

Total Maxillectomy and Free Flap Reconstruction in Hemodialysis Patients: Report of Two Cases

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Summary: Currently, an increasing number of patients are undergoing hemodialysis. However, little is known regarding the outcome or perioperative management of head and neck cancer reconstruction in patients undergoing hemodialysis. Here, we report two cases of patients with maxillary squamous cell carcinoma undergoing hemodialysis. The patients underwent total maxillectomy and free abdominal flap transfer. A short-thread double-needle was used in one patient because arterial calcification and intimal dissection were observed during microvascular anastomosis. Maintenance hemodialysis was performed the day before and after the surgery. Nafamostat mesylate, an ultra-short acting anticoagulant, was used in the postoperative hemodialysis for 2–3 weeks to prevent bleeding. The flaps survived completely, and no major postoperative complications occurred in either case. One patient showed no evidence of disease at 1 year following the surgery, whereas the other patient died of cancer metastasis 6 months following the surgery. Although further standardization of perioperative hemodialysis management is needed, free flap reconstruction could be considered a safe and effective therapeutic strategy for patients with head and neck cancer undergoing hemodialysis. (*Plast Reconstr Surg Glob Open* 2021;9:e3922; doi: [10.1097/GOX.0000000000003922](https://doi.org/10.1097/GOX.0000000000003922); Published online 4 November 2021.)

The number of patients undergoing hemodialysis (HD) owing to end-stage renal disease (ESRD) is rapidly increasing worldwide.¹ Advances in HD treatment have improved life expectancy,¹ and have also contributed to the increasing number of patients with cancer who undergo HD in several fields. A similar trend is expected in the field of head and neck cancer; the number of patients undergoing HD who require microvascular head and neck reconstruction will further increase in the future because these patients are not considered good candidates for nonsurgical therapy. However, little has been reported on head and neck reconstruction in patients undergoing HD.^{2–4} The major concern is the possibility of reconstructive failure owing to the associated vascular disease or poor healing ability of the patients

undergoing HD. There is also concern regarding perioperative HD management, including anticoagulation and HD scheduling. Here, we report two cases of total maxillectomy and free flap reconstruction in patients undergoing maintenance HD.

CASE REPORT

Case 1

A 55-year-old man with squamous cell carcinoma of the right maxillary sinus presented to our institute (Figs. 1, 2). The etiology of renal failure was diabetes mellitus, and the HD duration was 8 months. No metastatic lymph nodes were evident, and calcification at the bifurcation of the common carotid artery was observed in the neck computed tomography images. Right total maxillectomy was performed (Fig. 3), and the defect was reconstructed using a free deep inferior epigastric artery perforator flap. The flap artery and the right facial artery were anastomosed using double-needle sutures because the facial artery showed severe intimal dissection. The operation time was 447 minutes, and the intraoperative blood loss was 385 mL. HD was performed the day before and after surgery, and thrice a week thereafter. Nafamostat mesylate was used as an anticoagulant during HD for 3 weeks. The postoperative course was uneventful, and oral intake was resumed

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Received for publication August 27, 2021; accepted September 21, 2021.

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DOI: [10.1097/GOX.0000000000003922](https://doi.org/10.1097/GOX.0000000000003922)

Disclosure: The authors have no financial interest to declare in relation to the content of this article.

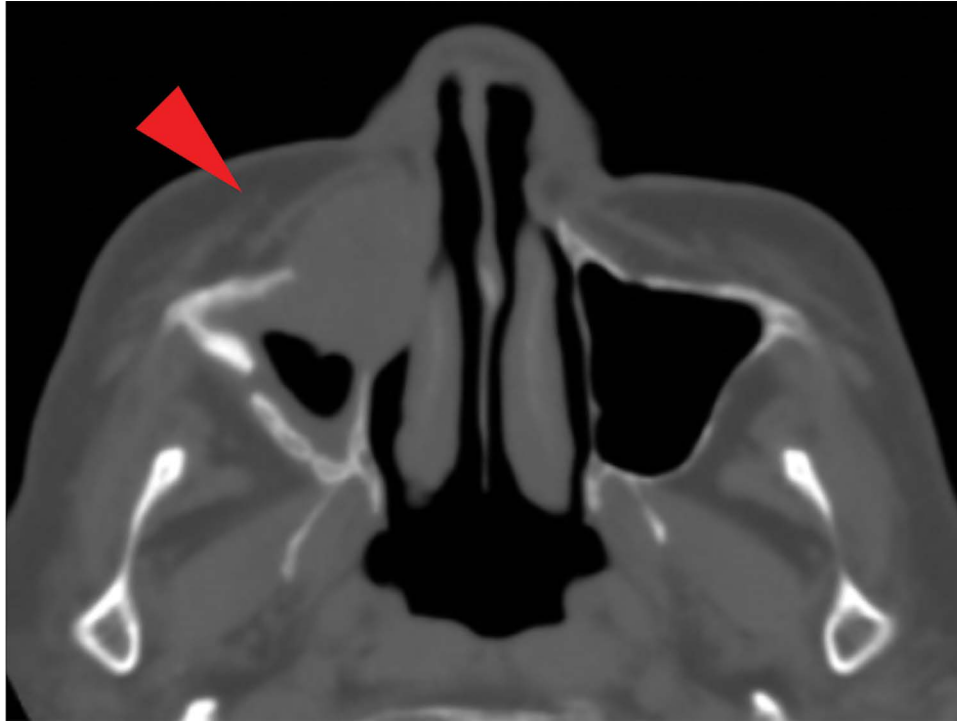


Fig. 1. Computed tomography image before surgery in Case 1. A mass was present in the right maxillary sinus.



Fig. 2. Preoperative appearance of Case 1.

on postoperative day 14. The surgical margins were tumor-free, and no adjuvant therapy was administered. The patient showed no evidence of disease at 1 year following the surgery (Fig. 4).

Case 2

A 64-year-old man presented at our institute for management of upper gingival cancer. The cause of chronic kidney failure was diabetes mellitus, and the HD duration

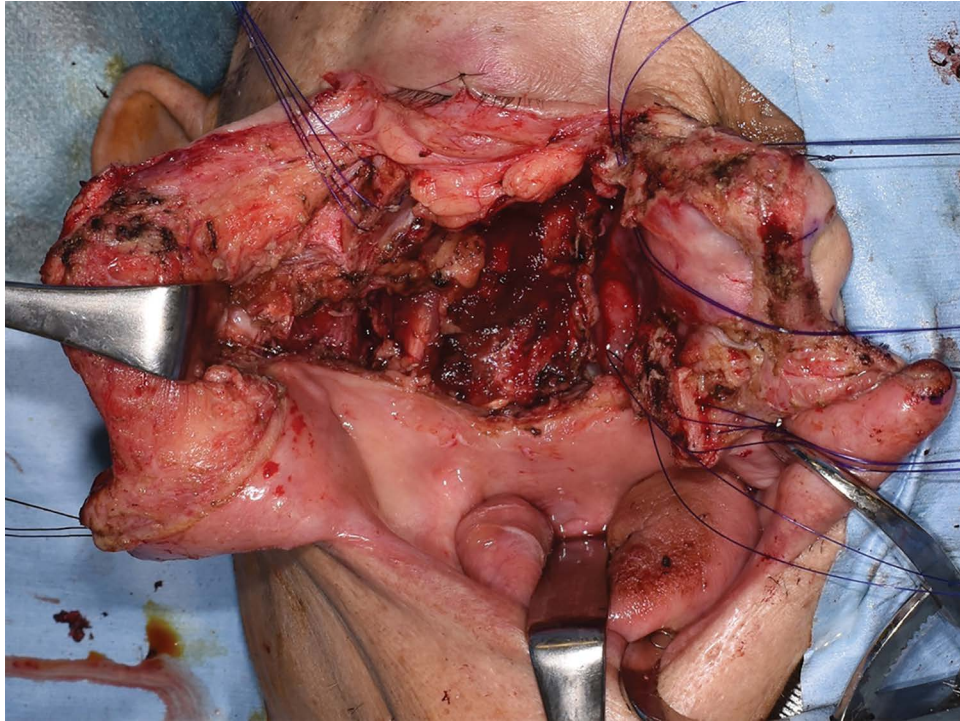


Fig. 3. Total maxillectomy in Case 1.



Fig. 4. Postoperative appearance of Case 1.

was 14 years. The patient presented with several contributory medical histories, including hyperlipidemia and asymptomatic cerebral infarction. Preoperative computed tomography images revealed no evidence of cervical lymph node metastasis. Right total maxillectomy that

included the orbital floor was performed. A free rectus abdominus myocutaneous flap was used to fill the defect, and the anterior rectus sheath was used to reconstruct the orbital floor. The operation time was 562 minutes, and the intraoperative blood loss was 560 mL. HD was performed

the day before and after surgery, and thrice a week thereafter. Nafamostat mesylate was used during HD for 2 weeks. The postoperative course was uneventful, and oral intake was resumed on postoperative day 14. Radiation therapy (66 Gy) was administered owing to positive surgical margins 1 month following the surgery. Nevertheless, metastasis of the cervical lymph node and the lung was found 3 months after the surgery. Chemotherapy was not administered owing to ESRD. The patient died of cancer 6 months following the surgery.

DISCUSSION

Indicating microvascular head and neck reconstruction to patients undergoing HD is a challenge for reconstructive microsurgeons. Patients undergoing HD are generally considered to be at high risk for reconstructive failure, the extent of which is still not well understood.² Previous studies have reported that patients with ESRD do not possess a higher rate of wound complications than patients without ESRD.^{2,4} These reports also agree that atherosclerosis and arterial calcification could be major obstacles to flap surgery success in patients with diabetes and peripheral vascular disease undergoing HD. Although intimal dissection and arterial calcification in the neck were also observed in both of our patients, there were no complications related to vascular anastomosis or wound healing. In case 1, we used a short-thread double-needle microsuture owing to severe intimal dissection, as previously reported for atherosclerotic arterial anastomosis.⁵ If such countermeasures against pathological vessels are prepared, microvascular head and neck reconstruction in patients undergoing HD can be safely performed without significantly increasing the risk of failure.

Perioperative HD management is also very important and may affect the outcome of reconstructive surgery. In particular, the choice of anticoagulants during postoperative HD may directly affect the success or failure of head and neck reconstruction. Heparin is commonly used in this setting to inhibit coagulation factors activated by dialysis membranes⁶; however, it can increase the risk of bleeding and hematoma formation in the early postoperative period.⁷ In particular, total maxillectomy is one of the most high-risk head and neck surgical procedures considering the risk of bleeding.⁸ Therefore, nafamostat mesylate was used as an alternative to heparin, as Mochizuki et al previously reported.³ Nafamostat mesylate has an ultra-short anticoagulant activity duration, which is limited to the extracorporeal circuit,⁹ and can minimize the risk of bleeding during HD. Although further studies are warranted; nevertheless, nafamostat mesylate could be a promising alternative to heparin for postoperative HD following head and neck surgery.

The timing of perioperative HD should also be carefully considered. It is recommended that HD be performed the day before the surgery to minimize any risks from anticoagulation and from unresolved fluid or electrolyte shifts.¹⁰ This adjustment is also important to accommodate the possibility of reoperation due to microvascular

compromise. If surgical re-exploration becomes necessary on day 1 and conflicts with postoperative HD, there is a margin for performing HD on day 2. The postoperative course of both our cases was uneventful, and HD was performed on day 1 as scheduled. A flexible HD schedule must be planned in advance to accommodate the management of possible adverse events.

CONCLUSIONS

Total maxillectomy and free flap reconstruction can be performed safely, even in patients undergoing HD. However, a more standardized protocol for perioperative management of major head and neck surgery in patients undergoing HD should be explored in future studies.

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ACKNOWLEDGMENTS

This study was conducted in accordance with the Declaration of Helsinki.

PATIENT CONSENT

The patient provided written consent for the use of his image.

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