CASE SERIES

Cyst decompression for large peri-radicular lesions: A case report

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Abstract

Management of large peri-radicular lesions poses a unique challenge to the clinicians. Conventional treatment approaches include non-surgical root canal treatment (NSRCT) along with cyst enucleation and endodontic surgery. On the contrary, decompression strategies are conservative procedures resulting in predictable healing outcomes. This clinical report presents two cases of large peri-radicular lesions that were managed by decompression procedures along with NSRCT. At one year follow-up, both cases demonstrated significant reduction in lesion size and evidence of periapical bone healing on two dimensional radiographs. Decompression procedures for large peri-radicular lesions is a low cost and conservative approach as opposed to conventional treatment. However, further research is required in this aspect as no standardized protocol exists for decompression procedures.

Keywords: Surgical decompression, endodontics, peri-apical cyst.

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Introduction

The size of a periapical lesion is an important prognostic factor which negatively impacts the outcome of non-surgical root canal treatment (NSRCT).[1-2] The incidence of cyst among periapical pathologies ranges from 6%-54%.[3,4] Furthermore, cysts are classified into "true" or "bay" depending on the communication of the cyst lining with the root canal lumen.[4] It is assumed that true cyst are self-sustaining entities that do not heal after NSRCT.[5] Larger lesions >10mm have three times greater probability of being diagnosed as a cyst as compared to smaller lesions.[5] This implies that additional surgical interventions for larger periapical lesions are required, especially when lesion attains the critical size of 10mm.[5]

This report illustrates two cases of large cystic periapical lesions which were managed through NSRCT with decompression therapy utilizing standard protocol as described previously.[5]

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Case Report #1

A young healthy male was referred to the Dental Clinics of Aga Khan University Hospital, Karachi in January 2022 for the management of large radiolucent lesion associated with mandibular incisors. On intra-oral examination, tooth # 41 was found to be tender. Orthopantomogram (OPG) revealed a large radiolucency associated with tooth # 31-42. Sensibility testing of tooth #41 showed a negative response to both cold and electric pulp tests, while tooth #31,42 responded positive. Cone Beam Computed Tomography (CBCT) scan showed a partially resorbed buccal cortical plate adjacent to tooth #41 as shown in figure 1a-c. The size of radiolucency measured 6 x 8 mm at its greatest dimension. Based on these observations, a diagnosis of necrotic tooth with symptomatic apical periodontitis was made for tooth # 41.

Several treatment options were discussed with the patient including NSRCT only, NSRCT with cyst decompression or extraction of tooth followed by prosthetic replacement. The patient opted for NSRCT with cyst decompression for tooth #41.

NSRCT was initiated in tooth #41 as shown in figure 1d. After cleaning and disinfection of the root canals, a calcium hydroxide based intra-canal medicament was placed for

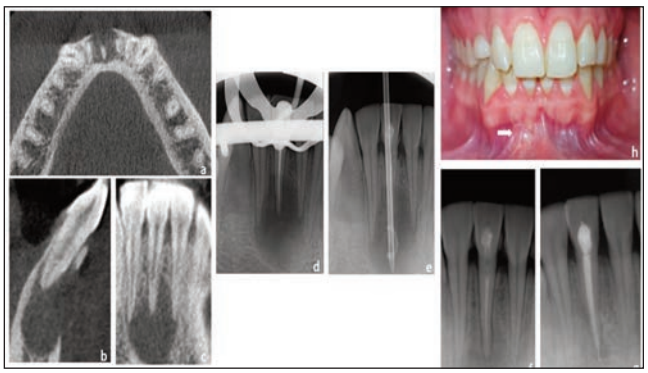

Figure-1: (a-h): a,b,c) Pre-operative CBCT scan showing large radiolucent lesion surrounding apices of #41,42. Also note the absence of buccal cortical plate. d) Initiation of non-surgical root canal treatment #41. e) Periapical radiograph taken to verify the position of decompression tube. f) Intracanal medicament placement in tooth#41. g) Periapical radiograph demonstrating evidence of periapical healing in tooth #41. h) White arrow demonstrating complete healing of the surgical site with formation of scar tissue #41.

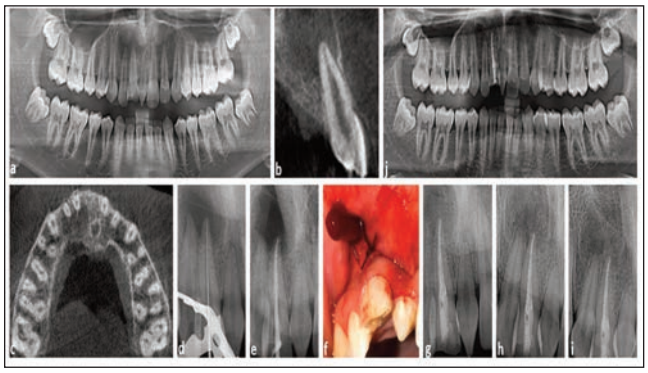

Figure-2: (a-j): a) Orthopantomogram demonstrating radiolucent lesion associated with apices of #11,12. b,c) Sagittal and axial section of a CBCT scan showing a circumscribed periapical radiolucency associated with #11,12. d,e) Initiation of non-surgical root canal treatment. f) Decompression tube in place. g,h,i) Periapical radiograph at 3 months, 6 months and 9 months follow-up periods showing progressive signs of periapical healing. j) Orthopantomogram demonstrating signs of periapical bony healing in # 11.

two weeks. On the same visit, tube for cyst decompression was placed. A full thickness mucoperiosteal flap was raised after giving a semilunar incision around the apices of #41,42. The labial cortical plate was found to be perforated, and the surrounding granulation tissue was curetted. The contents of lesion were aspirated using a 10cc disposable syringe. The content was straw-coloured semi-solid fluid mixed with blood and necrotic debris. A nasogastric tube was cut to approximately 28 mm in length and positioned in the lesion cavity such that half of its length is visible in oral cavity. A syringe needle was placed in the tube and radiograph was exposed to ensure the position and patency of tube as shown in figure 1e. The decompression tube was stabilized in place with silk sutures while the remaining flap was closed with vicryl sutures. The patient was advised to irrigate the decompression tube with 0.2% chlorhexidine mouthwash daily using a disposable syringe. Unfortunately, the patient did not attend the two weeks follow-up visit for obturation. After three months, the patient presented for a follow-up visit. On examination, the decompression tube was patent and intact. Periapical radiograph showed signs of healing in # 41 with intra-canal medicament inside the root canal shown in figure 1f. Tooth #41 was obturated and the access cavity was sealed with flowable composite. On the same visit, the decision to remove the tube was made. At six-month follow-up period, the surgical site was completely healed with formation of scar tissue as shown in figure 1h. A periapical radiograph was obtained at one year follow-up period, which showed significant reduction in the lesion size and evidence of bony healing as shown in figure 1g.

Case Report #2

A young healthy male presented to the Dental Clinics of Aga Khan University Hospital, Karachi in August 2021 with complaint of intermittent swelling in upper front teeth after a history of trauma. Upon intraoral examination, tooth #11 was buccally positioned with uncomplicated crown fracture. On sensibility testing tooth #11 had a negative response to cold and electric pulp test, while the adjacent teeth # 12,21,22 responded positively.

OPG showed a periapical radiolucency around the apices of tooth #11,12 as shown in figure 2a. CBCT scan revealed a thin buccal cortical plate as shown in figure 2b,c. The size of radiolucency measured 10 x 8 mm at its greatest dimension. Based on these observations, a diagnosis of necrotic tooth with symptomatic apical periodontitis was made for tooth #11. Treatment options as previously described were discussed with the patient. The patient opted for NSRCT with cyst decompression.

The same clinical protocol was followed as described previously for NSRCT and decompression for tooth#11 as shown in figure 2d,e,f. The patient was instructed for a follow-up after a week, but the patient reported earlier on fifth post operative day with complaint of tube blockage. The clot was removed, and tube was irrigated to maintain patency. Furthermore, on the second follow-up visit i.e. on 10th post operative day, the patient presented with the complaint of dislodged tube. Upon examination, the soft tissue had healed considerably and re-attempt to place the tube was not made. Following this, the patient was examined every three months to assess healing clinically and radiographically. At one year follow-up, an increase in the bone density and evidence of trabecular bony formation was observed as shown in figure 2g,h,i.

Discussion

Cyst is a histological term and definitive diagnosis cannot be made on the basis of clinical and radiographic features only. However, according to Caliskan M. a preliminary diagnosis of a cyst may be assumed if the following preconditions are met. (i) Lesion involves teeth with necrotic pulp (ii) the cysts aspirate is straw coloured (iii) and contains cholesterol crystals (iv) the radiographic lesion size is 200 mm^2 or more.[6] Both the reported cases had a large well circumscribed radiolucency associated with necrotic teeth. The fluid aspirate collected during the decompression procedure was straw coloured. Based on these findings, a preliminary diagnosis of radicular cyst was assumed in both cases.

The exact mechanism for cyst healing is poorly understood. It has been suggested that bay cyst heals by apoptosis once the causative stimulus is removed.[1,7] True cysts due to their self-sustaining nature are unlikely to heal after NSRCT and therefore require surgical intervention.[5] Once the true cyst is established, it is claimed that cystic fluid exerts pressure

on the surrounding bone which activates the release of cytokines and chemokines such as interlukin-1a (IL-1a) from its epithelial cells.[8-10] Other experts suggest that residual bacterial colonies in the cyst lumen may be the reason for a cyst to persist after NSRCT.[10] Non-microbial cause such as cholesterol crystals are also attributed as a reason for a non-healing cysts.[5]

Therefore, a decompression procedure can offer several advantages, (i) during this procedure the epithelial lining of the cyst will be disrupted as suggested by Natkin E.[9] (ii)the procedure relieves the intra-cystic pressure which inhibits the expression of IL-1a.[8] (iii) decompression device further acts as a drainage measure which removes bacterial colonies endotoxins and cholesterol crystals from the cyst lumen.(iv) Finally drainage allows for efficient cell migration and fibroplasia to occur for enhanced healing.[9]

Several devices have been advocated for decompression procedures these include rubber dam, iodoform gauze, removable partial denture, polyvinyl tubing and radio opaque tube in acrylic base.[5] In this case report, nasogastric tube has been utilized for this purpose as it is easily available and sterile. Nasogastric tube is a rigid tube and it can be easily adjusted to the desired length according to the surgical site. Furthermore, nasogastric tube can be readily sutured to surrounding mucosa with easy insertion and removal.[5]

Conclusions

Decompression along with NSRCT is least invasive and reliable procedure for the successful management of large peri-radicular lesions. However, further research is warranted as no standardized protocol exists for the decompression procedures.

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References

1. Tian FC, Bergeron BE, Kalathingal S, Morris M, Wang XY, Niu LN, et al. Management of large radicular lesions using decompression: a case series and review of the literature. J Endod. 2019;45:651-9. doi:10.1016/j.joen.2018.12.014.
2. Wang FM, Liang H, Glickman GN, Gutmann JL. Use of a Penrose drain for decompression of a large periapical lesion: a case report with 4.5-year follow-up. J Endod. 2024;50:1521-6. doi:10.1016/j.joen. 2024. 07.005.
3. Nair PNR, Pajarola G, Schroeder HE. Types and incidence of human periapical lesions obtained with extracted teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1996;81:93-102. doi:10.1016/S1079-2104(96)80156-9.
4. Ricucci D, Rôças IN, Hernández S, Siqueira JF Jr. "True" versus "bay" apical cysts: clinical, radiographic, histopathologic, and histobacteriologic features. J Endod. 2020;46:1217-27. doi:10.1016/j.joen.2020.05.025.
5. Umer F, Javed F. Decompression strategy for critical-sized lesions: a case series and literature review. Aust Endod J. 2021;47:731-40. doi:10.1111/aej.12536.
6. Çalışkan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: a clinical review. Int Endod J. 2004;37:408-16. doi:10.1111/j.1365-2591.2004.00809.x.
7. Chamani A, Moushekhian S, Zarei M, Shakiba R, Davarian MH. Integrated management of a large radicular cyst: a case report on efficacy of decompression and conservative approaches. Clin Case Rep. 2025;13. doi:10.1002/ccr3.70070.
8. Talpoș-Niculescu R, Veja I, Neagu CS, Rusu LC, Talpoș-Niculescu Ș, Popa M, et al. Nonsurgical endodontics and decompression-based management of extensive periapical cystic-like lesions: a comparative and radiological study with a two-year follow-up. J Clin Med. 2025;14:6127. doi:10.3390/jcm14176127.
9. Natkin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence, and treatment of periapical cysts and granulomas. Oral Surg Oral Med Oral Pathol. 1984;57:82-94. doi:10.1016/0030-4220(84)90267-6.
10. Lin LM, Ricucci D, Lin J, Rosenberg PA. Nonsurgical root canal therapy of large cyst-like inflammatory periapical lesions and inflammatory apical cysts. J Endod. 2009; 35:607-15. doi:10.1016/j.joen.2009.02. 012.

Author Contribution:
FU: Concept, supervision, data analysis, interpretation and critical review.
MAM: Design, data collection, processing, data analysis, interpretation, literature review, writing and critical review.
SH & SJ: Design, data collection, processing, data analysis, interpretation, literature review and writing.