

Reconstruction of a Radiation-Induced Oropharyngeal Soft Tissue Necrosis Using a Pedicled Nasoseptal Flap: A Novel Approach

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Introduction

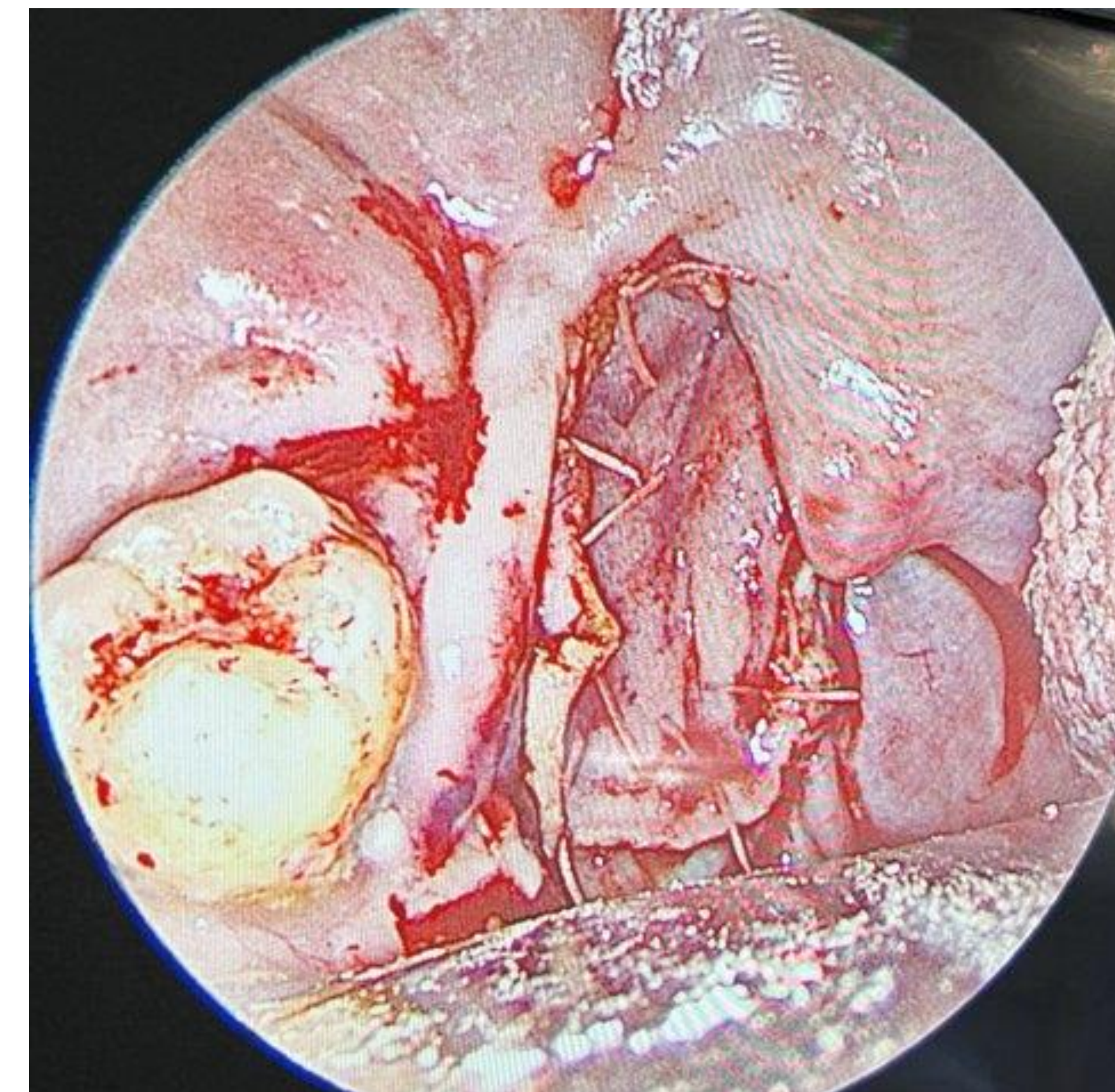
Radiation-induced oropharyngeal wall necrosis is a rare but challenging complication following chemoradiation for head and neck cancer. Management is often complex, with options ranging from conservative measures to free flap reconstruction. Although free flap reconstruction remains the gold standard for reconstruction of large or complex radiation-associated oropharyngeal defects, these procedures are lengthy, resource-intensive operations that carry significant potential downsides — including donor-site morbidity, limited suitability for frail or medically complex patients, and an increased risk of complications or flap failure when performed into irradiated recipient beds.^{1,2} The pedicled nasoseptal flap (NSF), commonly utilized in skull base surgery, provides robust vascularized tissue for reconstruction, but there have only been a few cases reported where it has been used for oropharyngeal reconstruction after cancer resection.^{3,4,5} This report presents a case of radiation-induced oropharyngeal necrosis successfully repaired with a pedicled NSF and reviews the literature on its application reconstruction of oropharyngeal defects.

Case Details

A 57-year-old male with cT2N3M0 p16-positive tonsillar squamous cell carcinoma completed definitive chemoradiation therapy with cisplatin (70 Gy in 2 Gy fractions) in August 2024. Follow-up PET/CT in November 2024 demonstrated residual metabolic activity in the right tonsillar fossa with a standardized uptake value (SUV) of 8, decreased from a pretreatment SUV of 16.4. In December 2024, the patient presented to the emergency department with large-volume oropharyngeal hemorrhage requiring emergent airway management with awake fiberoptic nasal intubation. Intraoperatively, a right tonsillar fossa defect was identified with necrotic debris extending into a larger ulcer of the lateral oropharyngeal wall and base of tongue. Hemostasis was achieved, biopsies and a NavDx assay were negative for residual carcinoma, and postoperative CT angiography confirmed vascular proximity to the defect without active extravasation. A tracheostomy was subsequently performed for airway protection. In January 2025, the patient underwent endoscopic-assisted reconstruction of the oropharyngeal defect using an ipsilateral pedicled nasoseptal flap. After thorough debridement of necrotic tissue in the tonsillar fossa and glossotonsillar sulcus, the vascularized flap was harvested, delivered from the nasopharynx into the oropharynx, and inset transorally to repair the defect. The postoperative course was uneventful. As of August 2025, the patient remains well, without dysphagia, bleeding, fever, chills, epistaxis, drooling, oral mass, or new neck findings.

Results

Figure 1. Intraoperative image of nasoseptal flap covering oropharyngeal defect



Discussion

Although the nasoseptal flap (NSF) is most commonly used in skull base surgery and has been described for TORS tonsillectomy defects, this case demonstrates a novel application for radiation-induced oropharyngeal necrosis. The NSF provided reliable, vascularized coverage in a heavily irradiated field, promoting healing of a large soft tissue defect that would have been difficult to manage otherwise. Importantly, its use allowed us to avoid a mandibulotomy, which would have been required for free flap reconstruction in the setting of severe trismus. Compared with free tissue transfer, the NSF offers shorter operative time, reduced donor-site morbidity, and robust vascularized tissue well-suited for healing in irradiated environments.⁴ Recent case reports have described the use of the NSF for reconstruction of various oropharyngeal defects, all demonstrating feasibility and reliable outcomes.^{3,4,5} Our case differs in that the NSF was applied to a radiation-induced necrotic defect rather than a clean surgical defect following primary oncologic resection. Despite the increased risk of flap failure in this context, the NSF provided durable and effective reconstruction. This report extends the literature by highlighting the NSF as a less invasive yet effective option for secondary reconstruction of radiation-induced oropharyngeal necrosis in complex clinical scenarios.

Conclusion

The pedicled nasoseptal flap is a versatile and reliable option for reconstructing challenging oropharyngeal defects, including those caused by radiation-induced necrosis. This case demonstrates that the NSF can provide durable, vascularized coverage in heavily irradiated fields, avoid more invasive procedures like free flap reconstruction or mandibulotomy, and achieve excellent functional outcomes. The NSF should be considered a valuable, less invasive alternative for secondary reconstruction in complex oropharyngeal defects.

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