

Case Report

HYALURONIC ACID ENRICHED WITH AMINOACID USED TO FILL BONE DEFECT AFTER CYST NASOPALATINE ENUCLEATION: A CASE REPORT

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ABSTRACT

In this study, we aim to evaluate the hyaluronic acid enriched with amino acids used to fill bone defects after cyst enucleation. A 56-year-old man was referred by the dentist to the Department of Oral Surgery, University of Chieti-Pescara, concerning a nasopalatine duct cyst. Hyaluronic acid was placed for better healing. The flap was sutured with interrupted suturing with 3-0. The cyst material was sent for histopathological examination. Microscopical examination revealed a cystic cavity covered by pseudostratified epithelium. The clinical, radiologic, and histopathological aspects suggested an infected nasopalatine duct cyst. No adverse reactions were recorded, and the postoperative course was characterized by the absence of pain. Clinical and radiographic controls were performed by digital dental X-ray at 2 and 4 months after cystic enucleation surgery. The X-ray showed increased bone mineralization. Within the limits of the present investigation, this case report mainly summarized the potential mechanism of HA in promoting bone regeneration and the application prospects of hyaluronic acid-based in bone regeneration.

KEYWORDS: *hyaluronic acid, cyst, nasopalatine duct, bone healing, bone graft, biomaterials*

INTRODUCTION

Cystic lesions are frequent in the oral and maxillofacial areas (1, 2). Nasopalatine duct cysts (NPDC), also known as incisive canal cysts, are the commonest developmental cysts in the jaws (3). The etiology is not certain, but mechanical trauma or bacterial infection could stimulate the proliferation of residual epithelial tissue in the nasopalatine duct. Genetic factors sometimes play a role (4). Secondary cysts are formed by mucus secretion from the retained epithelial cells. Males are affected 18–20 times more often than females. NPDC is suggested when the aspirate is clear and straw-colored (3, 4). A differential diagnosis must be made for lateral radicular cysts and cystic ameloblastoma (5). If the nasopalatine duct appears to be greater than 7 mm in diameter, the presence of a cyst should be suspected. Cyst enucleation and local curettage are a general treatment for nasopalatine cysts (6).

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Usually, the cysts remain asymptomatic. A common symptom is a recurrent swelling in the palatal aspect between the central incisors; at times, the cyst may extend labiopalatally, and fluctuation will be positive (7). The nasopalatine duct cyst is seen as a well-defined cystic outline between or above the apices of the maxillary first incisor teeth (8). Killey et al. reported that any radiograph that showed radiolucency less than 6 mm wide may be considered within normal limits as an incisive canal fossa without specific symptoms (9). Histopathology in the epithelium may be stratified squamous at a lower level; more superiorly, it may be pseudostratified columnar, cuboidal, and ciliated (10). The presence of mucous glands, goblet cells, and cilia highly indicates their origin within the incisive canal, as does the presence of nerves and blood vessels in the fibrous capsule (11).

Cystic contents are an important diagnostic aid to rule out normal incisive canal fossa radiolucency. The viscous fluid content may be mucoid material or even pus if the cyst has been infected (12). Surgical enucleation is the line of treatment of nasopalatine duct cysts, by raising a palatal flap from canine to canine. In the present case report, the residual bone defect after cyst enucleation was filled with hyaluronic acid (HA) enriched with amino acid (13).

CASE REPORT

A 56-year-old man was referred by the dentist to the Department of Oral Surgery, University of Chieti-Pescara, concerning a nasopalatine duct cyst. The swelling was initially small, but it gradually increased in size. No history of trauma was reported by patients. Intraoral examination revealed a pink-colored, well-defined swelling located between the roots of the central incisors. The panoramic radiograph and cone-beam computed tomography (CBCT) showed a well-defined unilocular radiolucent area beyond the nasal floor. The size evaluated by CBCT approximately was 4x3.5cm (Fig. 1).

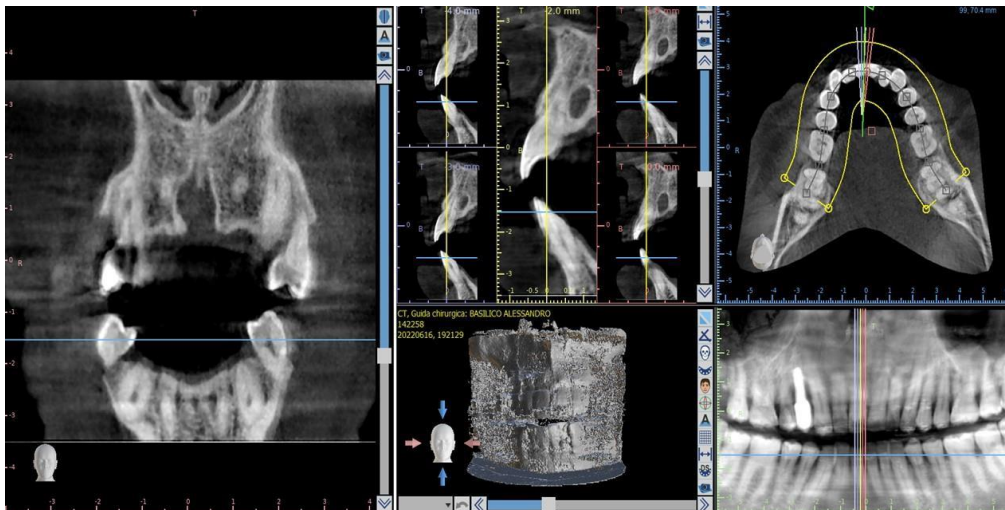


Fig. 1. A well-defined, unilocular radiolucent lesion in the maxillary anterior region on the CBCT was detected.

The patient was subjected to antibiotic treatment with Amoxicillin + Clavulanic acid (GlaxoSmithKline, UK) 2 gr/day for six days from the one before surgery. Disinfection of the oral cavity was achieved by rinsing with Chloroxidine digluconate at 0.2%. Conscious sedation was achieved by intravenous administration of benzodiazepines. After loco-regional infiltration anesthesia with Articain + Adrenaline 1/100.000 (Septodont, France), and a full-thickness of the palatal mucosa is engraved (Fig. 2).



Fig. 2. A): Intraoperative image showing the size of the cyst; **B):** Residual bone defect after cyst enucleation.

A palatal mucoperiosteal flap was reflected by a periosteal elevator to expose the cyst. The neurovascular bundle is salvaged and the cyst is carefully dissected free, from its bony bed. The inner lining of the cyst was scraped off and sent for microscopic evaluation. Hyaluronic acid (Italfarmacia, Rome, Italy) was placed to improve the healing response (14). The flap was sutured with interrupted suturing with a 3-0 polyamide (Assumid, Assut, Europe, Magliano dei Marsi, AQ Italy). The cyst material was sent for histopathological examination. Microscopical examination revealed a cystic cavity covered by pseudostratified epithelium. There is a fibrous connective tissue wall that is inflammatory in lymphocytes and plasma cells. The clinical, radiologic, and histopathological aspects suggest an infected nasopalatine duct cyst. No adverse reactions were recorded, and the postoperative course was characterized by the absence of pain. Clinical and radiographic controls were performed by digital dental X-ray at 2 and 4 months after cystic enucleation surgery. The X-ray showed increased bone mineralization (Fig. 3).

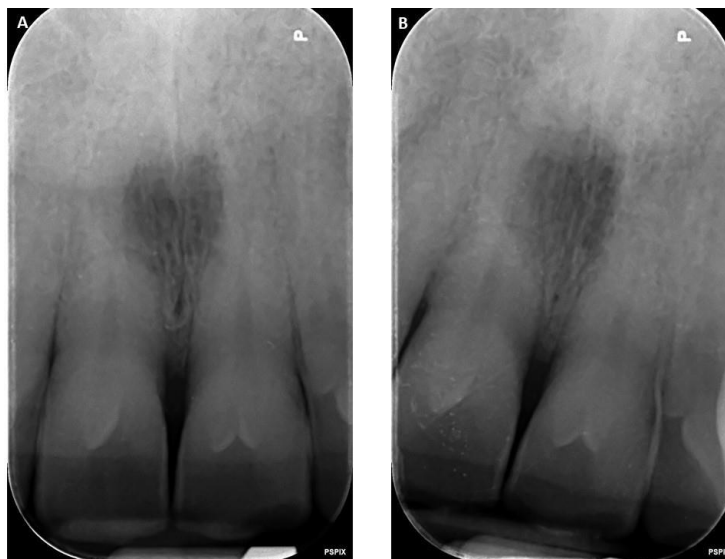


Fig. 3. A): Digital X-ray after 2 months. **B):** Digital x-ray after 4 months shows a bone defect reduction and an increase in mineralization.

DISCUSSION

The clinical results of this case report show the absence of pain and good soft tissue healing. Progressive healing has been recorded, and minor post-operative symptoms occurred, such as swelling, low pain, absence of sensitive alterations, and no hemorrhagic complications.

Bone healing involving a variety of cells, growth factors, cytokines, chemokines, and intracellular and extracellular signaling pathways and have a limited ability to self-heal after injury. When the length of the bone defect exceeds 2 to 2.5 times the diameter of the damaged bone, the self-healing ability of bone tissue alone is not enough (15, 16). For this reason, many biomaterials have been proposed such as, autologous bone, hydroxyapatite, porcine bone, bovine

bone etc. In recent years, hyaluronic acid-based hydrogels have received extensive attention in soft tissue augmentation regeneration and in bone regeneration (17). It is generally present in mammalian tissues and plays a critical role in cell differentiation, migration, proliferation, inflammation, angiogenesis, wound healing (18, 19).

In this case report, we described the use the HA for fill the cyst cavity, through clinical evaluation and reported a good healing without clinical sign. Also, the x-ray shows the radiopacity the bone defect residual after cysty and residual cavity volume reduction was recorded.

The clinical use of biomaterial with or without barrier membranes in bone defects resulting from cystic lesions is not completely clarified (20-25). Cystic cavities have been shown to heal well without the use of biomaterials, which could behave like foreign bodies. In this study, we used cross-linked high molecular weight hyaluronic acid enriched with amino acid.

In conclusion this case report mainly summarized the potential mechanism of HA in promoting bone regeneration and the application prospects of hyaluronic acid-based in bone regeneration.

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