

Management of Lateral Periodontal Cyst with Platelet Concentrates

Abstract:

A periodontal cyst (LPC) is considered a rare developmental odontogenic cyst, originates from epithelial rests in the periodontal ligament, and is a non-inflammatory cyst on the lateral surface of the root of a vital tooth. This case report features a 22-year-old female who complained of a painful hyperplastic lesion that had been present for two months between the distobuccal site of her maxillary right lateral incisor (#12) and the mesiobuccal site of her maxillary canine (#13). Radiographically, an interproximal periodontal cyst appears on the side of the root and extends to the apex of an involved tooth as a radiolucent area with a well-defined border by a radiopaque line that cannot be differentiated from that of a periodontal abscess. This case report discusses the management of LPC using surgical enucleation with adjunctive use of regenerative platelet concentrate

Key-words: Lateral periodontal cyst, odontogenic cyst, non-inflammatory cyst, L-PRF,

Introduction:

The Lateral Periodontal cyst is a rare type of odontogenic developmental cyst that accounts for less than 0.4% of all odontogenic cysts and is non-keratinized and non-inflammatory and is situated next to or lateral to the roots of teeth.[1]. In 1958, Standish and Shafer first documented the occurrence of lateral periodontal cysts. These types of lesions may cause tooth displacement in one-third of LPCs.[2] LPCs are an uncommon variety of jaw cysts that share histological traits with adult gingival cysts (GCA). Hence, LPCs can also be considered as an intraosseous variation of adult extraosseous gingival cysts.[3]

Radiographically, the cyst shows a "teardrop appearance" which is a characteristic feature of LPC. Often patients with this condition are usually asymptomatic until they are affected by secondary infection. [4-7]. According to the World Health Organization (WHO) classification of odontogenic tumors and cysts (4th Edition, 2017), LPC, Botryoid odontogenic cysts (BOC), and gingival cysts of adult (GCA) have a common histological feature and are classified as

developmental odontogenic cysts except that LPC is unilocular in nature.[8] Teeth more likely affected are [mandibular canines](#), [premolars](#) followed by an anterior segment of the maxilla.[6]

Histologically, a thin, nonkeratinizing layer of squamous or cuboidal epithelium, typically ranging from 1 to 3 cell layers in thickness and resembling the reduced enamel epithelium characterizes the LPC. In an LPC, the epithelial cells occasionally have interstitial fluid between them and have

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tiny, pyknotic nuclei.[1,4,8] Furthermore, localized plaques of fusiform or spindle-shaped epithelial thickenings and transparent cells rich in glycogen have also been observed in the cystic lining. LPCs have a diameter of less than 1 cm, although the rare botryoid variety might appear as a bigger, multilocular radiolucency that extends to the periapical region.[5,9] The lesion is often treated with conservative surgical enucleation and following up the patient over a period of six months to one year, in order to monitor for recurrence.[1,10]

Case Description:

This case report features a 22-year-old female who reported to the department of Periodontology with a painful hyperplastic lesion that was present for two months between the distobuccal site of her maxillary right lateral incisor (#12) and the mesiobuccal site of her maxillary canine (#13). The patient did not have any systemic comorbidities.

On intra-oral examination, the swelling was present between permanent central incisor #11 and lateral incisor #12. While doing a pulp vitality test, #12 was vital and the swelling was non-tender and non-mobile. Further extra oral examination turned up no clinically obvious lymphadenopathy, edema, or asymmetry.

On radiographical examination retained deciduous lateral incisor root stump #52 was present in between permanent central incisor #11 and lateral incisor #12. A well-defined oval shape radiolucency of 1 cm in diameter with corticated borders and apical extension present between the roots of teeth #12 and #13 (fig.1).

A provisional diagnosis of LPC was made based on clinical and radiological findings.

The patient's informed consent was obtained before scaling and root planing were carried out.

Because of the presence of an apical extension of radiolucency visible on the radiograph, intentional Root canal treatment was planned followed by surgical enucleation of LPC.

Surgical Procedure and Follow-Up:

A full-thickness mucoperiosteal triangular flap with a single vertical incision at the distal line angle to the canine was planned. A crevicular incision was made using a 15c bard parker blade and full thickness flap was reflected under

local anesthesia (2% lignocaine with 1:80000 adrenaline) (fig-2). Extraction of deciduous lateral incisor root stump #52 was performed at the same time. A total enucleation of the lesion was done and was checked by using a surgical curette (fig.3).

A 5 ml of venous blood was drawn from the antecubital fossa in a plain vacutainer tube and centrifuge at 2700 rpm for 12 minutes, after centrifugation L-PRF was procured and placed to fill the defect site after surgical enucleation of the lesion.(fig-4)

The flap was approximated by an interrupted suturing technique using triclosan-coated 5-0 absorbable suture and periodontal dressing was placed (fig 5). Post-operative instructions were given and antibiotics (Tab Amoxicillin (500 mg) + Clavulanic acid (125 mg) –1 tab –BD), Analgesics (Tab Aceclofenac (100 mg) + Serratiopeptidase (15 mg) + Paracetamol(325mg)—1 tab –BD for 5 days were prescribed. Suture was removed after 7 days. The patient was recalled at the intervals of 1 month, and 2 month for evaluation, and uneventful healing and complete resolution of lesion was observed.

No indications of the lesion recurring clinically or radiographically were found during follow-up investigations. Bone regrowth could be seen laterally in the defect area on periapical radiography obtained at 8 weeks.(fig-6)

Histopathology Examination:

The soft tissue sample that had been removed was promptly fixed in 10% neutral buffered formalin and sent for histopathological review. Under scanner view section shows a epithelium enclosing the connective tissue stroma. On higher magnification 2 or 3-layered cuboidal epithelium is seen. Few areas show focal thickening. A few cells having clear cytoplasm and a few having abundant glycogen cells are seen. A diagnosis of Lateral Periodontal Cyst was made based on histopathological analysis and clinico-radiological correlation. It was determined to constantly monitor the patient because of the lesion's minimal probability of recurrence.

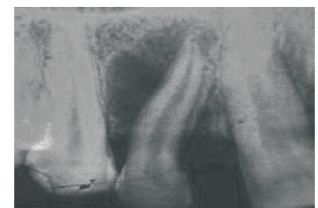
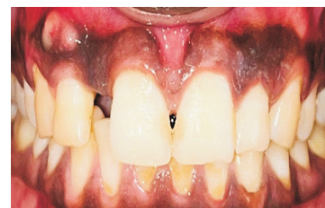
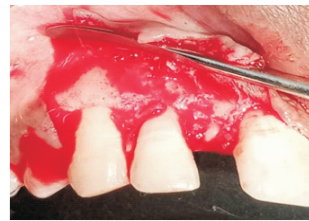


Fig -1 Pre-operative clinical image

Radiographic image



Fig -2
Crevicular incision with single vertical incision



Full thickness mucoperiosteal flap reflected



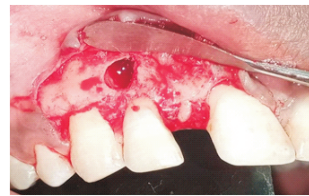
Fig -3
Surgical enucleation of cyst



Removal of cyst



Fig -4
Preparation of L-PRF



The L-PRF was placed to fill the cavity

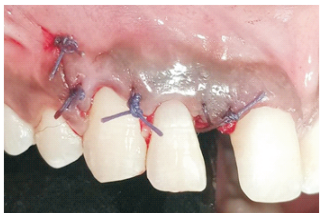


Fig -5
Interrupted suture was given



periodontal dressing placed

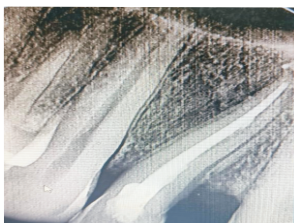


Fig -6
Post operative radiographical view after 2 month



Post operative clinical view after 2 month

Discussion:

LPC is a rare developmental odontogenic cyst which associates with vital teeth and is usually asymptomatic unless the cyst is secondarily infected. About 0.8% to 2% of all cysts are LPC. According to a study of the literature, adults between

the ages of 5th and 7th decade are more likely to have the LPC than those between the ages of the 2nd and 3rd decade. Most frequently found in the mandibular premolar area followed by the maxillary anterior region.^[10] LPCs are related to 3 etiopathological hypotheses: reduce enamel epithelium, remnants of the dental lamina, and the remnant of the cellular rest of Malassez.

According to the first hypothesis, which is confirmed by the immunohistochemistry expression of Proliferating Cell Nuclear Antigen (PCNA), the cyst is bordered with nonkeratinized epithelium resembling the decreased enamel epithelium. Since LPC histopathologically exhibits glycogen-rich clear cells, which are also seen in the dental lamina, the second explanation relates to the remnant of the dental lamina. The third theory proposed that the epithelial remnants of Malassez seen on the surface of the roots, the main site of the LPC, may be involved.

LPC has a distinctive quality in that the cyst appears on radiographs as a well-circumscribed round or teardrop-shaped radiolucent area with a radiopaque rim that is situated laterally to the root of an important tooth. The cyst's diameter is often less than 1 cm. No periodontal ligament space is involved, and no neighbouring teeth's roots are resorbed.^[11,12] When LPC is multicystic, it is also referred to as an "odontogenic botryoid cyst" because its macroscopic and microscopic characteristics resemble a "bunch." (from the Greek word "botrios").^[13]

In this case report, LPC was managed using surgical enucleation and L-PRF and the lesion has shown complete resolution with uneventful healing. L-PRF is an autologous platelet concentrate, consisting of a fibrin matrix enriched with platelets, leukocytes, and a plethora of cytokines and growth factors. Fibrin matrix also contributes to the angiogenic potential of L-PRF. By capturing the released biomolecules, the fibrin matrix ensures a progressive release of these molecules over time. Plethora of growth factors such as Vascular endothelial cell growth factor (VEGF), Fibroblast growth factor-2 (FGF-2), Platelet-derived growth factor (PDGF), and Cytokines upon degranulation. Growth factors and other mediators released by activated platelets play an important role in tissue regeneration and Angiogenesis therefore, platelet concentrates represent therefore a promising therapeutic biomaterial in regenerative medicine.^[14]

Conclusion:

LPC is a rare odontogenic and developmental cyst with mostly surgical enucleation and bone graft filling the defect site. The present case highlights the uses of L-PRF as a regenerative material for the management of LPC. The benefits of L-PRF have extensive and variable applicability of growth factor which enhances wound healing and angiogenic property.[15,16]

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