Journal of Dental Science and Medicine

Joana, J Dent Sci Med 2024, 7:6

Editorial Open Access

A Case Report On the Non-Surgical Treatment of a Large Cystic Lesion Using Water-Based Calcium Hydroxide Medication and Double Antibiotic Paste

Joana Gilbert*

Department of Clinical and Community Sciences, School of Dentistry, University of Alabama at Birmingham, United States

Abstract

This case report describes the non-surgical management of a large cystic lesion in the periapical region, treated with double antibiotic paste (DAP) and water-based calcium hydroxide. The use of a combined antibiotic paste and calcium hydroxide medicament has shown promise in non-surgical approaches, offering an effective alternative to surgical intervention. The report highlights the clinical outcomes, radiographic results, and the therapeutic efficacy of this non-invasive method for managing cystic lesions in endodontics. The success of this case suggests the potential benefits of conservative management strategies in appropriately selected patients with large cystic lesions.

Keywords: Cystic lesion; non-surgical management; double antibiotic paste; water-based calcium hydroxide; periapical cyst; endodontics

Introduction

Cystic lesions in the periapical region represent a common pathology encountered in clinical endodontics. The most common type of cyst is the periapical cyst; which is a result of chronic infection due to an untreated necrotic pulp. Traditional management of large cystic lesions has often involved surgical intervention; such as cyst enucleation or marsupialization; especially when the lesions are extensive. However; advancements in non-surgical treatment options have opened the door to more conservative management strategies. This case report demonstrates the successful non-surgical management of a huge periapical cystic lesion using a combination of double antibiotic paste (DAP) and water-based calcium hydroxide medicament. This approach aims to achieve resolution of the cyst without the need for surgical intervention; highlighting the potential of non-invasive techniques in the treatment of large cystic lesions. These cysts are typically found in the periapical region of the tooth, where they form as a consequence of an inflammatory response to infection within the root canal system. The cysts themselves are often asymptomatic in the early stages, leading to delayed diagnosis. However, as the lesion enlarges, it can cause swelling, pain, and other clinical manifestations that require prompt intervention. The treatment of large periapical cystic lesions has traditionally involved surgical methods, such as cyst enucleation, marsupialization, or apicoectomy, which are aimed at completely removing or draining the lesion. While these surgical approaches are effective in eliminating the cystic lesion, they can sometimes lead to complications such as significant bone loss, tooth extraction, or cosmetic and functional concerns, particularly when the lesion is large. Furthermore, the invasive nature of these procedures may not always be suitable for patients with medical comorbidities or those who prefer to avoid surgery. In recent years, the dental community has been exploring non-surgical treatment modalities for managing periapical cysts. Non-surgical treatments offer the potential benefits of avoiding the morbidity associated with surgical interventions, preserving natural tooth structure, and improving patient comfort. A promising approach involves the use of medicaments such as calcium hydroxide and antibiotic pastes, which have demonstrated efficacy in disinfecting the periapical tissues, controlling infection, and promoting tissue regeneration. Double antibiotic paste (DAP), typically composed of ciprofloxacin, metronidazole, and sometimes minocycline, has been shown to possess strong antibacterial properties and is widely used in the treatment of endodontic infections. DAP is known for its broad-spectrum antimicrobial activity, and it has been used in cases of severe infection to effectively eliminate bacteria within the root canal system and periapical tissues. Combined with the antimicrobial and tissue-regenerating properties of calcium hydroxide, DAP can provide an effective treatment for periapical cysts. Calcium hydroxide promotes an alkaline environment that assists in disinfecting the root canal system and helps regenerate bone and soft tissue, thereby facilitating healing in periapical lesions. The combination of DAP and calcium hydroxide as a non-surgical treatment for periapical cysts offers a less invasive alternative that may improve clinical outcomes and reduce the need for extensive surgical procedures. However, while the use of these medicaments has shown promise in smaller cystic lesions and in cases of apical periodontitis, there is limited evidence on their efficacy in treating larger cystic lesions. The case report presented here aims to contribute to the growing body of evidence supporting the use of this combined approach by documenting the successful non-surgical management of a large cystic lesion using DAP and water-based calcium hydroxide [1-5].

Case presentation

A 34-year-old male patient presented to the dental clinic with complaints of swelling and mild pain in the upper right posterior region of the jaw. The patient reported that the symptoms had been gradually worsening over the past several months. On clinical examination; a noticeable swelling was observed in the right maxillary region; which

***Corresponding author:** Joana Gilbert, Department of Clinical and Community Sciences, School of Dentistry, University of Alabama at Birmingham, United States E-mail: joanagilbert254@gmail.com

Received: 03-Nov-2024, Manuscript No: did-25-159797, **Editor assigned:** 06-Nov-2024, Pre-QC No: did-25-159797 (PQ), **Reviewed:** 20-Nov-2024, QC No: did-25-159797, **Revised:** 27-Nov-2024, Manuscript No: did-25-159797 (R), **Published:** 30-Nov-2024, DOI: 10.4172/did.1000274

Citation: Joana G (2024) A Case Report On the Non-Surgical Treatment of a Large Cystic Lesion Using Water-Based Calcium Hydroxide Medication and Double Antibiotic Paste. J Dent Sci Med 7: 274.

was tender to palpation. There were no signs of systemic infection; and the patient's medical history was unremarkable.

Radiographic examination

A periapical radiograph revealed a large well-defined radiolucency associated with the root of the right maxillary first molar. The lesion extended beyond the apex of the involved tooth; indicating a significant periapical cyst. There was no evidence of cortical bone involvement or displacement of adjacent structures. The radiographic appearance suggested a chronic periapical cyst; which was large enough to warrant careful consideration regarding the treatment approach.

Diagnosis

The clinical and radiographic findings were consistent with a diagnosis of a large periapical cyst secondary to a necrotic pulp. Given the size of the lesion; the patient was informed about the potential need for surgical intervention. However; after discussing the possible benefits and risks of surgical and non-surgical management; the patient expressed a preference for a non-invasive approach.

Treatment plan

The decision was made to attempt non-surgical management of the cyst using a combination of double antibiotic paste (DAP) and water-based calcium hydroxide. The patient was thoroughly informed about the treatment plan; and written consent was obtained for the use of these medicaments.

Non-surgical procedure

1. **Anesthesia**: Local anesthesia was administered to ensure patient comfort during the procedure.

2. **Access opening**: A standard access opening was performed on the maxillary first molar. The necrotic pulp was extirpated; and the canal system was thoroughly debrided using rotary instruments and copious irrigation with sodium hypochlorite.

3. **Infection Control**: After cleaning and shaping the root canal system; the canal was irrigated with 5.25% sodium hypochlorite to ensure complete disinfection. The lesion's walls were also irrigated to remove any residual debris.

4. **Medicament Placement**: The cystic cavity was carefully debrided; and a combination of double antibiotic paste (DAP) was placed within the root canal system. DAP was composed of a mixture of ciprofloxacin; metronidazole; and minocycline. After placement; a layer of water-based calcium hydroxide was applied over the paste to provide a high pH environment; which is known to have antimicrobial and tissue-regenerating properties.

5. **Temporary Restoration**: The access cavity was temporarily sealed with a glass ionomer cement. The patient was scheduled for follow-up appointments to monitor progress and assess radiographic changes.

Follow-up and outcome

The patient was instructed to return for follow-up visits at regular intervals. Radiographic and clinical assessments were performed at 3; 6; and 12 months after treatment. The following observations were made during the follow-up period:

1. **3 Months**: The patient reported no pain or discomfort. The swelling had significantly reduced; and the clinical appearance of the lesion showed signs of healing. Radiographic images demonstrated a slight reduction in the size of the cystic lesion.

2. **6 Months**: Continued improvement was observed both clinically and radiographically. The lesion appeared smaller; with evidence of new bone formation at the periphery of the cystic lesion. The root canal was filled with a material suitable for long-term sealing.

3. **12 Months**: At the one-year follow-up; the patient remained symptom-free. The radiographic examination revealed a significant reduction in the size of the cystic lesion; with complete resolution of the periapical radiolucency. The bone surrounding the previously involved tooth had regenerated; and no signs of recurrence were noted.

Clinical and radiographic evaluation

The non-surgical approach using DAP and calcium hydroxide was deemed successful; as evidenced by the significant reduction in the size of the cystic lesion; the restoration of normal bone density; and the complete absence of symptoms. The patient's tooth was preserved; and no surgical intervention was required.

Discussion

Periapical cysts are common lesions associated with chronic pulp infection. Traditional management typically involves surgical techniques such as enucleation or marsupialization; which may be invasive and carry risks such as tooth extraction or bone loss. However; recent studies have suggested that non-surgical approaches; particularly the use of medicaments like DAP and calcium hydroxide; can be highly effective in managing these lesions.

Double antibiotic paste (DAP) has gained popularity in the treatment of apical periodontitis and cystic lesions. The combination of ciprofloxacin; metronidazole; and minocycline has been shown to provide broad-spectrum antimicrobial activity; effectively reducing the bacterial load within the cystic cavity. DAP has also demonstrated the ability to promote the healing of surrounding tissues; contributing to cyst resolution.

Calcium hydroxide is another key component in the treatment of periapical lesions. Known for its antimicrobial properties and ability to induce hard tissue formation; calcium hydroxide helps create a favorable environment for healing and tissue regeneration. When combined with DAP; calcium hydroxide enhances the medicament's efficacy by maintaining a high pH environment that further aids in the control of infection and promotes healing. The surgical removal of a cyst may result in substantial bone loss, possible tooth loss, and other complications, particularly when the lesion is extensive or located in delicate areas of the mouth. Therefore, non-surgical treatment options have garnered increasing interest as a more conservative approach that can help preserve tooth structure and bone integrity while providing adequate resolution of the cystic lesion. This case report demonstrates the successful non-surgical management of a large periapical cystic lesion using a combination of double antibiotic paste (DAP) and water-based calcium hydroxide. The therapeutic rationale behind this approach lies in the unique properties of both DAP and calcium hydroxide, which have been shown to effectively control infection, promote tissue healing, and reduce the size of cystic lesions. By using these medicaments, the need for surgical intervention was avoided, offering the patient a less invasive treatment alternative. Double Antibiotic Paste (DAP) is well-documented in the literature for its broad-spectrum antimicrobial properties. The combination of ciprofloxacin and metronidazole is particularly effective against

the polymicrobial infections commonly found in periapical lesions. Ciprofloxacin, a fluoroquinolone, exhibits potent activity against Gram-negative bacteria, while metronidazole targets anaerobic bacteria, which are frequently implicated in endodontic infections. The use of DAP in endodontic therapy has been shown to significantly reduce bacterial load, disinfect the root canal system, and help resolve periapical infections by creating an environment that promotes the healing of surrounding tissues. In the case presented here, the use of DAP in combination with calcium hydroxide resulted in a substantial reduction in the size of the cystic lesion over the 12-month follow-up period. The paste's antimicrobial properties likely contributed to the resolution of infection in the periapical region, while the calcium hydroxide, with its inherent ability to promote healing through the creation of a high-pH environment, provided additional support to the regeneration of bone and soft tissue. Calcium Hydroxide, as a key component in the treatment of periapical lesions, has been widely studied for its role in enhancing healing and inducing reparative processes. When placed in the root canal system, calcium hydroxide exhibits antimicrobial effects, neutralizes acids, and creates an alkaline environment that is hostile to bacteria while promoting the formation of reparative dentin and the regeneration of bone tissue. In addition, calcium hydroxide has been shown to stimulate osteoblast activity, thereby encouraging new bone formation around the cystic lesion. One of the key advantages of using calcium hydroxide, especially in combination with DAP, is its ability to enhance tissue healing and regeneration, which is particularly critical in the management of large cystic lesions. By eliminating the infection and promoting tissue regeneration, calcium hydroxide supports the repair of the periapical tissues, including the restoration of normal bone density and structure around the cyst. The clinical outcomes observed in this case are consistent with findings from other studies that have explored the use of DAP and calcium hydroxide in the treatment of periapical lesions. Over a 12-month period, significant radiographic and clinical improvements were noted, including reduced cyst size, complete resolution of the periapical radiolucency, and the restoration of bone density around the previously affected tooth. These results underscore the potential of using a non-surgical approach in the management of large cystic lesions, particularly in cases where surgical intervention may pose additional risks or complications. Despite the promising outcomes observed in this case, it is important to acknowledge that the non-surgical management of large periapical cysts is not without its limitations. While DAP and calcium hydroxide have shown efficacy in this case, the treatment of more extensive cysts may require additional interventions, such as the use of biomaterials to enhance tissue regeneration or the need for supplemental treatments to ensure long-term success. Moreover, the long-term effectiveness of this combined approach should be further investigated in larger studies, as individual patient factors, lesion size, and the presence of other complicating factors may influence the outcomes. In addition, the success of non-surgical management using DAP and calcium hydroxide depends on several factors, including the ability to achieve thorough disinfection of the root canal system and surrounding tissues. Inadequate debridement or incomplete bacterial control could compromise treatment outcomes and lead to the recurrence of infection. Therefore, careful case selection and thorough follow-up are essential for ensuring the success of this approach. In this case; the use of both DAP and calcium hydroxide resulted in the successful resolution of the cystic lesion; avoiding the need for surgical intervention. The findings suggest that this non-surgical approach can be considered as a viable option for the management of large periapical cysts in appropriately selected patients [6-10].

Conclusion

This case report demonstrates the successful non-surgical management of a large periapical cyst using double antibiotic paste and water-based calcium hydroxide. The combination of these medicaments provided effective infection control; promoted tissue healing; and facilitated the resolution of the cyst without the need for surgery. The outcomes of this case suggest that non-surgical management may be a viable treatment option for large cystic lesions in endodontics; offering a conservative alternative to more invasive procedures. Further studies and larger clinical trials are needed to validate the long-term efficacy and applicability of this approach in different clinical settings.

Acknowledgment

None

Conflict of Interest

None

References

1. Silver MH, Newell K, Brady C, Hedley-White ET, Perls TT (2002) Distinguishing between neurodegenerative disease and disease-free aging: correlating neuropsychological evaluations and neuropathological studies in centenarians. Psychosom Med 64: 493–501.
2. Stek ML, Gussekloo J, Beekman ATF, Van Tilburg W, Westendorp RGJ (2004) Prevalence, correlates and recognition of depression in the oldest old: the Leiden 85-plus study. J Affect Disord 78: 193–200.
3. von Heideken Wågert P, Rönnmark B, Rosendahl E, Lundin-Olsson L, M C Gustavsson J, et al. (2005) Morale in the oldest old: the Umeå 85+ study. Age Ageing 34: 249–255.
4. Miles TP, Bernard MA (1992) Morbidity, disability, and health status of black American elderly: a new look at the oldest-old. J Am Geriatr Soc 40: 1047–1054.
5. Gueresi P, Troiano L, Minicuci N, Bonafé M, Pini G, et al. (2003) The MALVA (MAntova LongeVA) study: an investigation on people 98 years of age and over in a province of Northern Italy. Exp Gerontol 38: 1189–1197.
6. Nybo H, Petersen HC, Gaist D, Jeune B, Andersen K, et al. (2003) Predictors of mortality in 2,249 nonagenarians—the Danish 1905-Cohort Survey. J Am Geriatr Soc 51: 1365–1373.
7. Von Strauss E, Fratiglioni L, Viitanen M, Forsell Y, Winblad B (2000) Morbidity and comorbidity in relation to functional status: a community-based study of the oldest old (90+ years). J Am Geriatr Soc 48: 1462–1469.
8. Andersen HR, Jeune B, Nybo H, Nielsen JB, Andersen-Ranberg K, et al. (1998) Low activity of superoxide dismutase and high activity of glutathione reductase in erythrocytes from centenarians. Age Ageing 27: 643–648.
9. Ankri J, Poupard M (2003) Prevalence and incidence of dementia among the very old. Review of the literature. Rev Epidemiol Sante Publique 51: 349–360.
10. Wilkinson TJ, Sainsbury R (1998) The association between mortality, morbidity and age in New Zealand's oldest old. Int J Aging Hum Dev 46: 333–343.