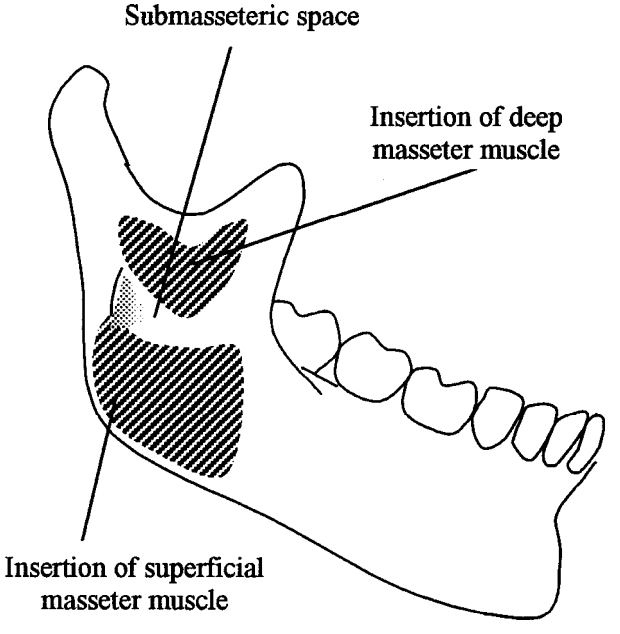

Fig. 1
Lateral view of the mandible highlighting the submasseteric space.

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FIG. 2

Axial CT image through the level of the maxillary alveolar ridge, demonstrating pus (arrow) between the masseter muscle and the mandibular ramus.

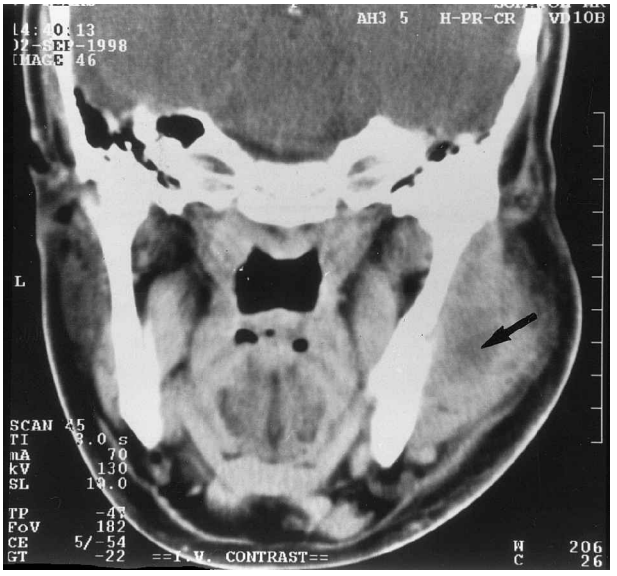

FIG. 3

Coronal CT image through deep face demonstrating heterogeneous enlargement of the right masseter muscle and a small area of decreased density beneath the muscle, indicating the presence of a small abscess (arrow).

shaped swelling typically involves the ramus from the arch to the angle and inferior border in its vertical aspect, and the anterior and posterior ramus border in its horizontal dimension. Severe trismus is a consistent feature of the disease. Usually, infection of the submasseteric space originates from an unerrupted third molar with an associated pericoronitis, especially if its distal surface projects by the anterior aspect of the masseteric and buccopharyngeal fascia. In this paper a case of a patient with submasseteric abscess is presented in order to show the key points in the diagnosis is and treatment of the disease.

Case report

A healthly 24-year-old male was referred by his general practitioner with the diagnosis of parotitis to the ENT Clinic of Tzanion General Hospital of Piraeus, because of a right facial swelling present for the last four days. The patient had been treated by cefuroxime for the last two days and a history of a dental procedure involving the extraction of the third molar tooth, one month previously, was obtained. At the time of examination a large, diffuse, painful, extra-oral swelling involving the right masseteric area was apparent. By palpation the swelling was found to be firm, nonfluctuant and quite tender, accompanied by intense trismus. It involved the tissues overlying the lateral aspect of the ramus and extended posteriorly to the region of the parotid gland, up to the post-auricular region.

A CT scan was performed and the soft tissue view showed a heterogeneous enlargement of the right masseter muscle, measuring $3 \times 5 \times 6$ cm. Beneath the muscle a small area of decreased density was apparent, indicating the presence of a small abscess (Figures 2 and 3). The superficial lobe of the right parotid gland appeared mildly swollen, as well as the adjacent skin, the subcutaneous tissue and the fascia of the cervical fascia, indicating a cellulitis of the involved tissues. Also, some small hyperplastic lymph nodes of the right submandibular and posterior accessory region were found. The infection was associated with fever (38.5°C orally) and with a blood cell count high in white blood cells of the polymorphonuclear type. All the other blood serum tests were unremarkable.

A diagnosis of submasseteric abscess was established and surgical intervention was performed. The abscess was opened by the external approach and an unexpectedly large quantity of pus was drained. A drainage tube was put in place and cultures for aerobic and anaerobic bacteria were obtained, that showed the prevalence of *Streptococcus viridans* and *Bacteroides melaninogenicus*. Antibiotic treatment was administered intravenously and the post-operation course was uneventful.

Discussion

Most infections of the submasseteric space arise from the molars, and especially the third molar.[4] The understanding of how infection spreads to this space is important.[5] Initially, the pulp of the tooth is injured, because of bacterial, chemical or traumatic involvement, resulting sometimes in pulpitis and death of the tooth. The posterior aspect of the crown and follicle of such teeth often lie beyond the buccinator muscle insertion along the alveolar ridge and in close relation to the anterior border of this submasseteric space. Suppurative pulpitis leads to disruption of the periodontal membrane around the root. Further necrosis of the apical soft tissues causes the infection to spread into the marrow of the mandible. From that site the abscess may disrupt the plates of the cortical bone and can break through the periosteum into the muscles surrounding the jaw. The most common route of spread is posteriorly and medially extending to the temporal space without breakdown of the space barriers or it can break through the cervical fascia and spread medially to the parapharyngeal space. A rare route of spread of the inflammation is posterolaterally to the potential submasseteric space. Another source of inflammation in the submasseteric space may be a misdirected injection, if the needle is placed laterally to the ramus, during an inferior alveolar block.[6] Normal oral flora carried by the needle may become truly pathogenic when they are inserted deep into the oral tissues. Another possible cause of submasseteric abscess is osteomyelitis of the zygomatic or temporal bones. Finally, primary infection in adjacent spaces and further extension to the submasseteric space is possible.[7] Apart from superficial and deep temporal space, which

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communicates freely with the submasseteric space, many other neighbouring spaces maybe the source of primary infection. These spaces include the deep masseteric space, the space of the body of the mandible, the pterygomaxillary and the parotid space, or even the buccal, the submandibular, the sublingual and the parapharyngeal space. In our patient a history of dental procedure involving the third molar tooth was evident and this was probably the cause of the infection.

Diagnosed localized submasseteric abscess, as in our case, is rare, since extension to adjacent tissues is common. The severity of symptoms depends on the organisms involved, host defences and the mode of treatment used.[8] Swelling and tension caused by gross selection of pus in a confined space leads to varying degrees of pain, usually quite intense. Involvement of the laterally bordering masseter muscle causes trismus, that is a consistent diagnostic feature. Malaise and fever may also occur. The patient often appears toxic and the white blood cell count is indicative of infection. The onset of an abscess is usually rapid and the indurated swelling and pain are severe. The trismus makes the oral examination difficult. Infection medial to the mandible presents with less facial swelling than infection of the submasseteric space, but trismus is intensive in both cases. Due to the fact that the submasseteric space is small and without a natural anatomical outlet for drainage, symptoms can be protracted. Difficulty with diagnosis and undertreatment may be responsible for a long course of the disease with periods of remission and recurrence.[9]

Our patient presented with posterior facial swelling, so differential diagnosis with parotitis should be performed.[6] The superficial lobe of the parotid gland lies on the posterior lateral border of the masseter muscle, and the deep lobe of the gland lies posteriorly to the submasseteric space. Anatomically, a fibromuscular sheet separates the parotid gland from the submasseteric space. Differential diagnosis may be performed on clinical grounds. Parotid swelling tends to be prominent more posteriorly, elevating the auricle. In the case of a submasseteric abscess, swelling of the masseter is observed at the anterior border of the parotid, hiding the auricle almost completely from frontal observation. Palpation also is quite helpful since in parotid swelling tenderness is mostly at the region of the gland at the posterior border of the masseter muscle, while a submasseteric abscess causes tenderness anteriorly. A history must always be taken, and parotid disease is indicated if pain increases during meals, and submasseteric abscess when a definite history of dental disease is present. Trismus is prominent in submasseteric abscess but mild in parotitis. An intraoral examination is useful, since in parotid disease purulent discharge from Stenvers duct may be encountered and occasionally total duct blockage occurs. Salivation is normal in an abscess of the submasseteric space.

Finally, definite conclusions may be obtained by modern imaging techniques. Sialography is no more an absolute requirement and though ultrasonography procedures have proved useful in some instances,[10] CT scan is the technique of choice, since it may depict the inflammatory effects when both soft tissues and bone are involved. CT scanning has greatly assisted the accurate diagnosis of head and neck infections. Differential diagnosis between cellulitis and abscess formation is evident in most cases, thereby directing the choice of medical or surgical treatment. Many other benefits also may be gained from a CT scan, since mandibular osteomyelitis, unsuspected contralateral abscess or infection of another neighbouring space may be recognized and consequently direct the appropriate surgical approach. However, a few failures were reported[5] and the exact severity of the process may not be accurately estimated, as in our patient, where a CT scan showed a small collection of pus, but during the surgical procedure a large quantity of pus was drawn, indicating a much more severe condition. Surgical drainage of the abscess, either intraorally or by the external approach is the most efficient treatment,[11] although needle aspiration has been used by some authors as the initial method of treatment.[12]

In conclusion, the clinical findings and the history of the patient with a submasseteric abscess must always be considered in conjunction with modern imaging techniques in order to obtain accurate diagnosis and efficient treatment of the disease. However, the severity of the inflammatory process may sometimes be underestimated.

References

1 Braun IF, Hoffman JC Jr, Reede D, Grist W. Computed tomography of the buccomasseteric region: 2. Pathology. *Am J Neuroradiol* 1984;**5**:611–6
2 Baurmash HJ. Osteomyelitis or abscess? *J Oral Maxillofac Surg* 1996;**54**:803–4
3 Bransby-Zachary GM. Submasseteric space. *Brit Dent J* 1948;**84**:10
4 Marti K, Dimitroglou D. The submasseteric abscess as a complication of the semi-impacted wisdom tooth infection. *Hell Period Stomat Gnathoprosopike Cheir* 1989;**4**:191–4
5 Doxey GP, Harnsberger HR, Hardin CW, Davis RK. The masticator space: the influence of CT scanning on therapy. *Larygnoscope* 1985;**95**:1444–7
6 Mandel L. Submasseteric abscess caused by a dentigerous cyst mimicking a parotitis: report of two cases. *J Oral Maxillofac Surg* 1997;**55**:996–9
7 Newman MH, Emley WE. Chronic masticator space infection. *Arch Otolaryngol* 1974;**99**:128–31
8 Mandel L. Diagnosing protracted submasseteric abscess: the role of computed tomography. *J Am Dent Assoc* 1996;**127**:1646–50
9 Nishimura T, Okabe Y, Furukawa M. A chronic organized masseter abscess causing trismus resolved by hemimasseter myotomy. *Auris Nasus Larynx* 1996;**23**:140–2
10 Ariji E, Ariji Y, Yoshiura K, Kimura S, Horinouchi Y, Kanda S. Ultrasonographic evaluation of inflammatory changes in the masseter muscle. *Oral Surg Oral Med Oral Pathol* 1994;**78**:797–801
11 Gidley PW, Ghorayeb BY, Stiernberg CM. Contemporary management of deep neck space infections. *Otolaryngol Head Neck Surg* 1997;**116**:16–22
12 Herzon FS. Needle aspiration of nonperitonsillar head and neck abscesses: a six-year experience. *Arch Otolaryngol Head Neck Surg* 1988;**114**:1312–4

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