

External dental fistula due to face mask used in noninvasive positive pressure ventilation

Dear Editor,

Noninvasive positive pressure ventilation has been increasingly adopted for mechanical ventilation in patients with respiratory failure, negating the need for invasive methods to form an artificial airway (Figure 1A).^{1,2}

A 77-year-old Japanese man had undergone noninvasive positive pressure ventilation using a face mask to treat respiratory failure related to pleural effusion due to hepatic encephalopathy. He had left tooth decay in the upper jaw. He presented with an asymptomatic reddish lesion on his right cheek, which he had first noticed a week earlier and which had gradually increased in size. Physical examination revealed an approximately 10 mm reddish erosive nodule with a depressed center on the right cheek (Figure 1B). The necrotic nodule was contaminated with a small amount of drainage and matched the contact area of the face mask of the noninvasive positive pressure ventilation. We noted saline flowing into the oral cavity during nodule cleansing with isotonic sodium chloride solution. We further found a fistula that opened into the oral cavity and was consistent with the reddish nodule on his right cheek. Gingival swelling and redness were intraorally unclear at the right upper maxillary canines. Horizontal dislocation of his brain computed tomography revealed bone absorption deossification in the right upper maxillary canines and low absorption around the apexes of the third teeth was found (Figure 1C). The low absorption in the right third tooth apex matched the position of the nodule on his right cheek. Sagittal section of his brain computed tomography revealed the root apex of the right third tooth extraorally protruded into the oral cavity (Figure 1D). An orthodontist diagnosed the patient with apical periodontitis in the second to fifth teeth of the right upper maxillary canines. Based on these findings, we diagnosed the nodule lesion as an external dental fistula secondary to chronic apical periodontitis and manifested due to physical impairment triggered by the face mask used in noninvasive positive pressure ventilation. Approximately 2 weeks after extraction of these four teeth, gentamicin ointment alone was applied to the nodule lesion on his right cheek, leading to a gradual regression (Figure 1E).

An external dental fistula results from a suppurative inflammatory process located in the periapical tissue that communicates with the exterior skin through a suppurating channel.^{3,4} Cutaneous lesions usually present asymptotically and are often not even partially

associated with a dental etiology because of the low frequency of occurrence in dental symptoms.⁵ Consequently, the underlying dental cause is often missed leading to inappropriate diagnosis and treatment. Noninvasive ventilation refers to the delivery of positive pressure ventilation through a noninvasive interface such as a face mask, rather than an invasive interface such as an endotracheal tube and tracheostomy. We suggested both the positive pressure through the face mask and poor oral hygiene including apical periodontitis could trigger external dental fistula in the present case. We propose that patients who undergo noninvasive positive pressure ventilation should maintain appropriate oral hygiene to avoid apical periodontitis and the subsequent risk of external dental fistula.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

Takaharu Ikeda MD, PhD

Eimei Iwama MD

Kae Yokoyama MD

Kazuo Takahashi MD, PhD

Tamihiro Kawakami MD, PhD 

Division of Dermatology, Tohoku Medical and Pharmaceutical University, Sendai, Japan

Correspondence

Tamihiro Kawakami, MD, PhD, Division of Dermatology, Tohoku Medical and Pharmaceutical University, 1-15-1 Fukumuro, Miyagino-ku, Sendai, Miyagi 983-8536, Japan.

Email: tami@tohoku-mpu.ac.jp

ORCID

Tamihiro Kawakami  <https://orcid.org/0000-0001-6741-939X>

REFERENCES

1. Brochard L, Isabey D, Piquet J, et al. Reversal of acute exacerbations of chronic obstructive lung disease by inspiratory assistance with a face mask. *N Engl J Med.* 1990;323(22):1523–30.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2020 The Authors. *Journal of Cutaneous Immunology and Allergy* published by John Wiley & Sons Australia, Ltd on behalf of The Japanese Society for Cutaneous Immunology and Allergy

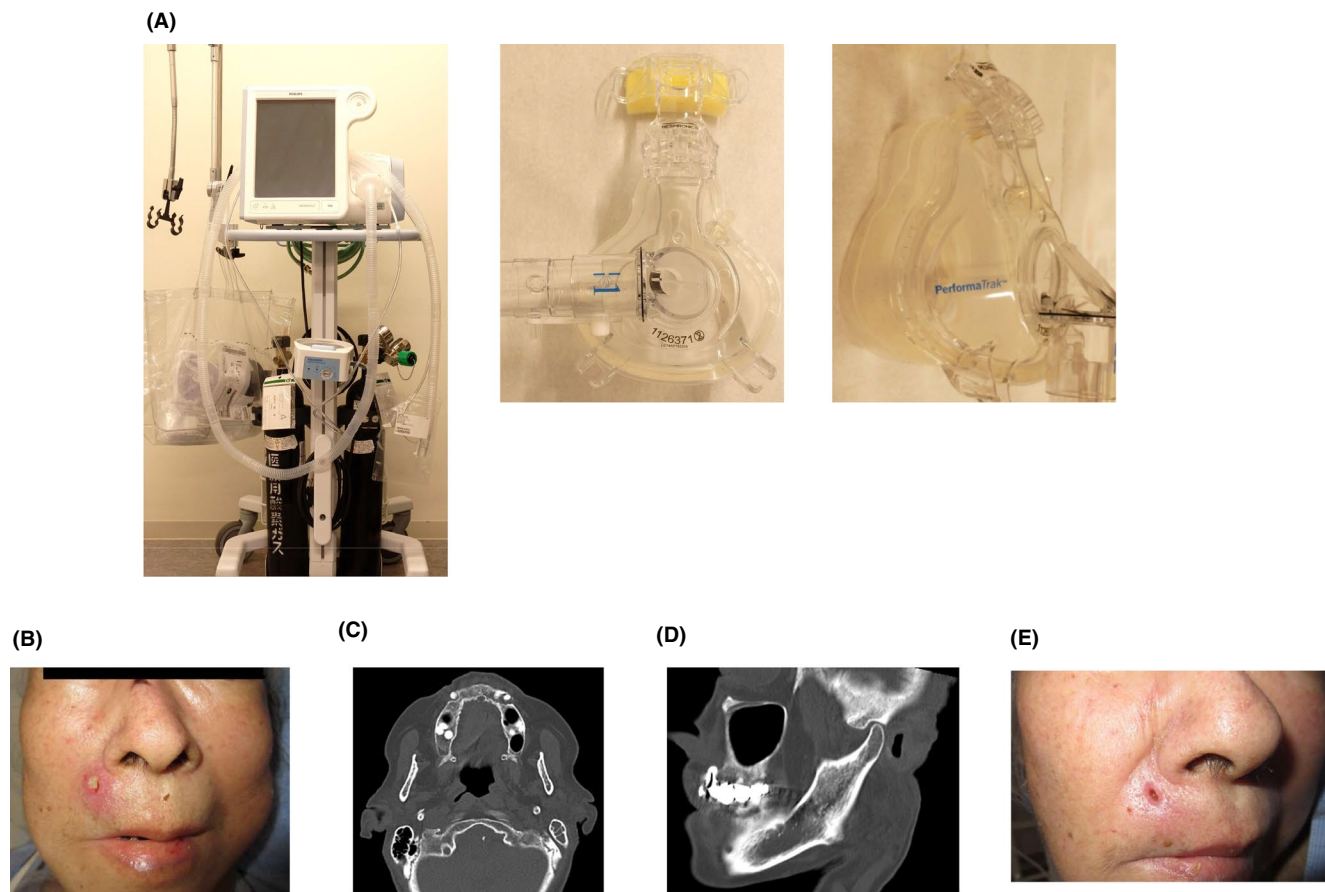


FIGURE 1 A, Ventilator and full-face mask of noninvasive positive pressure ventilation (V60 Ventilator[®] and Respironics Performa Trak[®], Philips Japan) were used in the present case. B, A reddish erosive nodule on the right cheek. C, Horizontal dislocation of brain computed tomography revealed bone absorption deossification in the right upper maxillary canines and low absorption around the apices in third teeth was founded. D, Sagittal section of brain computed tomography revealed the root apex of the right third tooth protruded into the oral cavity. The tooth protrusion was consistent with the reddish granulomatous and erosive nodule in the cheek. E, After removal of the teeth, the lesion on the right cheek gradually regressed

- Meduri GU, Abou-Shala N, Fox RC, Jones CB, Leeper KV, Wunderink RG. Noninvasive face mask mechanical ventilation in patients with acute hypercapnic respiratory failure. *Chest*. 1991;100(2):445-54.
- Spear KL, Sheridan PJ, Perry HO. Sinus tracts to the chin and jaw of dental origin. *J Am Acad Dermatol*. 1983;8(4):486-92.
- Honda Y, Hattori Y, Tomimori S, Tsuda Y, Otsuka A, Miyachi Y. External dental fistula caused by denosumab-related osteonecrosis of the jaw. *J Dermatol*. 2015;42(12):1202-4.
- Sato T, Suenaga H, Igarashi M, Hoshi K, Takato T. Rare case of external dental fistula of the submental region misdiagnosed as inverted follicular keratosis and thyroglossal duct cyst. *Int J Surg Case Rep*. 2015;16:39-43.