JPRS Journal of Plastic and Reconstructive Surgery
https://doi.org/10.53045/jprs.2022-0029
https://j-prs.jp/index.html

Case Report

Parotid Fistulas after Reconstructive Surgery for the Face and Neck Burn Contracture

Kan Nakamoto[1)], Yosuke Niimi[1)], Nagisa Osa[1)], Yoshiaki Inoue[2)], Keijiro Hori[1)] and Hiroyuki Sakurai[1)]

1) Department of Plastic and Reconstructive Surgery, Tokyo Women's Medical University, Tokyo, Japan
2) Department of Emergency and Critical Care Medicine, University of Tsukuba, Ibaraki, Japan

Abstract
A parotid fistula is a rare symptom, caused by abnormal canal between the skin and the salivary duct or gland, leading to salivary discharge from skin. A 53-year-old man suffered a severe facial, neck, and precordial flame burn, which was treated by multiple debridement and split-thickness-skin-grafts. After the release of cervical scar contracture with a distant flap, saliva discharge from small fistula became evident, following him coming to the authors' hospital for treatment of the scar contracture of the face and neck. The apertures of the fistula were located 2 cm cephalad. Computed tomography with contrast injected into the fistula revealed extension to the left parotid gland. Following from this, the site was covered with a free groin flap. Over two years after surgery, no recurrence of parotid fistula was observed.

Keywords
burn, parotid fistula, reconstructive surgery

J Plast Recontr Surg 2023; 2(3): 94-97
https://doi.org/10.53045/jprs.2022-0029

Introduction

Deep facial and neck burns may cause a variety of tissue damages including the facial nerve and parotid gland[1)]. Although the split-thickness-skin graft is a standard method of wound coverage in acute burn, the grafted skin shrinks over time[2)], resulting in variety of functional and aesthetic losses. Although the estimation of the original thermal damage to deeper structures is difficult for reconstructive surgeons, within this context, contracture release followed by thicker skin grafting or flap coverage is the most common procedure of burn reconstruction in order to improve the patient's quality of life[3,4)].

A parotid fistula is an abnormal canal, between the skin and the parotid duct or gland, leading salivary discharge from skin[5,6)]. The parotid fistula is mainly caused by trauma or operative procedures[7)]. We report a case in which the parotid fistula became evident after a reconstructive surgery for severe post-burn neck contracture with an expanded occipito-cervico-dorsal (OCD) flap[8)]. The etiology of the secondary fistula formation is discussed.

Case Presentation

A 53-year-old man suffered facial, neck, and precordial burns (TBSA 26%, BI 21) due to a workplace fire, and the burns were treated by multiple debridement and split-thickness-skin-grafts at the local burn center. At eight months after injury, he was referred to the authors' hospital for treatment of severe scar contractures at the face, neck, and right axilla (**Figure 1A**). There was no history of parotid fistula.

In order to correct the cervical burn contracture, an expanded OCD flap harvested from the left dorsal region was applied. A few months after this surgery, he started to complain a hyperhidrosis specifically located at left upper neck (**Figure 1B**). Meticulous examination of his left neck revealed two fistulous orifices in the grafted skin on the cephalic area of the OCD flap (**Figure 1C**). The fistulous orifices was distant from the surgical field. Computed tomographic (CT) fitulography showed that the fistula was connected to the lower pole of the left parotid gland, and a diagnosis of left parotid fistulas was made (**Figure 2A, B**).

Eleven months after the OCD flap transfer, the fistula

Corresponding author: Yosuke Niimi, niimi.yosuke@twmu.ac.jp
Received: July 24, 2022, Accepted: September 21, 2022, Advance Publication by J-STAGE: December 6, 2022

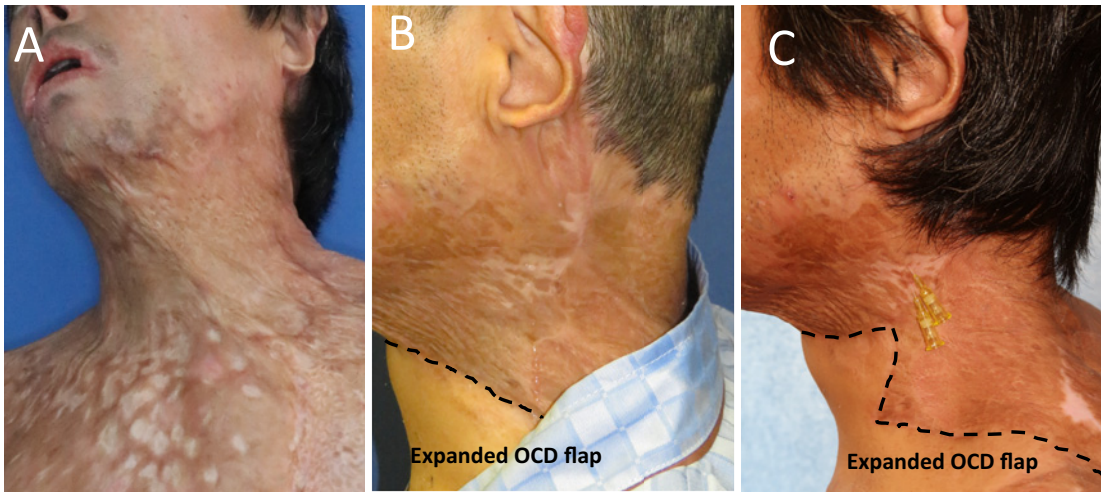

Figure 1. Findings of the left neck of a 53-year-old man.
(A) Wound contracture at the left neck was observed. (B) Expanded occipito-cervico-dorsal (OCD) flap from the left side was used for reducing cervical burn contracture. (C) At two years after injury, two parotid fistulas were found at the skin graft on the left neck. The black broken line in B and C indicate the area of OCD flap.

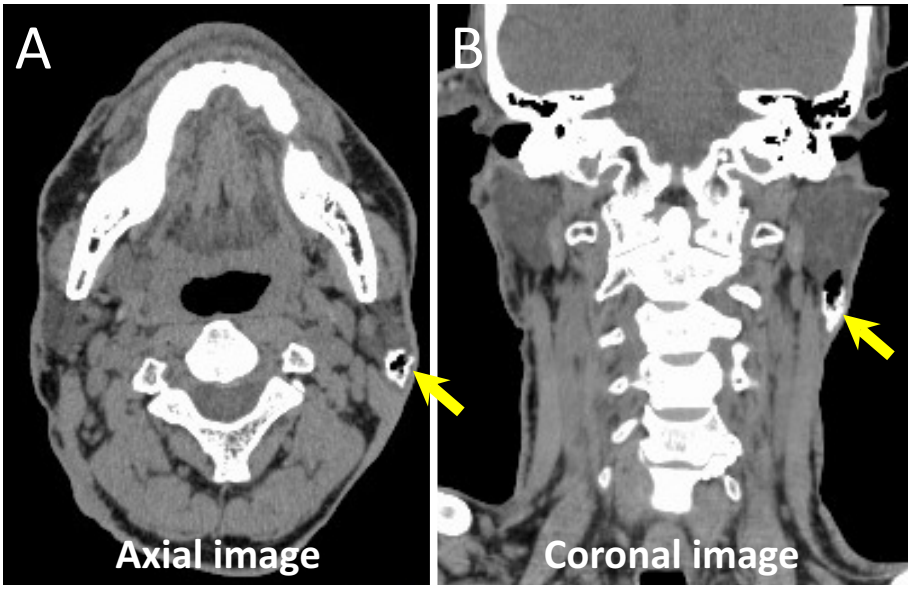

Figure 2. Computed tomographic (CT) photographs of the patient.
CT photograph A and B are axial and coronal photographs, respectively. Fistula-enhanced CT showed two continuous fistulas. The yellow arrows in A and B indicate the left parotid fistulas.

connected to the parotid gland was resected with surrounding cicatricial tissue (**Figure 3A, B**). The skin coverage was performed with a free groin flap extending to the lower part of his left ear to reconstruct the lobule (**Figure 3C**). No recurrence of parotid fistula was observed over two years after operation (**Figure 3D**).

Discussion

Parotid fistula can be classified into two groups; congenital and acquired fistulas. Acquired parotid fistulas is mainly caused by trauma or surgery, and is well known as one of the complications in parotid surgery[5,7]. Parotid fistula also can be classified into ductal injury and parenchymal injury. The fistula in this case was caused by parenchymal injury.

Although few post-burn parotid fistulas have been reported, these fistulas have been well documented after resection of parotid tumor or skin tumors overlying the parotid gland[5,6], usually appearing within a week[9]. However, even though thermal damage extended to the parotid gland, massive exudate from burn wound may jeopardize notification of salivary leakage in acute phase.

When the aperture of parotid fistula can be notified, CT fistulography is definitive modality in the diagnosis and surgical planning[10]. However, since the operation field was apart from the anatomical location of parotid glands, the diagnosis of the parotid fistula was delayed in this case.

The etiology of the parotid fistula formation in this case

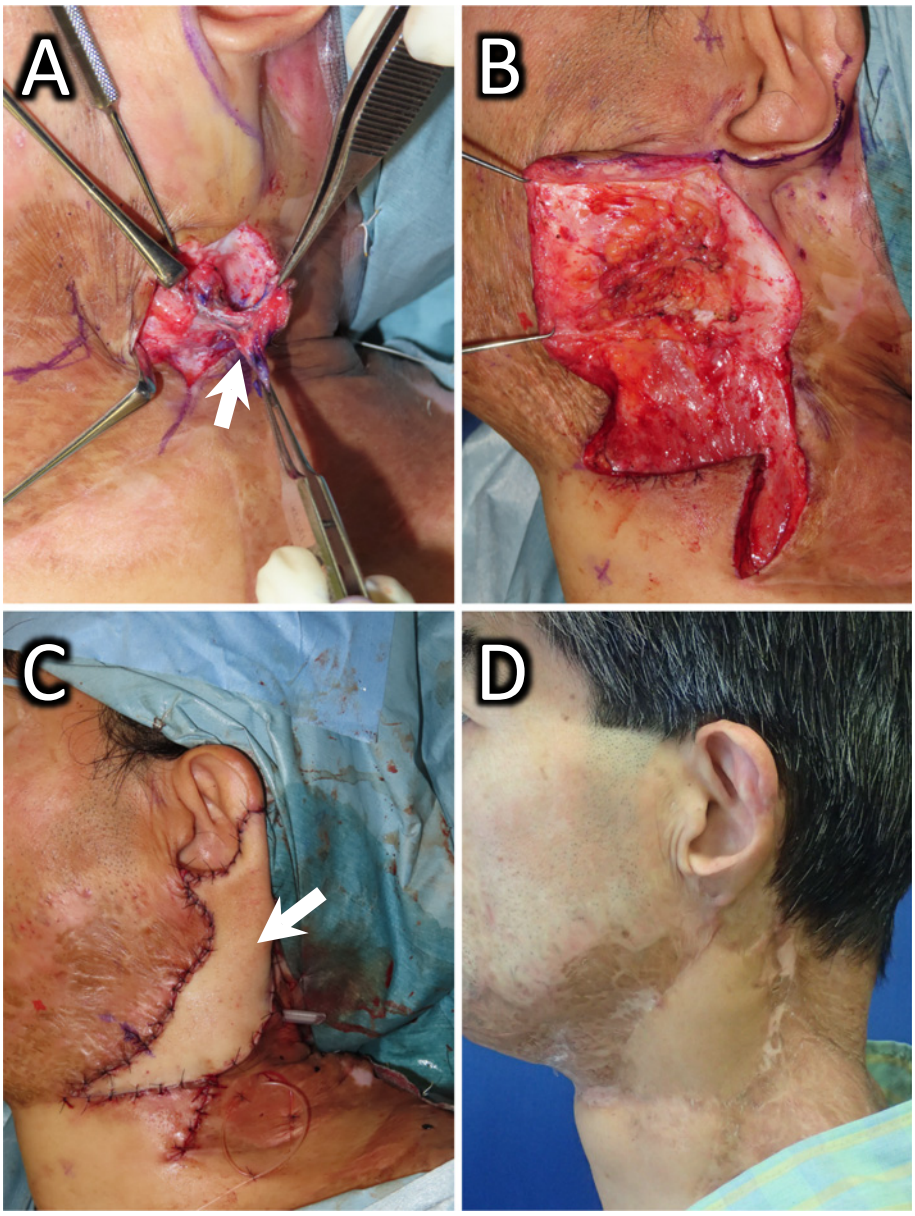

Figure 3. Intraoperative and postoperative findings.
(A) The fistulas were stained with crystal violet and resected as a mass, which was indicated by the white arrow. (B) Part of the parotid gland tissue was resected. (C) The wound was closed with a free groin flap for replenishing the skin. The white arrow indicates the free groin flap. (D) No recurrence of parotid fistula was observed at 27 months after surgery.

is speculated as follows. The patient's left neck including the parotid gland was deeply burned, and the capsule of the parotid gland was partially resected during debridement and split-thickness-skin-grafting in acute phase (**Figure 4A**). While the grafted skin constricted[2], the parotid fistulas was gradually elongated and eventually occluded (**Figure 4B**). The release of contracture with abundant skin made the occult fistula manifest (**Figure 4C, D**).

There are several treatments for parotid fistula such as percutaneous aspiration, compression, anticholinergic drugs, radiation therapy, tympanic neurectomy, local injection of botulinum toxin-A, and surgical repair[5-7].

The free groin flap after the excision of the fistulas in this case, where the replacement of the former scar with grafted STSG to free flap improved the appearance of the neck, allowed us wide coverage of the potential defect of parotid capsule, which might reduce the recurrence rate. In addition, the upper part of the flap could be used as tissue for the lobule reconstruction.

Woerd et al. reported that sialocutaneous fistula to the external auditory canal was covered with a temporal fascia flap after the excision of salivary glands[11], where the efficacy of the transplanted free groin flap was maximized for multiple reconstructive objectives, with free flaps being functionally and cosmetically superior in surgery for burn scar contractures[12].

In this case the sufficient amount of tissue was provided and better aesthetic results.

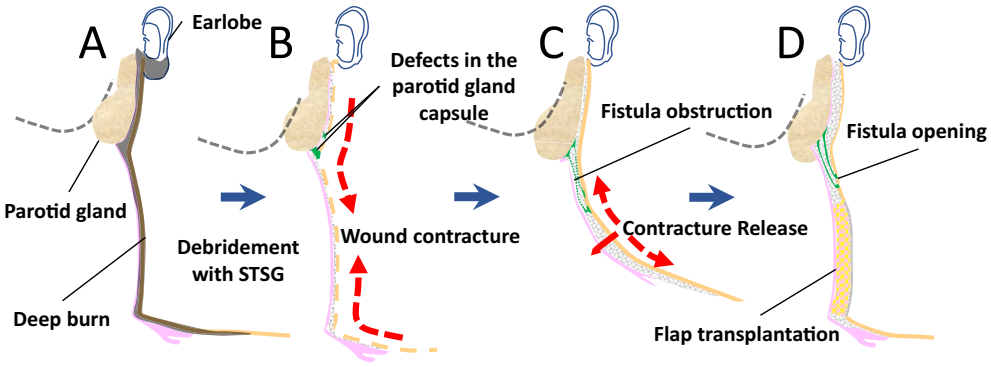

Figure 4. Schematic illustrations for the appearance manifestation of parotid fistulas.
(A) The patient's left neck including the parotid gland was deeply burned, and the capsule of the parotid gland was partially resected during debridement and split-thickness-skin-grafting in acute phase. (B) While the grafted skin constricted, the parotid fistulas was gradually elongated and eventually occluded. (C) The fistula traction was reduced by transplanting a local flap. (D) The parotid gland fistulas appeared.

Conclusion

A case with parotid fistula was reported. Although the injury to the parotid sheath seemed to be occurred during acute phase of the burn treatment, the discharge from the fistula became evident after release of post-burn neck contracture. After fistulectomy, coverage of free flap was useful for preventing recurrence.

In cases of deep burns of the face and neck, parotid fistulas may occur during treatments for scar contracture.

Author Contributions: KN and YN collected the patient data, performed the literature search, and wrote the majority of the manuscript. HS was the leader of this case, made the intraoperative decision, directed the clinical management of the case, and shaped the final conclusions. All authors have read and approved the final manuscript.

Conflicts of Interest: There are no conflicts of interest.

Ethical Approval: This study was carried out in accordance with the World Medical Association Declaration of Helsinki (June 1964) and subsequent amendments.

Consent to Participate: The patients voluntarily gave written informed consent to participate in this study.

Consent for Publication: The patients voluntarily gave written informed consent to participate in this study.

References

1. Lambert RA, Shogan AN, Vrouwe SQ. Pneumomediastinum, facial nerve injury, and sialocele secondary to a firework burn to the cheek: a case report. J Burn Care Res. Apr 2022;43:981−3.
2. Sakurai H, Soejima K, Takeuchi M, et al. Reconstruction of perioral burn deformities in male patients by using the expanded frontal scalp. Burns. Dec 2007;33:1059−64.
3. Sakurai H, Takeuchi M, Fujiwara O, et al. Total face reconstruction with one expanded free flap. Surg Technol Int. 2005;14:329−33.
4. Guo P, Pan B, He L, et al. Application of the expanded neck flap for face and ear reconstruction in burn patients: a report on 2 Cases. Ear Nose Throat J. 2020;145561320963592.
5. Marchese-Ragona R, De Filippis C, Marioni G, et al. Treatment of complications of parotid gland surgery. Acta Otorhinolaryngol Ital. 2005;25:174−8.
6. Ferron C, Cernea SS, Almeida ART, et al. Primary treatment of early fistula of parotid duct with botulinum toxin type A injection. An Bras Dermatol. 2017;92:864−6.
7. Naragund AI, Halli VB, Mudhol RS, et al. Parotid fistula secondary to suppurative parotitis in a 13-year-old girl: a case report. J Med Case Rep. 2010;4:249.
8. Ogawa R, Akaishi S, Huang C, et al. Clinical applications of basic research that shows reducing skin tension could prevent and treat abnormal scarring: the importance of fascial/subcutaneous tensile reduction sutures and flap surgery for keloid and hypertrophic scar reconstruction. J Nippon Med Sch. 2011;78:68−76.
9. Parekh D, Glezerson G, Stewart M, et al. Post-traumatic parotid fistulae and sialoceles. A prospective study of conservative management in 51 cases. Ann Surg. 1989;209:105−11.
10. Moon WK, Han MH, Kim IO, et al. Congenital fistula from ectopic accessory parotid gland: diagnosis with CT sialography and CT fistulography. AJNR Am J Neuroradiol. 1995;16:997−9.
11. van der Woerd BD, MacNeil SD. Sialocutaneous fistula to the external auditory canal repaired with superficial parotidectomy and temporoparietal flap: A case report. Med (Baltim). 2017;96:e7038.
12. Chang LS, Kim YH, Kim SW. Reconstruction of burn scar contracture deformity of the extremities using thin thoracodorsal artery perforator free flaps. ANZ J Surg. 2021;91:E578−83.