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Management of Odontogenic Keratocyst by Decompression: A Case Report

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ABSTRACT

Odontogenic keratocyst (OKC) is a locally aggressive intrabony cyst of odontogenic origin and one of the most debated jaw pathologies because of its high recurrence potential and variable treatment strategies. This report presents the long-term outcome of a mandibular OKC treated by decompression alone. A 31-year-old woman presented with painless right mandibular swelling. Imaging showed a well-defined unilocular radiolucency from the mandibular angle to the distal root of the first molar, associated with an impacted third molar and external root resorption of the second molar. Decompression was performed by creating a buccal bone window, evacuating the cyst, extracting tooth 48, and placing an acrylic plug. Histopathology confirmed an odontogenic keratocyst. Serial panoramic and cone-beam computed tomography scans demonstrated progressive bone fill, so secondary enucleation and curettage were not undertaken. At 7-year follow-up, complete radiographic healing and no recurrence were observed. This case demonstrates that, in carefully selected mandibular OKCs, decompression alone followed by strict and prolonged radiographic surveillance can achieve complete resolution while avoiding the morbidity of more aggressive procedures. Conservative treatment with decompression may therefore be considered a viable option in selected patients.

Keywords: Conservative treatment; Curettage; Decompression; Surgical; Jaw cysts; Odontogenic keratocyst.

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Introduction

Odontogenic keratocyst (OKC) was first described in 1956 and is currently classified as an odontogenic cyst in the 2022 World Health Organization classification. Molecular investigations frequently demonstrate mutations in the PTCH1 tumor suppressor gene, leading to aberrant activation of the sonic hedgehog (SHH) pathway and increased epithelial proliferation [2]. Clinically, OKC shows a predilection for males and typically occurs in the third decade of life [2,3]. Approximately half of all OKCs arise in the mandibular angle region and may extend into the ascending ramus and body of the mandible. Many patients remain asymptomatic until the lesion reaches a considerable size and involves structures such as the maxillary sinus, the ascending ramus, the condyle, or the coronoid process [4].

Accurate diagnosis of OKC requires thorough intra- and extra-oral clinical examination, detailed radiographic assessment, and histopathological confirmation. Radiographically, OKCs usually appear as well-defined radiolucent lesions with smooth or scalloped borders, which may be unilocular or multilocular [5]. Larger lesions are often multilocular and may be associated with unerupted teeth, makingwhich can make differentiation from other odontogenic lesions challenging. Histologically, OKCs typically present a thin, parakeratinized stratified squamous epithelial lining, 5–8 cell layers thick, with a corrugated parakeratin surface and a characteristic palisaded basal cell layer with hyperchromatic nuclei [6].

Daughter cysts arising from epithelial budding into the adjacent connective tissue are also a well-known feature [7]. Several surgical strategies have been proposed for the management of OKC, ranging from conservative to radical approaches. Conservative modalities include decompression, marsupialization, and simple enucleation, whereas more aggressive treatments comprise enucleation with peripheral ostectomy, application of Carnoy's solution, cryotherapy, or resection [2,3,8,9]. Because of the relatively high recurrence rate and risk of pathological fracture, radical resection may be indicated for large or recurrent lesions, or in the presence of cortical perforation [8,12,14]. Reported recurrence rates vary widely, from 7% to 28% within the first 5 years after treatment, depending on diagnostic criteria, treatment modality, and lesion size and location [10]. Consequently, long-term clinical and radiographic follow-up is essential, even though the overall prognosis is favorable [10,23,24].

This case report describes the conservative management of a mandibular OKC with decompression alone, without subsequent enucleation, with 7-year follow-up.

Case Presentation

This case is reported in accordance with the SCARE criteria [11]. On June 7, 2016, a 31-year-old woman presented to the Department of Oral and Maxillofacial Surgery, Mashhad University of Medical Sciences, with moderate, painless swelling in the right mandibular region. Her medical history was non-contributory, and she had no history of medication use or allergies. The case was managed in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.REC.1404.037). Written informed consent was obtained from the patient for treatment and for publication of anonymized clinical data and images. Intraoral examination revealed expansion of the vestibular cortical bone, with erythematous overlying mucosa. A panoramic radiograph showed a well-defined, unilocular radiolucent lesion extending from the mandibular angle to the distal root of the first molar (Figure 1). Tooth 47 demonstrated external root resorption.

Based on the clinical and radiographic findings, a provisional diagnosis of odontogenic keratocyst (OKC) was made, and decompression was selected as the treatment. Under local anesthesia, a mucoperiosteal flap was raised in the right mandibular buccal vestibule, and a bone window was created. The impacted third molar (tooth 48), which was associated with the lesion, was extracted. The cystic contents were evacuated, and the cavity was initially packed with gauze soaked in 2% povidone-iodine for three days, followed by regular irrigation with normal saline. An acrylic plug was fabricated and placed to maintain the decompression window and prevent premature closure of the bone defect (Figure 2). An elliptical segment of normal mucosa and a portion of the lesion capsule were submitted for histopathologic examination, which confirmed the diagnosis of OKC with a typical parakeratinized epithelial lining (Figure 3). The patient was followed regularly with clinical examinations and panoramic radiographs and/or cone-beam computed tomography (CBCT) scans (Figure 4). Serial images demonstrated a gradual reduction in lesion size and progressive new bone formation, evidenced by decreasing radiolucency and increasing radiopacity. In view of the continuous radiographic improvement and absence of any signs of recurrence, secondary enucleation was not performed.

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The acrylic plug was progressively reduced in size as the cavity shrank, and it was completely removed after one year. Follow-up has continued for seven years, during which radiographic examinations have shown stable bone healing with no evidence of recurrence or new lesions.

Figure 1. The first panoramic radiography of the patient revealed a well-defined, unilocular radiolucent lesion.

Figure 2. The panoramic view of the CBCT image of the lesion after marsupialization and placing acrylic plugs.

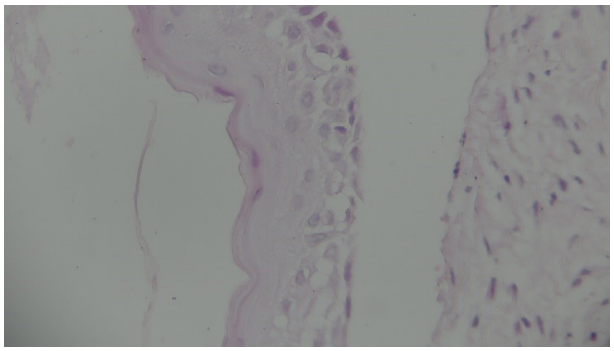

Figure 3. The histopathological view of an OKC at 40x magnification reveals a thin, uniform layer of stratified squamous epithelium lining the cyst. This epithelium is parakeratinized, displaying a characteristic wavy, corrugated surface. The basal cell layer is well-defined, showing palisaded columnar cells with hyperchromatic nuclei. The surface of the epithelial lining is covered by a layer of keratin, visible as eosinophilic due to the staining.

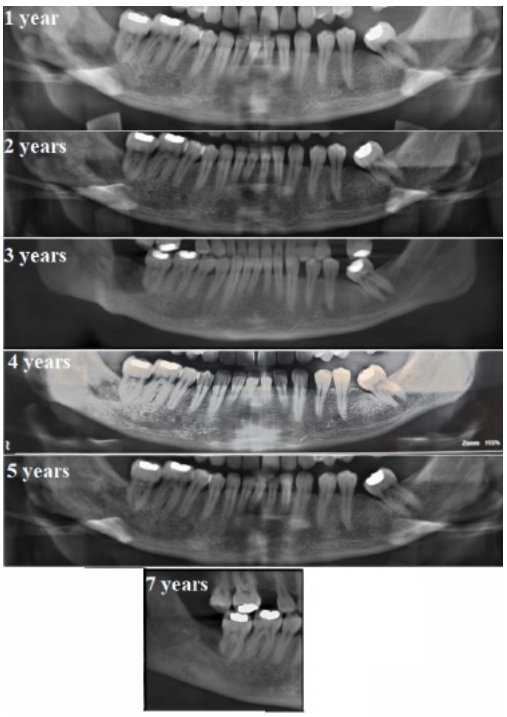

Figure 4. Images showing the postoperative regression of the lesion over the postoperative years.

Discussion

Treatment of OKC remains controversial because of its locally aggressive behavior and potential for recurrence. Available surgical options range from conservative procedures such as decompression, marsupialization, and simple enucleation to more aggressive approaches, including enucleation with peripheral ostectomy, the use of Carnoy's solution, cryotherapy, and resection [8,9,12,23]. An extensive systematic review reported recurrence rates of approximately 17.4% for enucleation with ostectomy, 11.5% for enucleation with Carnoy's solution, 14.6% for decompression followed by enucleation, and 8.4% for complete resection [12]. Radical resection has the lowest recurrence rate (2.1–4.2%). Still, it is associated with considerable morbidity and is generally reserved for specific situations such as recurrent OKC, extensive primary lesions, pterygoid involvement, or cortical bone perforation [14]. Decompression is intended to reduce intracystic pressure, decrease lesion size, and promote new bone formation, thereby facilitating subsequent enucleation and reducing the extent of surgery [15,16]. Many authors have reported successful two-stage management, with initial decompression followed by enucleation and/or curettage, often combined with adjunctive measures such as Carnoy's solution or peripheral ostectomy to minimize further recurrence [17–20,22,23]. This strategy can preserve vital anatomical structures, protect the inferior alveolar nerve, maintain mandibular continuity,

and reduce the risk of pathologic fracture, thereby improving functional and esthetic outcomes [18,19,20]. Pogrel and Jordan [21] demonstrated that decompression alone can lead to substantial bone formation and, in some cases, complete resolution of OKC over 7–19 months in nonsyndromic patients. Khan et al. [13] reported an extensive OKC occupying almost the entire mandible, initially treated by decompression. However, a recurrence occurred 2 years later; subsequent curettage and application of Carnoy's solution resulted in no further recurrence during a 10-year follow-up. Al-Juhni et al. [17] described a patient with Gorlin-Goltz syndrome who had OKCs successfully managed with decompression and enucleation, with no recurrence after 3 years. De Castro et al. [23], in a systematic review, confirmed that conservative surgical approaches can achieve acceptable recurrence rates when long-term follow-up is performed. Nevertheless, few reports have described decompression as the sole definitive treatment without secondary enucleation [9,22].

In such cases, careful case selection and strict radiographic surveillance are critical. The present case adds to this limited body of evidence by demonstrating complete radiographic and clinical resolution of a mandibular OKC treated exclusively with decompression, with no recurrence over 7 years of follow-up. The progressive reduction in lesion size, increased bone density, and the absence of radiographic or clinical signs of recurrence justified avoiding a second-stage enucleation. Another important consideration is the cumulative radiation dose associated with repeated imaging. Al-Qurmoti et al. [25] recommended limiting the number of follow-up CT scans, especially in patients with minor initial defects, to reduce radiation exposure and healthcare costs. In the present case, follow-up was primarily based on panoramic radiographs, and CBCT was reserved for selected time points. Dental CBCT typically delivers an effective dose that is substantially lower than that of medical CT, often around one-fifth of the dose, depending on the protocol used [26]. Overall, the present report supports decompression as a conservative, function-preserving option for selected mandibular OKCs. Long-term radiographic follow-up is mandatory, given that recurrences may occur several years after treatment [10,23,24].

Conclusion

Multiple treatment options are available for the management of OKC, and no single gold standard has been universally accepted. This case report suggests that, in appropriately selected patients, decompression alone followed by prolonged clinical and radiographic surveillance can achieve complete resolution while avoiding the morbidity associated with more aggressive surgery. Conservative treatment with early decompression, careful case monitoring, and long-term follow-up should be considered as a viable therapeutic option for mandibular OKCs that do not show features warranting radical resection.

Conflict of Interest

There is no conflict of interest to declare.

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