

An Experience with a Different Conservative Management of Keratocystic Odontogenic Tumor

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ABSTRACT

Background: The aim of our study is to share our experience with conservative management of odontogenic keratocyst, and also to study the role of Carnoy's solution in prevention of recurrence of small keratocystic odontogenic tumour (KCOT). **Methods:** 29 consecutive patients with 30 KCOT treated in department of Oral & Maxillofacial Surgery in Teerthanker Mahaveer Dental college, Moradabad, UP. Initial biopsy was carried out in all patients and the OKCs were diagnosed after histological examination by the Oral Pathology Department. Out of 26 KCOT which were treated with enucleation alone, 14 patients were subjected to additional burning of cyst epithelium by Carnoy's solution. 4 large OKC which might undergone pathological fracture were treated by two stage surgery marsupialization followed by enucleation. **Results:** The majority of the lesions (17 patients, 56.7%) occurred in the mandibular third molar region. Recurrence occurred in 4 patients, in which 3 of them were from enucleation group and one of marsupialization and enucleation group. All the cases were monitored continuously with panoramic radiographies and clinical evaluations. curettage of the remaining lesion. The average follow-up was 15 months. **Conclusion:** Use of Carnoy's solution with enucleation has definite advantage over the conventional enucleation. Further large KCOT can be conservatively treated with low morbidity with Marsupialization followed by enucleation successfully. The systematic and long-term post-surgical follow-up is considered to be a key element for successful results.

Key Words: Carnoy's solution, Marsupialization, Odontogenic Keratocyst

INTRODUCTION

The odontogenic keratocyst (OKC) is a cystic lesion of odontogenic origin, which is type of developmental cyst. It was first described in 1956 by Phillipsen^[1] and it is well known for its high recurrence rate.^[2] Due to aggressive behavior and high recurrence rate nomenclature of keratocystic odontogenic tumour was given. For the same reason, many research regarding the optimum treatment are carried out over the six decade.^[1-8] The OKC accounts for 11% of all cysts in the jaws and is most commonly located in the mandibular third molar region. Radiographically, it can be either unilocular or multilocular lesion with or without a scalloped contour. These characteristics are suggestive but not considered an unequivocal proof for the definitive diagnosis of OKC because other lesions may exhibit similar features.^[4] The rates of recurrence vary enormously, from a maximum of 62% to a minimum

surgeons advocate aggressive treatment including complete removal with extension margins or meticulous curettage of the surrounding tissues.^[5] If enucleation is done alone then it has the highest recurrence rates (range, 17% to 56%). To decrease the recurrence potential, various adjunctive therapies have been tried, including the use of Carnoy's solution or peripheral ostectomy or, cryotherapy, or electro-cautery.^[5-9] Carnoy's solution composed of 1 g of ferric chloride (FeCl₃) dissolved in 24 mL of absolute alcohol, 12 mL of chloroform and 4 mL of glacial acetic acid.^[6] Decompression or marsupialization which is more conservative options in the treatment of KCOT is also becoming popular.^[10, 11] Marsupialization was first described by Partsch in 1882^[12, 13] for the treatment of cystic lesions, through the creation of a surgical bony window through the buccal mucosa. Their borders are then sutured to create an open cavity that communicates with the oral cavity. This procedure relieves pressure from the cystic fluid, allowing reduction of the cystic space and facilitating bone apposition to the cystic walls.^[10-15] Decompression and marsupialization are almost very similar techniques. The main difference lies in the creation of a surgical window in the oral mucosa and cystic membrane,^[14] and in using a cylindrical device^[11] (like the rubber of a dropper) or a rigid drain to prevent mucosal closure. This is done with the objective of maintaining a continuous communication between the oral cavity and the cyst cavity. The decompression technique allows the permeability of

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of 0%.^[5] The most of recurrent cases occur within the first 5 years after treatment.^[5-9] For this reason, most

the cystic cavity because the union of the cyst epithelial wall with the mucous membrane results in the externalization of the lesion. In addition, after the surgical intervention, the cystic lining tends to become thicker, which facilitates its removal completely after a second surgery. The use of this technique is acceptable possible KCOT treatments. In 1971, Browne^[16] described marsupialization as a technique for the treatment of KCOT. In 1976, Tucker^[14] first described the use of decompression and secondary enucleation as a first-line treatment option for OKC. In 1991, Brøndum and Jensen^[11] reported a recurrence rate of 18% in 51 OKC patients during a 13-year period. Thirty-two of these patients were treated with decompression of the lesion. Of these cases, 8 presented recurrence of the lesion. Additionally, when achieving a significant reduction of the lumen—which can be confirmed through radiographic imaging—a secondary cystectomy was justified to prevent recurrence of the lesion. Those who criticize the use of marsupialization or decompression for the treatment of OKC argue that this technique does not allow a complete removal of the whole cystic covering, which would lead to a continuation of epithelial proliferation and facilitate an increment of the recurrence.^[5] Brøndum and Jensen^[11] were not in agreement with this argument because recurrences was not observed by them in patients treated by decompression with second stage enucleation. Several reports describe the use of decompression to decrease the size of the cyst, after which it is definitively enucleated.^[10-16] Use of these techniques alone is not reported commonly when a complete resolution of the OKC has been achieved.^[15, 16] Regarding the remaining epithelium after decompression of the lesion, August et al^[15] reported the differentiation of the OKC epithelium once treatment is carried out. Through histochemical analyses based on Cytokeratin-10 tests, August et al^[15] accomplished the pre-operative identification of the lesion in 14 OKCs. After surgery, the same analysis was carried out again in the cystic epithelium to determine whether the marsupialization or decompression technique results in epithelial modulation, which is associated with lower recurrence rates. It was observed that 64% of the patients did not present Cytokeratin-10 in the analyzed epithelium, which may have been contributed to the lower rates of recurrence. Pogrel and Jordan^[17] reported the use of marsupialization as a definitive treatment of OKC. In this study, 10 patients were treated exclusively with marsupialization and decompression, achieving resolution of the lesions with a recurrence rate of 0%. This study was done to report our experience with the surgical treatment of 30 OKCs, 26 small

which were treated either by enucleation alone or by enucleation and Carnoy's solution and four large OKCs which were treated anticipating pathological fracture based on marsupialization and enucleation with reference to the recurrence rate.

MATERIALS AND METHODS

Twenty-nine patients (17 females, 12 males) with a total of 30 OKCs attended the Department of OMS in Teerthanker Mahaveer Dental College between 2011 and 2014. Basal cell nevus syndrome patients with multiple OKCs were not included in our study. One patient with 2 OKCs in different anatomic locations, without clinical features of Gorlin Syndrome, were included too. In this study, the age range was 15 to 49 years (average, 30 years). All the OKCs were diagnosed by histologic examination by the Oral Pathology Department. All lesions were diagnosed by radiographic images and clinical features and preoperative biopsy, confirmed postoperatively by histopathologic report. Of total 30 OKC 4 large OKC was treated with decompression followed by enucleation, 12 patient was treated with enucleation alone and rest 14 patient were treated with enucleation and Carnoy's solution also initial biopsy and decompression of the cyst was carried out on the same day if possible. Under local anesthesia (2% lidocaine with epinephrine 1:200,000), Four patients were lost during follow up, but were assumed asymptomatic and were included in non-recurrence group.

Group 1 Simple enucleation

Under local anesthetic, a horizontal incision was made in the alveolar ridge with a #15 scalpel. A muco-periosteal flap was obtained with exposure of the cystic cavity. The secondary curettage of the cavity was carried out with a Lucas's bone curette and the cavity was irrigated with saline solution. Finally, the flap was closed with 4.0 silk suture (Johnson & Johnson, Ethicon, Brazil). Simple enucleation and Carnoy's solution. Patient's follow-up at 7, 15, and 30 days with clinical and serial panoramic radiographs was done.

Group 2 Enucleation followed by destruction of cystic lining by Carnoy's solution

After removal of cyst, remaining mucosal lining was burned using Carnoy's solution and was sutured.

(c) Marsupialization followed by enucleation

When the cyst was large where enucleation alone may not be able to remove complete cyst lining, flap was raised and bony window was created, whenever it was possible [Figure 1, 2 and 3]. Cystic lining was sutured with the mucosa, and an iodophore dressing was given [Figure 4], which was changed biweekly for 2 weeks and weekly for 12 weeks. Secondary

curettage of the surrounding tissues was carried out after the decompression phase, once radiographic evaluation confirmed reduction in size of the lesion [Figure 5]. The postoperative care included the use of paracetamol via oral for pain control. Amoxicillin 500 mg (oral), thrice a day was prescribed for 5 days for all the patients. Careful monitoring was based on monthly panoramic radiographies and clinical visits to determine lesion size regression as an effect of decompression and bone formation [Fig 1]. Postoperative care included oral aceclofenac with paracetamol, amoxicillin or clindamycin (in penicillin-allergic patients). In those cases where treatment of the lesion consisted of enucleation only, a procedure similar to the one described above was used. Patients received follow-up with clinical and serial panoramic radiographs at 7, 15, and 30 days. Ninety days after the procedure is done, patients were monitored periodically every 6 months.



Figure 1: Pre-op OPG (Orthopantomogram).



Figure 2: Intra-operative.

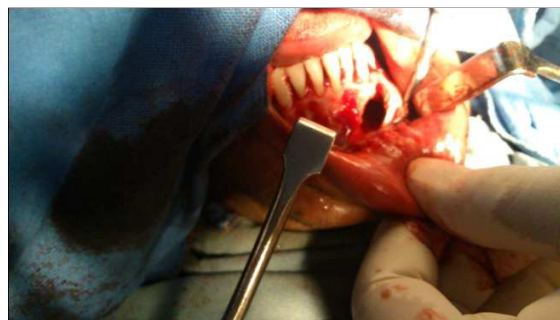


Figure 3: Intra op after cortical perforation

RESULTS

Of total 30 OKC most of the lesions (17 lesions, 56.7%) occurred in the mandibular third molar region. The most common histologic pattern of KCOT was parakeratinized (70%). Five KCOT presented satellite cysts and had the parakeratinized pattern. Four OKCs were treated by marsupialization and curettage of the remaining lesion, KCOT by enucleation and curettage only and remaining 12 by enucleation and curettage with burning of cyst lining by carnoy's solution. The mean time for decompression was 8.5 months varied from 4 to 12 months. Recurrence occurred in 4 patients, in which 3 of them were from enucleation group and one of marsupialization and enucleation group. All recurrence cases were submitted to enucleation/curettage and peripheral osteotomies of the remaining bone cavity. The average follow-up for the 28 cases were 15 months.



Figure 4: Post-op OPG after Iodophore dressing.



Figure 5: Post-Op after 6 months showing decrease in cyst size

DISCUSSION

Many authors have shown the successful treatment of large KCOT using marsupialization.^[10,11,15,16] This treatment does require a cooperative patient who will irrigate the cyst on a regular basis and will follow up regularly. For this reason, only a select group of patients may be suitable for this treatment. The benefit of this treatment over more conventional approaches (enucleation, en-bloc resection) lies in the minimal surgical morbidity. In addition, associated structures such as the inferior alveolar nerve and developing teeth are less vulnerable to damage.^[10,12,17] The decompression and marsupialization techniques are based on the exteriorization of the cystic cavity and result in communication with the oral cavity.^[11, 14] This process relieve pressure of the cystic fluid and allows shrinkage of the cystic space and the apposition of bone to the cystic walls. There are many cases reported in literature which advocates use of marsupialization to decrease the size of the cyst, after which it was definitively enucleated in second surgery. Partsch in the late 1800 described the use of marsupialization for the treatment of cystic lesions. Although our study sample was small but Carnoy's solution is definitely more effective in preventing recurrence of KCOT. In this study, only one case has recurrence in unconventional approach and overall four cases had recurrence. The secondary treatment, based in curettage associated to the peripheral osteotomy, has been accomplished in all of the cases. The main advantage of the conservative treatment is the preservation of bone and teeth, fact that it is covered of great importance if we consider that most of the patients are young. These procedures are less traumatic for the patient, eliminating medication and hospitalization expenses, and in most cases, avoid any reconstruction through autogenous grafts or extensive reconstructions. In most of the cases in which the recession is the elected treatment, the need of accomplishing the reconstruction of the jaw through grafts of autogenous bone is imperative. Usually these reconstructions are accomplished in a second surgery, which translates into larger discomfort for the patient, and increase of the morbidity, increments in the costs of the treatment, and time of recovery, among others. Time of duration of the decompression treatment (1 to 14 months) is one of the disadvantages of this technique. In fact, this is one of the main causes of abandonment of the treatment by the patient because of loss of interest in proper irrigation treatment and attendance of periodic controls. In spite of being a technique that requires prolonged postoperative treatment and special considerations (like the ones mentioned above), and

even a second surgical procedure in order to curette the remaining cystic cavity, it is a technique that allows the professional to offer the correct treatment and save hospital expenses that would increase with other, complicated procedures that require general anesthesia and hospitalization. The recurrence rate observed among our sample was 14%. In comparison with other important published studies.^[4, 9, 11, 16-19] We obtained results within the average with a more conservative approach. If we sum up the advantages of a conservative approach, like the one we suggest, versus a more radical treatment, the marsupialization treatment protocol stands up as an equally effective, cheaper, and simpler procedure for the treatment of OKC if the patient can be closely monitored and periodically evaluated (clinically and radiographically). Several studies suggest that the largest number of recurrences of OKC occur during the first 5 years after the initial treatment period (about 70%).^[20,21] For this reason the annual radiographic control of these patients is recommended for an undetermined time.^[5,22,23]

CONCLUSION

We conclude that use of Carnoy's solution with enucleation has definite advantage over the conventional enucleation. Further large KCOT can be conservatively treated with low morbidity with Marsupialization followed by enucleation successfully. The systematic and long-term post-surgical follow-up is considered to be a key element for successful results.

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How to cite this article: Goyal AK, Vishal, Khan M, Kumar A, Srivastava A. An experience with a different conservative management of Keratocystic odontogenic tumor. *Ann. of Int. Med. & Den. Res.* 2015;1(1):13-7.

Source of Support: Nil, **Conflict of Interest:** None declared