Surgical Management of Large Radicular Cyst Associated with Mandibular Deciduous Molar Using Platelet-rich Fibrin Augmentation: A Rare Case Report

Abstract

Radicular cysts arising from deciduous teeth are rare and usually cause a large bony defect. Autologous platelet-rich fibrin (PRF) is an easily available healing biomaterial in oral surgical defect with the new perspective of accelerated healing of a large bony defect. The present case is of unusually large radicular associated with neglected carious mandibular deciduous second molar in 10-year-old girl and its surgical management with PRF augmentation as a healing biomaterial in the bony defect. One-year follow-up showed uneventful healing and eruption of succedaneous tooth. Healing was relatively faster and facilitated by PRF placement. Furthermore, the importance of anticipatory guidance about the treatment of diseased primary teeth and their preservation gets highlighted.

Keywords: *Anticipatory guidance, platelet-rich fibrin, primary teeth, radicular cyst*

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Introduction

Radicular cysts are rarely associated with deciduous teeth, accounting for 0.5%–3.3% of all radicular cysts.[1] They usually cause a large bony defect, requiring healing augmentation.[2] Several materials are used for healing augmentation, among which platelet-rich fibrin (PRF) is the second-generation platelet concentrate enriched with growth factors, where platelets lie between top layer of acellular plasma and red blood cells at bottom. Many growth factors such as platelet-derived growth factor and transforming growth factor are released from PRF.[3] This case report presents an effective use of PRF in surgical management of unusually large radicular cyst with large bony defect in mandible.

Case Report

A 10-year-old female patient reported with the chief complaint of painless swelling in lower left side of her jaw for 15–20 days. The patient's parents gave previous history of dental consultation and symptomatic drug therapy 2 years back. The swelling was diffuse, measuring 3 cm × 3 cm on left mandibular angle region. It was firm and tender on palpation. Intraoral examination showed grossly carious 75. Orthopantomograph revealed a large unilocular radiolucency on periapical aspect of 75, extending to the lower border of mandible, displacing tooth bud of 35 [Figures 1a and 2]. Thinning of buccal cortical plate was evident on occlusal radiograph. The lesion was provisionally diagnosed as radicular cyst. Cystic fluid aspirate was obtained and sent for the histopathological evaluation. Surgical enucleation, followed by placement of autologous PRF as a surgical adjuvant, was planned under general anesthesia. For preparation of PRF, 5 ml of whole venous blood was collected in two sterile Vacutainer tubes without adding anticoagulant. The Vacutainer tubes were then centrifuged for 10 min at the speed of 3000 rpm. Extraction of 75 was done. Cystic site was exposed through intraoral approach and cystic lining was enucleated. Displaced tooth bud of 35 was preserved. PRF was placed in the defect. Hemostasis was achieved and primary closure was done using sutures. The excised cystic mass was submitted for histopathological examination. Histopathological features were consistent with the clinical diagnosis of radicular cyst.

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Sutures were removed after a week. A removable functional space maintainer was given till the eruption of mandibular second premolar [Figure 1b]. The patient was kept under regular clinical and radiographic follow-up. After 3 months of follow-up, oral and radiological examination revealed healing wound and reduction in size of radiolucency. There was recall of 24 months which showed uneventful eruption of mandibular second premolar and complete bone healing [Figures 1c and 3].

Discussion

Radicular cysts, also called as periapical cysts or infected dental cysts, arise from the chronic inflammatory stimulation of epithelial cell rests of Malassez in periodontal ligament. They are rarely associated with primary teeth. However, when associated with primary teeth, they may cause bone resorption reaching large dimensions.[4] As pulp therapy cannot always be successful in primary teeth because of their variant root morphology, cysts in primary dentition may be associated with both treated and untreated teeth.[5,6] Furthermore, pulpotomy medicaments can be regarded as stimulating factors for cyst growth.[7] The healing of hard and soft tissues is mediated by intra- and extra-cellular events regulated by protein signals. Platelets are involved in the process of wound healing through blood clot formation and release of growth factors promoting the healing. The primary objective in healing of surgical wound with large bony defect is the bone regeneration inside the defect to fill the cavity. Various surgical adjuvants used to get best possible clinical results include materials such as autologous bone, allograft, and xenograft (an organic bovine bone) and synthetic materials such as bioactive glass. The mechanism is only related to bone biology and the osteogenic properties of the various filling materials.[8] PRF allows cell migration and proliferation like a fibrin network. It is obtained from anticoagulant-free blood harvest. Many growth factors such as platelet-derived growth factor and transforming growth factor are released from PRF.[3] It is widely used in various fields of oral and maxillofacial, periodontal ear–nose–throat and plastic surgery. Its use in stimulating the healing of surgical wound with large bony defect created by radicular cyst was reported as surgical adjuvant along with allogenous bone graft biomaterial. In the present case, allogeneic bone grafting was not done with the assumption of high healing potential in growing age. Normally, after the periapical surgery, approximately 1 year is required for complete healing, while with the use of PRF, healing occurs fast and complete regeneration of bone takes place in approximately 6 months.[9] Thus, application of autologous PRF as a surgical adjuvant yields new possibilities of enhanced healing and fast functional recovery. It is economical and more effective than any other conventional regenerative materials. However, with the clinical use of PRF as surgical adjuvant, only radiologic evaluation of bony defect is possible. More clinical trials and histologic studies are required to authenticate its stimulating effect in bone healing. It is also important to understand that the effective use of these preparations rich in growth factors depends on the skills and abilities of the

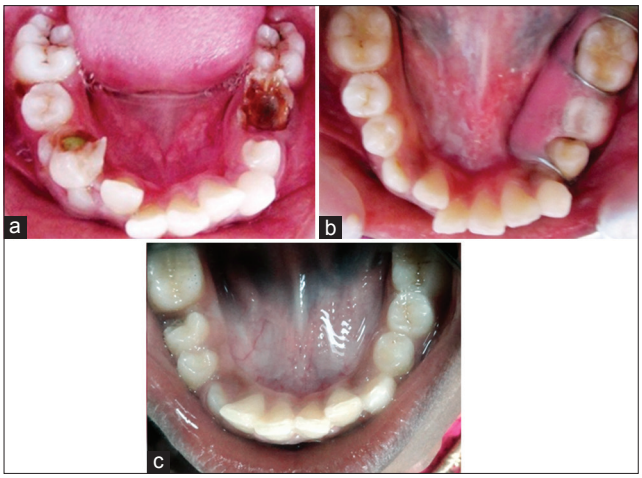

Figure 1: (a) Clinical photograph showing gross caries with 75. (b) Removable functional space maintainer with 75. (c) Follow-up clinical photograph after 1 year showing uneventful eruption of 35

Figure 2: Panoramic radiograph showing large cystic lesion involving 75

Figure 3: Follow-up panoramic radiograph after 24 months showing bone healing and eruption of 35

surgeon to understand, prepare, use, and correctly combine the technologies. With use of PRF, oral and maxillofacial surgery has entered in the era of regenerative medicine. This article highlights the economic use of PRF as surgical adjuvant. Also, as the reported case was from rural area with low socioeconomic status with neglected dental treatment by the parents having predetermined concept of "temporary/falling tooth" for milk teeth, this had led to the development of unusually large-sized cystic lesion. In the present case, the need of dental education of the illiterate families in rural areas with low socioeconomic status gets highlighted. Hence, anticipatory guidance regarding dental caries and their consequences in children remains an essential component of pediatric and preventive dentistry.

Conclusion

Large cystic bony defects warrant possibility of pathological fracture; hence, they should be treated cautiously. The use of autologous PRF as a surgical adjuvant is an innovative, economic method of promoting bone healing. Awareness about dental caries and its consequences is very important for prevention, management, and prognosis of such pathologies in children.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient's parents have given consent for images and other clinical information to be reported in the journal. The patient's parents understand that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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