

Case Report

Management of large mandibular periapical cyst by cortical bone preservation: a case report

Syed Sayeed Ahmed, Ranjith Kumar*, Tabishur Rahman, Md Kalim Ansari

Department of Oral and Maxillofacial Surgery, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

Received: 04 June 2021

Revised: 05 July 2021

Accepted: 08 July 2021

*Correspondence:

Dr. Ranjith Kumar,

E-mail: rkranjith.29@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Periapical cysts are the most common odontogenic cystic lesions of inflammatory origin which is believed to be derived from the epithelial rests of malassez. Different treatment modalities have been described in the literature. However, the existence and proper treatment of these cysts remains a contentious topic. The management of radicular cyst is by conservative management or marsupialisation alone or enucleation alone or marsupialisation followed by enucleation. If the teeth involved in the cysts are salvageable, root canal treatment, apicoectomy and retrograde filling are done in order to salvage the teeth involved. To select an appropriate treatment plan from above the extent of the cystic lesion is an important factor. This article aims to report a clinical case of large periapical cyst of huge proportion treated with a new novel technique in an effort to shed some light on preservation of lateral cortical plate which is usually compromised along with cystic content and uneventful primary healing using microplates and screws. We illustrate the possibility of complete primary healing of large cystic periapical lesion with of preservation of lateral cortical bone using microplates and screws.

Keywords: Periapical cyst, Lateral cortical bone, Enucleation

INTRODUCTION

Periapical cysts are typically of inflammatory origin and are derived from the remnants of Hertwig's epithelial root sheath called as cell rest of Malassez.¹ Two techniques are widely performed in surgical management of large such cysts i.e. enucleation and marsupialization. The contemporary approach favours enucleation with attempted faster healing of the resultant cavity using autologous bone or various bone substitutes.²⁻⁵ We have tried to promote healing by a novel technique of fixing back the lateral cortical bone which was removed to create the access window to the cyst.

CASE REPORT

A 19 years old female reported with a chief complaint of slowly progressing swelling in the lower anterior jaw

region for three months, painful over last two weeks. No history of trauma, paraesthesia or dental pain. Extra oral examination revealed, a firm, tender swelling of 5×6 cm in size along with tender bilateral submandibular lymph nodes. Intraoral examination revealed vestibular obliteration, well defined, firm, tender swelling in the mandibular symphysis region extending from 33 to 44 region. The involved teeth were tender on percussion and non-vital on pulp testing. Aspiration yielded a straw-coloured fluid.

Orthopantomogram (OPG) showed well demarcated unilocular radiolucency with sclerotic borders extending from 35 to 45 region of the mandible (Figure 1). Computed tomography (CT) confirmed the findings of OPG.

A diagnosis of periapical cyst was made and enucleation under general anaesthesia was planned. Decided to

preserve the lateral cortical bone which will be removed to create access window. The cyst was exposed using a crevicular incision followed by creation of an access window (3×3 cm) by removing overlying lateral cortical bone using postage stamp technique. Two titanium plates (1.5 mm system) were partially secured to the cortical bone to be removed after marking positioning holes over the adjacent bone (Figure 2). The cyst was enucleated, and the resultant cavity was covered with the removed cortical bone after its endosteal surface was curetted for removal of any attached pathological tissue (Figure 3). Before putting the bone segment back, endodontic treatment of involved teeth was completed by an endodontist. The incision was closed, and patient was extubated and discharged after a week following suture removal. Postoperative healing was uneventful. The patient was followed up for 5 years and reported no complaints.



Figure 1: Orthopantomogram demonstrating extent of lesion.



Figure 2: Technique of cortical plate preservation using titanium mini plates.



Figure 3: Reattached cortical plate.

DISCUSSION

The treatment options for periapical cysts depends upon size, integrity of cystic walls, proximity to vital structure and localisation of lesion.⁷ The same can be assessed by ultrasonography, OPG, CT and magnetic resonance imaging (MRI). Various treatment options which are available are enucleation, marsupialization, decompression, and curettage.⁸ Enucleation, also called as cystectomy, requires complete removal of the cystic lining and healing of the wound by primary intention. The lesion is separated from the bone without bone removal. The bone which is required for surgical access is only sacrificed.⁹ Curettage is a method in which the wall of the cyst cavity is surgically scraped and its contents are removed. The lesion is thus removed from the bone along with immeasurable, variable amount of surrounding bone.^{10,11} In marsupialization, intra cystic pressure is relieved by keeping a patent opening to the exterior.¹² The decompression is a method which used to create an orifice in the cyst with the smallest possible opening to reduce the intracystic pressure and with placement of tubing to maintain the drainage.^{12,13} Resection of the cystic lesions of jaws also an available modality, but as a rare last resort of treatment option. It includes partial resection or total resection considered only in conditions like, cystic lesions with multiple recurrences, large cysts with excessively thinned out bone or with perforations, cases of malignant transformation within the cysts.^{14,15} Amidst various surgical options, complete enucleation (cystectomy) of radicular cyst is still “state of the art procedure”.⁶ The removal of a cyst (enucleation) evidently results in a bone defect. Literatures available are with two major options for healing after cystectomy. The first one, is the use of a bone grafting material for the purpose of achieving higher bone regeneration, such as autologous bone.¹⁷ Bone substitutes or mixtures of them.¹⁸⁻²⁰ Usage of these bone substitutes depends on the location and size of the cystic lesions, with considerations towards functional and aesthetic aspects. The second option is based on the regeneration from the initial clot formed.^{21,22} without any addition of filling substances, studies have shown that if the size of the cyst is 2 cm or less the healing from initial clot is mostly uneventful.²³ Studies are also available for the usage of PRF after enucleation and its success rate on the large cysts is still needs to be studied elaborately.²⁴ All these available manoeuvres have their own merits and demerits, amidst available treatment options and researches, single best option for management of large periapical cyst is still contentious. Here in this presented case patient’s own cortical bone which was removed to gain access to cyst cavity was re-used, adapted to its original site, fixed with microplates and, thus, eliminated the usage of any of the bone substitutes or fillers in any form. This is necessary to keep in mind that bone fillers and substitutes are foreign bodies, so in clinical settings chances of rejection, unpredictable resorption and occasional inflammatory foreign body reactions may occur.²⁵ Autogenous bone graft is also an accepted modality in jaw defects of various sizes but it requires another surgical site to harvest the

bone graft.²⁶ So, in our case we followed standard enucleation technique for the large periapical cyst and additionally shed light on preservation of cortical bone using microplates and screws. This technique seems to us a novel and new technique nowhere documented in the literature so far to the best of our knowledge. Preservation of cortical bone should be a mandate consideration in proportionately large cysts like in this case.

Indications to consider the preservation of cortical bone can be delineated as follows: large intra bony cysts without dehiscence, or large intra bony cyst with partial dehiscence of buccal or labial cortical bone, and large intra bony cysts with intact but papery thin cortical bone.

The advantages documented in our technique are preservation of cortical bone, restoration of natural bone contour, healing by primary intention with its all advantages.

The important surgical precaution for this procedure is complete haemostasis in intra bony cavity which is necessary to prevent postoperative infection within the bone cavity.

CONCLUSION

Based on the report, we suggest that preservation of cortical bone can be considered in cases presenting with large periapical cysts without bony dehiscence or partial bony dehiscence or with thinned out but intact plate.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

- Manwar NU, Agrawal A, Chandak MG. Management of infected radicular cyst by surgical approach. *Int J Dental Clinics.* 2011;3:75-6.
- Macintyre DR, Speculand B. Autogenous bone grafting for persistent maxillary cyst cavities. *Br Dent J.* 1983;155(8):273-6.
- Belli E, Longo B, Balestra FM. Autogenous platelet-rich plasma in combination with bovine-derived hydroxyapatite xenograft for treatment of a cystic lesion of the jaw. *J Craniofac Surg.* 2005;16(6): 978-80.
- Marx RE. Platelet-rich plasma: evidence to support its use. *J Oral Maxillofac Surg.* 2004;62(4):489-96.
- Marx RE, Carlson ER, Eichstaedt RM, Schimmele SR, Strauss JE, Georgeff KR. Platelet-rich plasma: Growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998;85(6):638-46.
- Ettla T, Gosau M, Sader R, Riechert TE. Jaw cysts. Filling or no filling after enucleation? A review. *J Cranio Maxillofac Surg.* 2012;40:485-90.
- Grossman L. *Endodontic practice.* 11th edition. Philadelphia. 1988;194-6.
- Ertas U, Yavuz MS. Interesting eruption of 4 teeth associated with a large dentigerous cyst in mandible by only marsupialization. *J Oral Maxillofac Surg.* 2003;61:1.
- Pogrel MA. Treatment of keratocysts: The case for decompression and marsupialization. *J Oral Maxillofac Surg.* 2005;63:1667-73.
- Peterson LJ. Let's say what we cut. *Oral Surg Oral Med Oral Pathol.* 1993;76:1.
- Gardner DG, Pecak AM. The treatment of ameloblastoma based on pathologic and anatomic principles. *Cancer.* 1980;46:2514-9.
- Pogrel MA, Jordan RC. Marsupialization as a definitive treatment for the odontogenic keratocyst. *J Oral Maxillofac Surg.* 2004;62:651-5.
- Castro-Núñez J. Decompression of odontogenic cystic lesions: Past, present, and future. *J Oral Maxillofac Surg.* 2016;74:104.
- Blanas N, Freund B, Schwartz M, Furst IM. Systematic review of the treatment and prognosis of the odontogenic keratocyst. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2000;90:553-8.
- Tolstunov L, Treasure T. Surgical treatment algorithm for odontogenic keratocyst: Combined treatment of odontogenic keratocyst and mandibular defect with marsupialization, enucleation, iliac crest bone graft, and dental implants. *J Oral Maxillofac Surg.* 2008;66:1025-36.
- Ettla T, Gosau M, Saderb R, Reicherta ET. Jaw cysts - Filling or no filling after enucleation? A review. *J Cranio Maxillofac Surg.* 2012;40(6):485-93.
- Macintyre DR, Speculand B. Autogenous bone grafting for persistent maxillary cyst cavities. *Br Dent J.* 1983;155(8):273-6.
- Belli E, Longo B, Balestra FM. Autogenous platelet-rich plasma in combination with bovine-derived hydroxyapatite xenograft for treatment of a cystic lesion of the jaw. *J Craniofac Surg.* 2005;16(6):978-80.
- Marx RE. Platelet-rich plasma: evidence to support its use. *J Oral Maxillofac Surg.* 2004;62(4):489-96.
- Marx RE, Carlson ER, Eichstaedt RM, Schimmele SR, Strauss JE, Georgeff KR. Platelet-rich plasma: Growth factor enhancement for bone grafts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998;85(6):638-46.
- Santamaría J, García AM, de Vicente JC, Landa S, López-Arranz JS. Bone regeneration after radicular cyst removal with and without guided bone regeneration. *Int J Oral Maxillofac Surg.* 1998;27(2):118-20.
- Chiapasco M, Rossi A, Motta JJ, Crescentini M. Spontaneous bone regeneration after enucleation of large mandibular cysts: a radiographic computed analysis of 27 consecutive cases. *J Oral Maxillofac Surg.* 2000;58(9):942-8.

23. Van Doorn ME. Enucleation and primary closure of jaw cysts. *Int J Oral Surg.* 1972;1:17-25.
24. Carlson NE, Roach RB. Platelet-rich plasma: clinical applications in dentistry. *J Am Dent Assoc.* 2002;133:1383-6.
25. Cornell CN. Osteoconductive materials and their role as substitutes for autogenous bone grafts. *Orthop Clin North Am.* 2019;30:591-8.
26. Hall HD, Phillips RM, Chase DC. Bone grafts of large cystic defects in the mandible. *J Oral Surg.* 1971;29:146-50.

Cite this article as: Ahmed SS, Kumar R, Rahman T, Ansari MK. Management of large mandibular periapical cyst by cortical bone preservation -a case report. *Int J Otorhinolaryngol Head Neck Surg* 2021;7:1354-7.