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CASE REPORT
Reconstructive

Chemotherapy-induced Nasopharyngeal Stenosis Treated with Bilateral Facial Artery Musculomucosal Flaps

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Summary: We report the first case of a 50-year-old woman who developed nasopharyngeal stenosis (NPS) after chemotherapy for malignant lymphoma. The chemotherapy was effective, but NPS developed following treatment. The tumors of the pharynx and soft palate became necrotic and turned into scar tissue, which caused NPS, especially in the caudal part of the soft palate. The patient developed nasal obstruction and obstructive sleep apnea due to the stenosis. The patient underwent 2 surgeries to resolve the NPS: the first was a simple incision of the stenosis, and the second was Z-plasty and mucous membrane transplantation from the posterior pharyngeal wall. However, the NPS recurred soon after these 2 surgeries. We used bilateral inferior-based facial artery musculomucosal (FAMM) flaps as a solution for recurrent NPS, and it was effective in preventing further stenosis. The blood supply to the flaps was stable, and the size of the flaps was enough to compensate for the area of tissue deficit. The use of bilateral FAMM flaps allowed both sides of the NPS to be corrected, and the flaps provided sufficient retracting strength to keep expanding the nasopharyngeal space by pulling from both sides. After the operation, nasal obstruction was decreased, and the sleep quality of the patient improved significantly. The velopharyngeal function was maintained, and there was no symptom of nasopharyngeal insufficiency. Our results suggest that the bilateral FAMM flap is a suitable method to rescue intractable cases of NPS.
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Nasopharyngeal stenosis (NPS) is a rare condition and a serious burden to patients in whom it causes rhinophonia and dyspnea, subsequently leading to insomnia. NPS is primarily known to be caused by medical interventions, such as tonsillectomy,[1,2] uvulopalatopharyngoplasty,[3] or radiation therapy for nasopharyngeal tumors.[4,5] Here, we report the first case of NPS occurring after chemotherapy for malignant lymphoma and describe the successful treatment of NPS using bilateral facial artery musculomucosal (FAMM) flaps.

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CASE REPORT

A 50-year-old woman with diffuse large B-cell lymphoma received chemotherapy treatment. The tumors of the pharynx and soft palate became necrotic during the therapy and turned into scar contractures that led to severe stenosis, especially at the level of the caudal part of the soft palate. The patient developed nasal obstruction and obstructive sleep apnea because of the stenosis.

After 5 months of chemotherapy, an almost 3 cm longitudinal length of stenotic space at the caudal part of the nasopharynx was confirmed by computed tomography (CT), and the limited movements of the soft palate and the posterior wall of the pharynx were observed by nasoendoscopy. The otolaryngologists incised the narrowest part of the nasopharynx, but it soon became narrow again because of contracture. Six months after the incision, we performed a scar revision using local Z-plasty and mucous membrane transplantation, but the scar tissue relapsed (Fig. 1). Five months later, the nasopharyngeal cavity was reconstructed using bilateral FAMM flaps.

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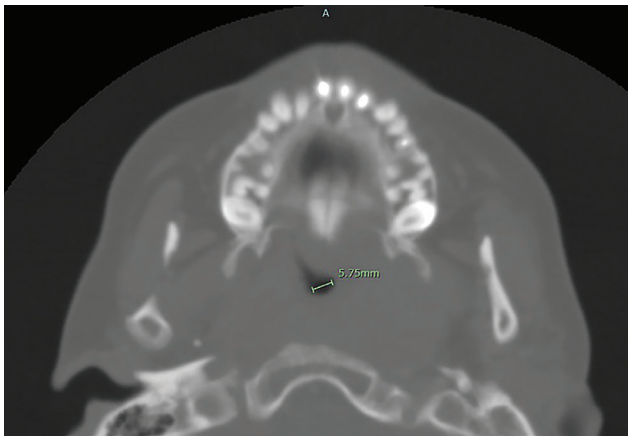

Fig. 1. The CT images displaying the stenosis before the operation. The distance from the posterior nasal septum to the nasopharynx was short, which means that the soft palate was shortened.

METHODS

Preoperatively, the nelaton catheter 14Fr was inserted through the nasopharynx space to confirm the location and size. Both facial arteries were examined using a hand-held Doppler device, and the bilateral inferior-based FAMM flaps were designed (Fig. 2). The flap length was 5 cm, which was dependent on the distance from the pivot point to the incised part of the nasopharynx. The flap width was 2 cm, carefully determined to allow for primary closure of the donor site. One lateral border of the flap was 1 cm inside the red lip, and the other was positioned at more than 5 mm distance from the parotid duct opening to avoid damaging the parotid duct. Both sides of the narrowest nasopharyngeal part were incised to release the contracture. The flaps were raised (Fig. 2) and advanced to the raw nasopharyngeal area. The donor site was closed primarily (Fig. 3). A nasal airway tube (diameter, 7 mm) was inserted for 1 week after the surgery.

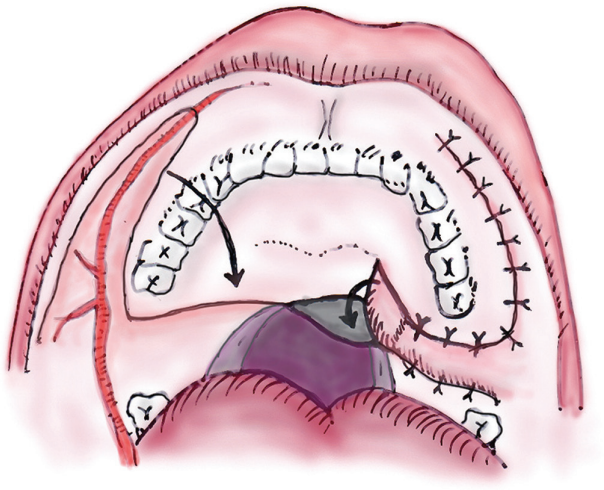

Fig. 2. The left side shows design of the incision of bilateral FAMM flap. The FAMM flaps included the mucosa, part of the orbicularis oris muscle, and the facial artery. The right side shows how the flap was moved and sutured. The tip of the flap was sutured to the side wall of the nasopharyngeal space.

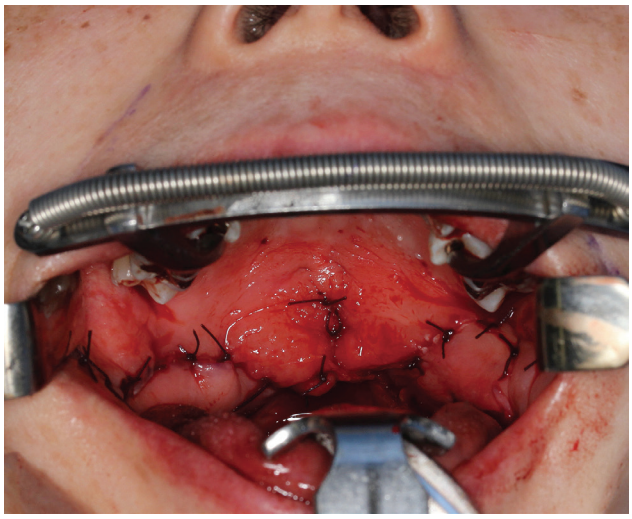

Fig. 3. Suture fixation of the bilateral flaps in the defect. The nasopharyngeal space was widened and pulled bilaterally by flaps.

RESULTS

The wounds healed with no issues. Nasal obstruction decreased, and sleep quality improved significantly. The patient still needed to open her mouth while sleeping, but no longer woke up as she did before the surgery. The velopharyngeal function was maintained, and there was no symptom of nasopharyngeal insufficiency. The patient reported a slight numbness of the upper lip and tended to bite a part of the flaps until 6 months after the surgery, but this did not adversely affect the flaps. The CT and nasoendoscopic view showed maintained nasopharyngeal patency 1 year after the operation (Fig. 4). We did not perform the pedicle excision because there was no request from the patient. The nasopharyngeal space has remained open even 2.5 years after the operation.

DISCUSSION

This is the first report of NPS following chemotherapy for malignant lymphoma. Some articles have reported total

Fig. 4. One year postoperative CT image indicates that the nasopharyngeal space was maintained.

posterior nasal stenosis as a result of chemoradiation for nasopharyngeal cancer.[6,7] Treatments for these cases have mainly consisted of the removal of the posterior inferior turbinates and posterior septum using a microdebrider or CO_2 laser. In these cases, the area of stenosis was surrounded by a bony structure. Therefore, the recurrence of stenosis was hardly admitted even after simply shaving the stenosis, but in our case, stenosis was surrounded only by soft tissue; so the area easily contracted soon after 2 primary operations.

Additionally, NPS involving the soft palate after tonsillectomy and/or adenoidectomy has been reported.[1,2] Local pharyngeal and soft palatal flaps are quoted in the literature as they are easy to use and faster to rise, with minimal donor-site morbidity. Unfortunately, these local flaps could not be considered as an option because the flap size was small and the patient had extensive scarring around the stenosis. We chose the FAMM flaps because the flap tissue was intact, the blood supply was stable, and the features of the flaps had great merit to retract the nasopharyngeal space bilaterally. This retracting force helped in preventing the recurrence of contracture.

The use of the buccal musculomucosal flap was first reported in 1987,[8] and the FAMM flap technique was developed by Pribaz in 1992.[9] FAMM flaps are raised based on the location of the facial artery, and the facial artery is usually located within 20 mm from the labial commissure.[10] The flaps contain the mucosa, submucosa, little buccinator muscle, and deeper plane of the orbicularis oris muscle. The flap can be 8–9 cm long and 1.5–2 cm wide to enable primary closure.[9] In this case, the length of the flaps was set to 5 cm as it could pull the stenotic space bilaterally.

Herein, we tried various methods, including incision, stenting, local flap, and mucous membrane transplantation, but the NPS recurred. We believe that the bilateral FAMM flap should not be used as the first option, but instead, it is a suitable method to rescue an intractable case. We did not have to leave the stent in after surgery because there was enough healthy tissue and contracture was prevented by bilateral retraction by flaps.

CONCLUSIONS

This study is the first to report a case of NPS caused by chemotherapy for malignant lymphoma. Successful surgical treatment of this severe complication was accomplished using bilateral FAMM flaps, which resolved the stenosis and prevented its recurrence.

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