

Acquired Nasopharyngeal Stenosis after Radiation for Nasopharyngeal Carcinoma

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Abstract

Introduction: Radiation therapy is the primary treatment for nasopharyngeal carcinoma (NPC). Nasopharyngeal stenosis (NPS) is a rare and morbid complication following radiation that is challenging to treat. This review aims to provide physicians with an update on management and prognosis.

Methods: A systematic review using the terms “nasopharyngeal stenosis,” “choanal stenosis,” and “acquired choanal stenosis.”

Results: 14 of studies identified 59 patients (average age=48 years) with NPS after radiotherapy. NPS usually presented 3 to 24 months from completion of radiotherapy. The most common clinical complaints were nasal obstruction (100%) and chronic sinusitis (23%). Most patients underwent endoscopic choanal stenosis/atresia excision by cold technique, with concomitant removal of the posterior septum and inferior turbinate (n=51); post-operative stenting was done for 20 of these patients. Some authors proposed using CO2 laser with balloon dilation as first line with success of 40-80% (n=8). Topical nasal steroids were used in 35 patients and intraoperative topical mitomycin in 7. During average 26 month follow up, 9 required revision surgery but ultimately all nasal obstruction was relieved. Transient velopharyngeal insufficiency was reported in 3 patients post-operatively, which did not require intervention.

Conclusion: When NPS occurs after radiation for NPC, primary excision of scarring is the most common method of management. Revision surgery may be required in up to 15% of cases; and the benefit of adjuvant medical therapy is unknown.

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BACKGROUND

Nasopharyngeal carcinoma (NPC) has a prevalence of 15–50 cases per 100,000 natives from South East Asia as compared to less than 1 in 100,000 USA natives.¹ Risk factors include smoking, latent EBV infection, and consumption of foods high on nitrosamines which are common in China and Brunei. Most patients present advanced disease secondary to non-specific initial symptoms such as nasal obstruction, aural fullness or unilateral serous otitis.^{2,3} The mainstay of treatment is chemoradiation, with radiation doses up to 60-70 Gy as standard of care.³⁻⁵ Post-radiation complications are common, including hearing loss, Eustachian tube dysfunction, and lower cranial neuropathy. Nasopharyngeal stenosis (NPS) is a rare but morbid complication that can be quite challenging to treat.^{5,6} Due to the rarity of reported cases, this review was performed to provide physicians with an update on management and prognosis.

METHODS

A systematic review from 2000 until 2020 was performed using PubMed database. The terms “nasopharyngeal stenosis”, “choanal stenosis” and “acquitted choanal stenosis” were used. Reports describing congenital stenosis or stenosis occurring after surgery in the absence of radiation were excluded. Data was tabulated using Microsoft Excel.

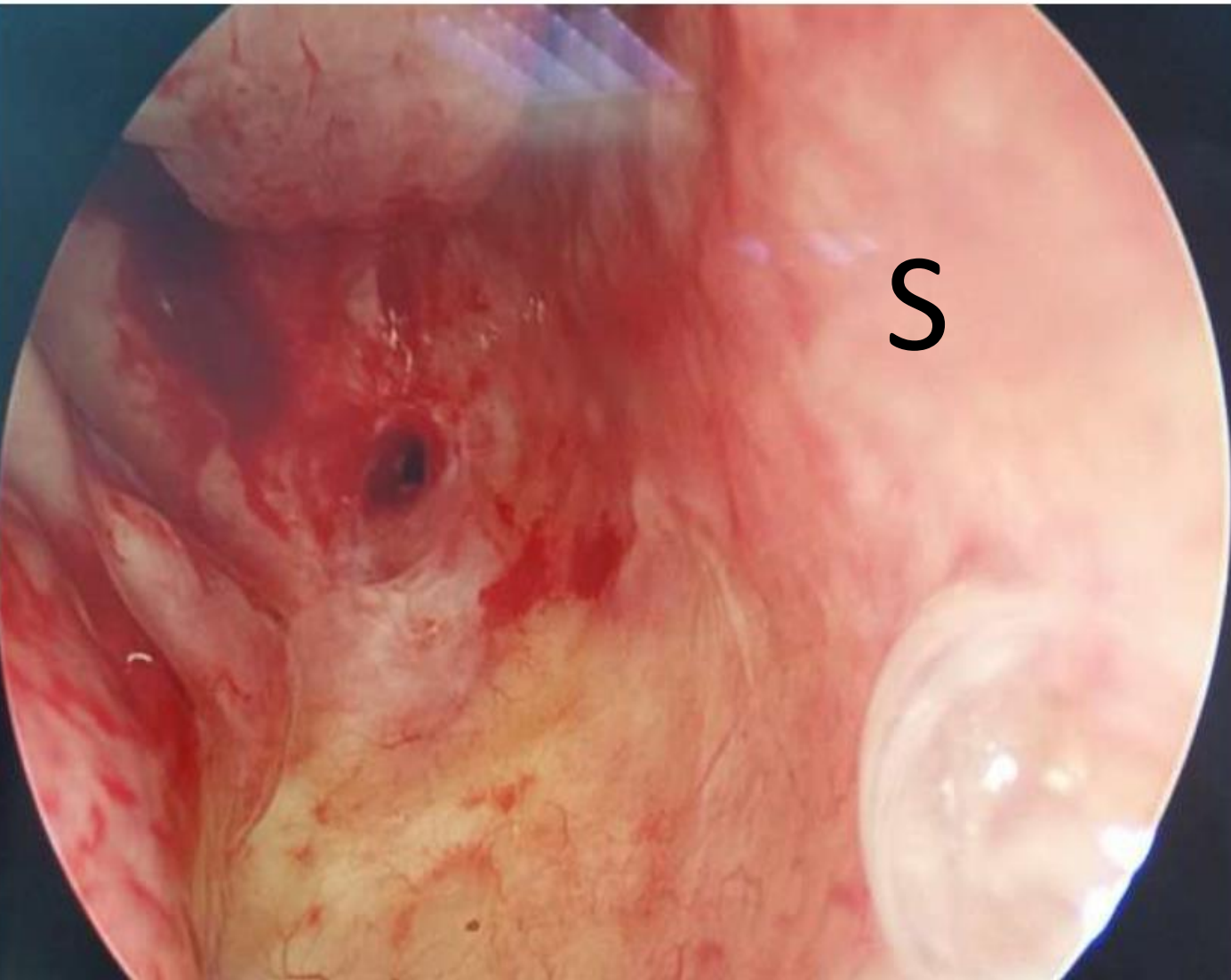


Figure 1: Endoscopic view of a right choanal stenosis secondary to radiation therapy. S: septum. Figure taken from Lakhdar et al's manuscript.



Figure 2: Axial T2 MRI sequence showing left nasopharyngeal stenosis with secretions layering anteriorly. Figure taken from Liu et al's manuscript

RESULTS

14 studies were identified that fit inclusion criteria. All patients had a diagnosis of nasopharyngeal carcinoma and received radiation vs. chemoradiation therapy for cure. NPS presented 3 to 24 months after completion of radiotherapy.

Table 1: Patient Characteristics	
Average Age	48 years
Most common symptoms	100% Nasal obstruction, 23% chronic sinusitis
Radiation Dose	60-70 Gy for cure
Diagnostic evaluation	100% nasal endoscopy, 55% cross sectional imaging (CT>MRI)
Total patients	59 patients

Table 2: Summary of Repair Outcomes		
	Balloon Dilation alone	Resection of stenosis
Number of patients	8	51
% Use of CO2 laser	5	6
% Use of stenting	3	20
Outcome	40-60% success	80-100% success
Follow up	18 months average	26 months average
Complications	2nd dilation needed in 5 patients	9 revision operations, 3 transient VPI
Adjuvant treatment	Yes, nasal steroids (100%) and mitomycin C (25%)	Yes, nasal steroids (52%), mitomycin C (10%)

DISCUSSION

This systematic review supports treating NPS by transnasal endoscopic excision in similar fashion to congenital choanal atresia repair. Balloon dilation appears to be an acceptable first option, but patients should be counseled on the possible need for revision surgery. Authors used post-operative stenting liberally but we are unable to comment on their effectiveness without head to head comparisons. Similarly, topical steroid and mitomycin C therapy were used by most surgeons without clear benefit. Complications such as velopharyngeal insufficiency (VPI) were rare and transient in all patients.

Liu et al quote a 5-10% rate of nasopharyngeal stenosis in patients who undergo radiation therapy for NPC.⁵ Treatment fields for NPC include the nasopharynx and skull base, as well as the sphenoid sinus, ethmoid sinus, posterior 1/3 of the maxillary sinus and the oropharynx. Initial mucosal edema and inflammation occurs within 2 months of treatment and progresses to tissue fibrosis, which can take 12-24 months after radiation. Future research on prevention of post-treatment edema could yield preventive therapy for NPS.

CONCLUSIONS

When NPS occurs after radiation for NPC, primary excision of scarring is the most common method of management. Revision surgery may be required in up to 15% of cases. The benefit of adjuvant medical therapy is unknown. Further investigation is warranted to optimize intervention and counsel patients about anticipated outcomes.

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