Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology 27 (2015) 791–795

Contents lists available at ScienceDirect

Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

journal homepage: www.elsevier.com/locate/jomsmp

Original Research

Cystic lesions in the jaw presenting as head and neck infection

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ARTICLE INFO

Article history:
Received 10 October 2014
Received in revised form 6 April 2015
Accepted 18 May 2015
Available online 17 June 2015

Keywords:
Cystic lesion in jaw
Infection
Cortex expansion

ABSTRACT

Although mandibular cystic lesions are typically considered sterile, they occasionally present as head and neck infections. We have observed seven cases where large facial abscesses were associated with large cystic lesions of the mandible. Therefore, the aim of this study was to evaluate mandibular cystic lesions presenting as infections in the head and neck region, based on the involvement of the surrounding structures and demographic variables. Out of the seven patients diagnosed as having head and neck infections associated with cystic lesions, three presented with dentigerous cysts and four with keratocystic odontogenic tumors (KCOT). Six out of the seven lesions were multilocular with large cortical expansion and erosion, suggesting that marked cortical expansion in the buccolingual direction might be indicative of the developing infection. The treatment of lesions required multiple surgical interventions including marsupialization, enucleation, and peripheral osteotomy or resection. Because of the large size of the cysts, all patients required long-term follow-up.

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1. Objective and methods

This retrospective study describes patients with mandibular cystic lesions presenting as head-and-neck infections. Both patient characteristics (age, gender, and past medical history) and lesion parameters (location, radiographically measured size, microbiologic characteristics, presence of impacted teeth and cortical erosion or expansion) were evaluated.

2. Results

Seven patients were diagnosed as having head and neck infections associated with cystic lesions of the mandible. Seven healthy subjects were enrolled as controls. The clinical data, including radiographic data, of the seven patients in the experimental group are summarized in Table 1 and Fig. 1. The age of the patients ranged from 17 to 34 years, with an average age of 37.4 years. The most frequent infection site was the submasseteric space. Dentigerous cysts were diagnosed in three cases and keratocystic odontogenic tumors (KCOTs) in four cases. Four cases involved impacted teeth in the lesions. Computed tomography (CT) scans revealed six of the seven lesions to be multilocular.

Histological analysis of cystic walls revealed the presence of chronic inflammation, including granulation tissue and clusters of foamy macrophages, in six cases, and acute inflammation and bacterial aggregation, which are typically associated with odontogenic abscesses. One patient presented with a benign cyst lined by corrugated stratified squamous epithelium with uninfected palisading basal cell layer. In three cases, the infection spread from the mental to the inferior alveolar foramen, three cases involved the inferior alveolar foramen, and one case was associated with both mental foramens. In four cases, CT scans revealed the loss of both buccal and lingual cortical plates. The three patients with dentigerous cysts were treated by marsupialization followed by enucleation, whereas the three patients with KCOT were treated by marsupialization followed by peripheral osteotomy. One case required hemimandibulectomy due to the extensive erosion of the cortical bone (Fig. 2).

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http://dx.doi.org/10.1016/j.ajoms.2015.05.005
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Table 1
Demographic data of cases.

No	Pathology	Size of the lesion	Present of impaction of tooth	Radiographics	The relation of lesion and lingual or mental canal	The cortex Erosion on CT	Treatment
1	Dentigerous cyst	*L* 13.1 cm × *H* 6.7 cm × *w* 3.6 cm	None	Multiloculated	Mental and lingula	buccal and lingual	Marsupialization + Enucleation
2	KCOT	*L* 9.3 cm × *H* 3.6 cm × *w* 1.1 cm	Tooth #17	Multiloculated	Lingula	None	Marsupialization + Peripheral ostectomy
3	KCOT	*L* 8.8 cm × *H* 4.4 cm × *w* 1.3 cm	None	Multiloculated	Lingula	None	Marsupialization + Peripheral ostectomy
4	KCOT	*L* 5.7 cm × *H* 1.7 cm × *w* 1.3 cm	Tooth #17	Multiloculated	Lingula	None	Marsupialization + Peripheral ostectomy
5	Dentigerous cyst	*L* 14 cm × *H* 4 cm × *w* 1 cm	Tooth #17	Multiloculated	Mental and lingula	Lingual	Marsupialization + Enucleation
6	Dentigerous cyst	*L* 17.3 cm × *H* 11.3 cm × *w* 3.3 cm	Tooth #22	Uniloculated	Bilateral mental	Buccal	Marsupialization + Enucleation
7	KCOT	*L* 8.5 cm × *H* 2.9 cm × *w* 4.1 cm	None	Multiloculated	Mental and lingula	Buccal and lingual	Hemimandibulectomy
Average		11.0 cm × 4.9 cm × 2.2 cm					

No	Infection spaces	Microbiology
1	Submasseteric	No detection
2	Submassetiric Submandible Pterygomandibular	No detection CRP 3.2
3	Submandible	G (+) cocci. G(−) rods, G(+)rods in Aeuro only CRP 16.3
4	Deep temporal Pterygomandibular Submandible	G(+) cocci. G(-) rods G(+)rods in Aeuro G (+) cocci G(-) rods in Anaeuro
5	Submasseteric	G(+) cocci. G(+) rods in Aeuro
6	Submental	No detection
7	Submasseteric space	Gram (−) and Gram (+) in Anaeuro Gram (+) Rods Gram (+) Cocci in Aeuro

KCOT: Keratocystic odontogenic tumor. M: Male; F: Female; L: Length; H: height; W: Width.
G(+) Gram Positive G (−) Gram Negative

3. Discussion

Many lesions that occur in the mandible have a cyst-like radiographic appearance. Mandibular lesions may be odontogenic or non-odontogenic. The majority of jaw lesions are radiolucent (>80%) [1]. Most mandibular cystic lesions are asymptomatic and can grow to a significant size. The most common symptom is pain, which may or may not be accompanied by swelling. These cystic lesions are usually sterile [2] and rarely present as an infection [3–7]. In fact, in the only review available on the subject, Smith and Kellman reported the infection rate in the case of dentigerous cysts to be 2.1% [8]. In contrast, head and neck cancer often presents as a neck abscess or cellulitis due to the presence of necrotic tissue or metastatic involvement of the lymph nodes. The poor vascular circulation in the necrotic tissue is an underlying factor behind predisposition to bacterial infection [9–11].

Periapical abscesses of the posterior teeth cause mandibular odontogenic infections to spread first to the masticator space. Accumulated pus perforates bone at its weakest and thinnest part, which, in case of the mandible, is the lingual aspect of the molar region. This causes the infection to spread into the sublingual or submandibular space. The location of this infection is similar to that of regular odontogenic infections [12,13], because the most common site of both dentigerous cysts and keratocystic odontogenic tumors is the region of the third molar in the mandibular ramus area [14]. One unique case (Case 4) presented with deep temporal space infection caused by KCOT associated with the third molar impaction. It is likely that the infection originated in the superior lingual aspect of the cyst and spread through the pterygomandibular space to the deep temporal space (Fig. 3).

Radiographically, both dentigerous cysts and keratocystic odontogenic tumors appear as well-defined, corticated and lucent lesions associated with unerupted teeth. An important feature of the keratocystic odontogenic tumor is its tendency to grow in a predominantly anteroposterior direction while causing minimal cortical expansion [1]. On the other hand, dentigerous cysts have the ability to expand asymptomatically and displace or resorb adjacent teeth or bone [15]. In addition, cysts of 2 cm in diameter or larger may cause mandibular expansion [16]. In our case, six out of seven patients presenting with infection showed marked cortical expansion accompanied by cortical erosion. Furthermore, the average width of the lesions was 2.2 cm, suggesting that marked cortical expansion in the buccolingual direction might be indicative of developing infection.

All patients except one presented with multiloculated cysts. Several studies have shown that multilocular odontogenic keratocysts typically have a higher recurrence rate than unilocular cysts [17,18], suggesting a more aggressive phenotype of the former type of lesions. This phenomenon might also explain the correlation between aggressiveness of cortical erosion and progress of the infection.

CT has become an indispensable tool for evaluating both maxillofacial pathology and infection, especially since the infection in deep spaces, although rapidly spreading, tends to be asymptomatic [12].

In our patients, CT scans revealed no differences in density values between infected cystic lesions and non-cystic lesions. This was despite the fact that in four cases the cyst cavities were filled with fluid with the density of water, and contained air pockets suggesting formation of gas from necrotic tissue within the abscesses [18]. Other potential causes of infection in the cystic lesions of the mandible include cortical perforation of the lesion with the possibility of connection to oral flora, and close proximity of the cyst to the periodontal pocket of the erupting molars.

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