Evaluation of different cauterization techniques in odontogenic keratocyst: An original research

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Abstract

Aim: Purpose of the present research was to valuate various cauterization techniques in treatment of Odontogenic Keratocyst.

Methodology: This study involved the retrospective review of 30 patients (20 males and 10 females) of biopsy proven odontogenic keratocysts. All patients were divided into two groups – Group I-received a combination of enucleation and chemical cauterization with every time freshly prepared Carnoy's solution (absolute alcohol 6 mL, chloroform 3 mL, glacial acetic acid 1 mL, ferric chloride 0.1 gm/mL) and Group-II- enucleation and electrocauterization of the lesion. None of these patients were diagnosed with basal cell nevus syndrome. A total of 30 biopsy proven OKC were resolved with this treatment method. Postoperative follow up consists of clinical and radiographic examination.

Results: Out of 30 cases 20 patients were asymptomatic and most of the lesions were (28/30) parakeratnized type. 15 OKCs had no evidence of clinical or radiographic recurrence after treatment by enucleation and electrocauterization. Recurrence was reported in 2 patients (5.8%) in chemical cauterization group.

Conclusion: Conservative surgical management of Odontogenic Keratocyst (OKC) with combined therapy using multimodal therapeutic approaches was shown to be a good alternative to resection in OKC.

Keywords: enucleation, KCOT, odontogenic keratocyst, Electro-cauterization, carnoy's solution.

INTRODUCTION

Odontogenic keratocyst OKC is a developmental cyst that was first described by Philipsen et al.1 OKC is now referred to by the World Health Organization (WHO) as a keratocystic odontogenic tumour KCOT, and WHO defined it as ''a benign uni- or multi-cystic, intraosseous tumour of odontogenic origin, with a characteristic lining of parakeratinized stratified squamous epithelium and potential for aggressive, infiltrative behaviour.2 The KCOT is one of the most aggressive odontogenic cysts. It can become quite large because of its ability for significant expansion, extension into adjacent tissues and rapid growth.3 Different studies showed the incidence of KCOT to be 3–11% of the odontogenic cysts.4 Generally, KCOT are solitary lesions unless they are associated with nevoid basal cell carcinoma syndrome.5 KCOT arises from cell rests of the dental lamina.6 Histopathologically, KCOT typically shows a thin, friable wall, which is often difficult to enucleate from the bone in one piece, and have small satellite cysts within the fibrous wall. Therefore, odontogenic keratocysts often tend to recur after treatment.7 Radiographically KCOT demonstrates a well-defined unilocular or multilocular radiolucency with smooth and often corticated margins. In 25–40% of cases, there is an unerupted tooth involved in the lesion. KCOT tend to grow in the anteroposterior direction within the medullary cavity of the bone without causing obvious bone expansion causing its delayed observation by the patients.8 The treatment of the KCOT remains controversial. Treatments are generally classified as conservative or aggressive. Conservative treatment generally includes simple enucleation, with or without curettage, or marsupialization. Aggressive treatment generally includes peripheral ostectomy, chemical curettage with Carnoy's solution, cryotherapy, or electrocautery and resection.9 The choice of treatment should be based on multiple factors; patient age, size and location of the cyst, soft tissue involvement, history of previous treatment and a histological variant of the lesion. The goal is to choose the

treatment modality that carries the lowest risk of recurrence and the least morbidity.10 Eyre and Zakrezewska in 1985, have stated the following treatment modalities for OKC/KOT.11 Enucleation• With primary closure• With packing• With chemical fixation• With cryosurgery• Marsupialization• Only• Followed by enucleation• Resection. Electrocautery, also known as thermal cautery, can also be used in KCOT, refers to a process in which a direct or alternating current is passed through a resistant metal wire electrode, generating heat. The heated electrode is then applied to living tissue to achieve hemostasis or varying degrees of tissue destruction.11 Electrocautery is a safe and effective method of hemostasis 12 during cutaneous surgery. It is also useful in the treatment of various small, benign skin lesions, although only lesions that do not require histological review should be treated with electrocautery.13,14 There are no absolute contraindications to electrosurgery. Each electrocautery device can deliver heat at a single temperature or range of temperatures, between 100o C and 1200o C. A common principle of all electrosurgical procedures is to use the least amount of power possible to achieve the desired effect, limiting damage to the adjacent tissue.15

AIM OF THE PRESENT STUDY

Purpose of the present research was to valuate various cauterization techniques in treatment of Odontogenic Keratocyst.

METHODOLOGY

We collected and analyzed the available data on patients who presented with histologically verified OKCs in over a five years period starting on May 2017–July 2021. Criteria used to establish a diagnosis were:

(1) Radiographic findings.

(2) Histological criteria as outlined by Pindborg and Hansen et al.

Total 30 patients (20 males and 10 females) with biopsy proven OKCs were included. The data collected included age at diagnosis, gender, lesion location, clinical manifestations, radiographic features, any previous treatment modality and recurrence. The location of the OKCs was classified as follows: maxillary incisor and canine, maxillary premolar, maxillary molar, mandibular incisor and canine, mandibular molar and mandibular angle and ramus. Mode of treatment related to cauterization was analysed. The patients were randomly divided into 2 groups each-

Group I- enucleation and chemical cauterization with carnoy's solution (absolute alcohol 6 mL, chloroform 3 mL, glacial acetic acid 1 mL, ferric chloride 0.1 gm/mL)

Group II- enucleation and electrocauterization

Post operative follow up radiological and clinical examination was analysed after 1 month and 6 months to note any recurrence or infections in those studies. Descriptive statistical analysis was carried out based on the data using mean and standard deviation with SPSS 25.0 software.

RESULTS

This retrospective study evaluated 30 non-syndrome associated patients with biopsy proven OKCs. The study included 20 men and 10 women. All the patients range from 11 to 72 years age. Maximum patients were from fourth decade. The duration of symptoms varied from one month to 23 months. Out of 30 cases 20 patients were asymptomatic and they were diagnosed incidentally by other dental departments while doing dental checkup and treatment. They were referred to oral surgery department for further management. Out of the 30 OKCs, 4 were in the maxilla and 26 were in the mandible. Mandibular lesions were more common than maxillary lesion in our study group. Most of the lesions were (28/30) parakeratnized type. All the cases were treated with enucleation followed by either chemical cauterization with carnoy's solution, where the entire lesion was enucleated, and the cyst cavities were treated with carnoy's solution technique i.e., applying it for 1 min or

electrocauterization where Electrocautery tip was moved all over the defect to make sure the remaining epithelial lining was cauterised. Defect was irrigated and complete haemostasis achieved before primary closer of the wound done with 3-0 silk. (Table 1) 15 OKCs had no evidence of clinical or radiographic recurrence after treatment by enucleation and electrocauterization. Recurrence was reported in 2 patients (5.8%) in chemical cauterization group. The treatment plan included extraction of the involved teeth, enucleation and chemical cauterization Panoramic radiographs were used for follow up i.e. after 1 month, 3 months, 6 months and afterwards as long as patient came for follow-up, where around 10% of lesions treated with chemical cauterization had recurrences or satellite cysts as compared to 4.7% in case of electrocauterization. (Table 2)

Table 1- Presenting symptoms in 30 cases of odontogenic keratocyst

Presenting symptoms	No. of cases
Swelling	6
Swelling, pain, epiphora	-
Swelling, pain	-
Swelling, pain, fever	2
Pain	-
Extra oral sinus tract, pain	1
Swelling, intraoral sinus tract	3
Asymptomatic	18

Table 2- Recurrence rate observed in both the groups

Groups	Recurrence rate	3 month	6 month
I	1.34±0.33	5.8%	10%
II	0.98 ±0.16	0	4.7 %

DISCUSSION

The most characteristic clinical aspect of KCOTs is the high frequency of recurrence. The mechanism of recurrence is thought to be related to residues of cyst epithelium and an intrinsic growth potential following excision. Reported recurrence rates vary from 0% to 62.5%.11-13 Enucleation alone is associated with the highest recurrence rates (range, 17% to 56%), especially when the cyst is removed in fragmented fashion.15 Various adjunctive therapies have been advocated to decrease recurrence potential; these include peripheral ostectomy or treating the surgical site with Carnoy's solution, electrocautery, or cryotherapy. Marsupialization has also been reported but is associated with recurrences in the range of 25% to 100%. Successful treatment by marsupialization alone or by marsupialization followed by enucleation has been reported. 3 Nakamura et al. and Myoung et al. found that KCOTs in the angle-ramus region of the mandible had a higher tendency to recur than those in the mandibular body. They explained this difference because of the difficulty in removing OKCs from the ramus.7 It is thought that possible epithelial remnants in the lingual area may potentially give rise to untreatable recurrences in the soft tissues In cases of lingual perforations, where vital structures are present, electrocauterization is usually used. Using Carnoy's solution as adjunctive therapy resulted in reducing the reoccurrence rate. Handling of Carnoy's solution is difficult and cannot be used near vital structures as this can cause permanent damage to the structures. Electro-cauterization is probably more effective in eliminating these possible epithelial remnants as its cauterizing effect reaches deeper than Carnoy's solution. It is easy to use and we can have control over depth of penetration, when compared to Carnoy's solution.9

CONCLUSION

Conservative surgical management of Odontogenic Keratocyst (OKC) with combined therapy using multimodal therapeutic approaches was shown to be a good alternative to resection in OKC. Therefore, an appropriate long-term follow-up must be done after the treatment is performed in order to ensure clinical success.

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