

Views and Practice

Application of cone-beam CT for the diagnosis of an odontogenic cutaneous lesion near the nasolabial fold: A case report

JK Yi 李辰奎, IH Baek 白日鉉, KW Min 閔庚元

Introduction

Extra-oral cutaneous sinus tracts can be caused by odontogenic- and non-odontogenic factors. Odontogenic cutaneous lesions can be caused by bacterial invasion of the pulp tissue that leads to periapical infection and abscess formation. Periapical periodontitis spreads along the path of least resistance in the bone and erupts through the skin resulting in a cutaneous sinus tract. Cone-beam CT combined with periapical radiograph is effective for diagnosing and tracing the origin of infection.

Department of Conservative Dentistry, Kyung Hee University Dental Hospital at Gangdong, School of Dentistry, Kyung Hee University, Seoul, Korea

JK Yi, DMD, PhD

Department of Internal Medicine, Eulji University School of Medicine, Daejeon, Korea

IH Baek, MD, PhD

Department of Human Resource Development, Graduate School of Chung-Ang University, Seoul, Korea

KW Min, PhD

Correspondence to: Dr. IH Baek

Department of Internal Medicine, Eulji University Hospital, Eulji University School of Medicine, 1306, Dunsan-dong, Seo-gu, Daejeon 35233, Korea

A lower incidence of odontogenic extra-oral cutaneous lesions is observed compared to intraoral sinus tracts. The location of a cutaneous lesion of dental origin can vary and occur at any region on the face and neck.¹⁻³ Approximately 80~86% of cutaneous sinus tracts are associated with the anterior mandibular teeth, and other mandibular sites, such as the chin and submental area. However, studies show that odontogenic maxillary cutaneous lesions have a low occurrence rate.

In many cases, patients are not aware of any dental problems, associated with their skin lesions. In addition, physicians tend to overlook the possibility of a dental infection that may lead to a cutaneous sinus tract. Recognising the dental aetiology in cutaneous lesions is a challenge for inexperienced medical doctors. We report the case of an odontogenic cutaneous sinus tract located in the nasolabial fold region with no dental symptoms. Cone-beam CT is utilised to identify the odontogenic origin of an extra-oral cutaneous lesion.

Case report

A 93-year-old woman visited the Department of Conservative Dentistry, Kyung Hee University Dental Hospital, Korea for investigation of an odontogenic association with her facial skin lesion. The patient complained of a sore spot on her left

nasolabial fold area and was managed by an otolaryngologist, an internist, a dermatologist, and a plastic surgeon. The sore spot was refractory to antibiotic therapy and developed into a nodule-like lesion. The dermatologist referred the patient to the Department of Cosmetic Surgery, Kyung Hee University Medical Center, Korea for evaluation of the painful left nasolabial-fold nodule (Figure 1a). Two days after the initial visit to the plastic surgeon, the painful nodule increased in size and became erythematous (Figure 1b). Seven days later, pus was drained from the nodule and a scab formed at the drainage site (Figure 1c). The plastic surgeon drained the remaining pus and took a tissue sample for biopsy. Gram staining and an abscess culture confirmed no bacteria in the lesion. Histopathological analysis of the biopsy sample collected by the plastic surgeon revealed the inflammatory characteristics of the nodule. Despite the lack of dental symptoms, the plastic surgeon referred the patient to the Department of Conservative Dentistry, Kyung Hee University Dental Hospital, Korea for evaluation of possible dental aetiology. A dental examination, which included periapical radiographs and Cone-beam CT, was performed. Radiography demonstrated a periapical lesion in the left upper canine region and incomplete endodontic treatment (Figures 2a & 2d). Cone-beam CT results showed a periapical inflammation that perforated the cortical bone at the root apex region (Figures 2b & 2c). Endodontic treatment

was performed to eliminate the infection sources from the canal. The lesion burst four days after the first endodontic treatment (Figure 3a). The oral maxillofacial surgeon sutured the wound opening. Twenty days after the initial endodontic treatment, the nodule-like lesion subsided and the painful swelling resolved (Figure 3b), and an endodontic treatment was completed (Figure 3c). A follow-up dental examination was not scheduled due to patient's advanced age. However, we communicated with the patient's guardian, who reported no recurrence of the cutaneous lesion.

Discussion

Patients with a cutaneous sinus tract are often unaware of any dental problems associated with their skin lesion.⁴ As the associated cutaneous lesion may appear early or up to 30 years later after the occurrence of the primary dental problem, patients initially consult an otolaryngologist or dermatologist, rather than dentists, for treatment of the cutaneous symptoms. In order to verify a putative clinical diagnosis, 49% of odontogenic cutaneous lesion cases involve supplementary examinations performed by medical doctors, who characterised the nature of the lesion as infectious, inflammatory, and neoplastic.⁵ More than 50% of patients with odontogenic cutaneous lesions were referred to a dental clinic by medical doctors. Since patients



Figure 1. A symptomatic nodule-like lesion demonstrated morphological changes from the initial visit to seven days after the initial visit to the plastic surgeon. (a) An erythematous nodule observed near the left nasolabial fold region during the initial visit (b) The nodule showed an increase in size and swelling two days after the initial visit. (c) The nodule showed trace pus and scab formation seven days after the initial visit.

with extra-oral sinus tracts often undergo multiple biopsies, are administered unnecessary antibiotics, and approximately 50% undergo unnecessary surgeries,⁶ cooperation between physicians and dentists is essential to promote the establishment of a proper diagnosis so that the patients can receive the proper endodontic treatment.

Clinically, a cutaneous dental sinus tract may resemble a pimple, ulcer, nodule, or indurated cystic area.⁷ Nodule-type lesions, which make up 52% of the reported cases, are often erythematous and suppurative.^{5,8} Histological findings of the sinus tracts include inflammatory tissue, granulation tissue, or abscess formation.^{5,9} The luminal surface is usually covered with granulomatous tissue and filled with purulent exudates containing polymorphonuclear leukocytes and chronic inflammatory cells. The treatment of cutaneous draining sinus tracts is based on elimination and clearance of the source of infection. This can effectively be accomplished by endodontic treatment or tooth extraction. Once completed, the sinus tract will resolve within two weeks and heal, usually with granulation tissue and leave a cutaneous scar.

There are limitations to diagnosing an odontogenic cutaneous lesion by visual inspection alone; thus, a radiological examination is often required. The use of radiopaque materials, such as gutta-percha, along with radiographs can help

to determine the probable source of infection and cutaneous draining sinus tract.⁹ Cone-beam CT images show inflammatory infiltration on the cortical surface and confirm the origin of the odontogenic infection. To increase diagnostic accuracy, dermatologists use an ultrasound.¹⁰ Careful dental examination is required when evaluating and treating non-healing facial skin lesions. Early diagnosis and treatment can prevent aggravation, unnecessary antibiotic therapy, and surgical treatment.



Figure 2. Cone-beam CT identified the periapical lesion that penetrated the cortical plate on the left upper canine. (a) Panoramic image showed periapical radiolucent lesion. (b, c) Cone-beam CT results demonstrated cortical plate perforation at the root end of the left maxillary canine. (d) Periapical radiograph showed periapical lesion and incomplete endodontic treatment.



Figure 3. Symptomatic inflammatory nodule-like lesion resolved after endodontic treatment. (a) Four days after initial endodontic treatment, the nodule had a burst and the images showed opened tract in the centre of the lesion. (b) Twenty days later, the painful swelling subsided, (c) and endodontic treatment was completed.

Conclusion

Dental evaluation is recommended for non-healing facial cutaneous sinus tracts involving the maxillofacial surface. Cone-beam CT analysis is an effective diagnostic method for identifying odontogenic aetiological factors.

Conflict of interests

No conflict of interests is declared.

References

1. Gocmen G, Varol A, Goker K, Basa S. Actinomycosis: report of a case with a persistent extraoral sinus tract. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2011;112:e121-3.
2. Pasternak-Junior B, Teixeira CS, Silva-Sousa YT, Sousa-Neto MD. Diagnosis and treatment of odontogenic cutaneous sinus tracts of endodontic origin: three case studies. *Int Endod J* 2009;42:271-6.
3. Soares JA, de Carvalho FB, Pappen FG, Araujo GS, de Pontes Lima RK, Rodrigues VM, et al. Conservative treatment of patients with periapical lesions associated with extraoral sinus tracts. *Aust Endod J* 2007;33:131-5.
4. Tidwell E, Jenkins JD, Ellis CD, Hutson B, Cederberg RA. Cutaneous odontogenic sinus tract to the chin: a case report. *Int Endod J* 1997;30:352-5.
5. Guevara-Gutierrez E, Riera-Leal L, Gomez-Martinez M, Amezcua-Rosas G, Chavez-Vaca CL, Tlacuilo-Parra A. Odontogenic cutaneous fistulas: clinical and epidemiologic characteristics of 75 cases. *Int J Dermatol* 2015;54:50-5.
6. Foster KH, Primack PD, Kulild JC. Odontogenic cutaneous sinus tract. *J Endod* 1992;18:304-6.
7. Barrowman RA, Rahimi M, Evans MD, Chandu A, Parashos P. Cutaneous sinus tracts of dental origin. *Med J Aust* 2007;186:264-5.
8. Samir N, Al-Mahrezi A, Al-Sudairy S. Odontogenic Cutaneous Fistula: Report of two cases. *Sultan Qaboos Univ Med J* 2011;11:115-8.
9. Johnson BR, Remeikis NA, Van Cura JE. Diagnosis and treatment of cutaneous facial sinus tracts of dental origin. *J Am Dent Assoc* 1999;130:832-6.
10. Shobatake C, Miyagawa F, Fukumoto T, Hirai T, Kobayashi N, Asada H. Usefulness of ultrasonography for rapidly diagnosing cutaneous sinus tracts of dental origin. *Eur J Dermatol* 2014;24:683-7.