Accepted Manuscript online: 2022-06-08 Article published online: 2022-07-10

Sinonasal Undifferentiated Carcinoma with Failed Response to Induction Chemotherapy

Michael R. Papazian[1] Alex J. Gordon[1] Michael Chow[1] Aneek Patel[1] Donato Pacione[2] Seth Lieberman[1] Babak Givi[1]

[1] Department of Otolaryngology—Head and Neck Surgery, NYU Langone Medical Center, New York, New York, United States
[2] Department of Neurosurgery, NYU Langone Medical Center, New York, New York, United States

Address for correspondence Michael Papazian, BS, Department of Otolaryngology—Head and Neck Surgery, New York University Grossman School of Medicine, New York, New York, 550 1st Avenue, New York, New York 10016, United States (e-mail: Michael.Papazian@nyulangone.org).

J Neurol Surg Rep 2022;83:e83–e86.

Abstract

Sinonasal undifferentiated carcinoma (SNUC) is a rapidly growing malignancy with a propensity for extensive local invasion. Multimodal therapy, including surgery, radiotherapy, and chemotherapy, is the standard approach to treatment, but the optimal sequence and combination of these modalities are uncertain. Induction chemotherapy is being increasingly utilized based on recent reports that show better outcomes for patients who respond to chemotherapy and the ability to determine further course of treatment. We present a unique case of a patient with locally advanced SNUC that did not respond to induction chemotherapy and a review of the available literature relating to the management of this rare malignancy.

Keywords

- sinonasal undifferentiated carcinoma
- induction chemotherapy
- endoscopic craniofacial resection
- review

Introduction

Sinonasal undifferentiated carcinoma (SNUC) is a rare, highly aggressive epithelial malignancy that is often locally advanced at presentation. Multimodality treatment is standard,[1–5] and the role of primary surgery is limited by the extent of intracranial extension. In selected patients, the response of SNUC to induction chemotherapy (IC) can be used to guide subsequent therapy.[3]

Case Report

A 68-year-old male presented with nasal congestion, rhinorrhea, and a right nasal cavity mass. Computed tomography and magnetic resonance imaging (MRI) demonstrated extension into the ethmoid, sphenoid, and right frontal sinuses and through the cribriform plate (►**Fig. 1A, B**). Biopsy was consistent with SNUC. After full workup, the tumor was staged as T4bN0M0. IC was initiated with two cycles of cisplatin and docetaxel. Interval MRI revealed no significant reduction in tumor size (►**Fig. 1C, D**). Endoscopic craniofacial resection was attempted. Although gross total resection was achieved, the margins were positive on the brain. Skull base defect was reconstructed by acellular dermal matrix and nasal septal flap (►**Fig. 2A, B**). The patient then received chemoradiation therapy (CRT). CRT was discontinued after two doses of carboplatin and 38 Gy due to patient intolerance. At 9 months posttreatment, MRI revealed persistent disease (►**Fig. 2C, D**). Biopsy was consistent with SNUC. Given the low likelihood of success with additional surgery, palliative options were recommended.

received
April 14, 2022
accepted after revision
June 2, 2022

DOI https://doi.org/10.1055/a-1871-3586.
ISSN 2193-6358.

© 2022. The Author(s).
This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (https://creativecommons.org/licenses/by-nc-nd/4.0/)

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

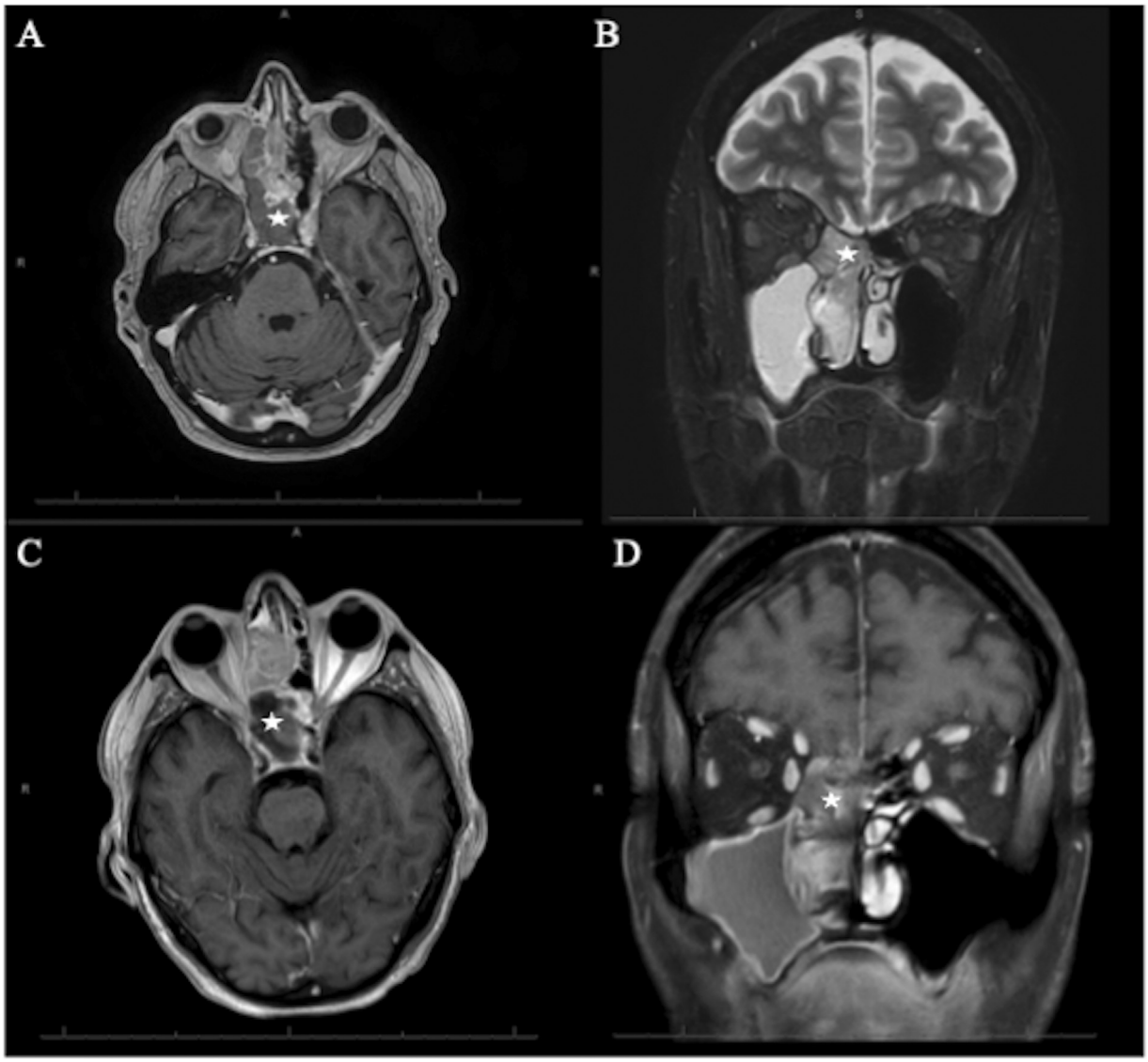

Fig. 1 Pre-treatment computed tomography (**A**) and magnetic resonance imaging (MRI) (**B**) images of right nasal cavity sinonasal undifferentiated carcinoma (star) with extension into ethmoid, sphenoid, and frontal sinus and through cribriform plate. Postinduction chemotherapy MRI (**C**, **D**) of same patient shows no significant reduction in tumor size.

Literature Review

SNUC is a rapidly progressive malignancy with an estimated 5-year overall survival (OS) of 35%.[6] Given its rarity, the optimal management of SNUC is unknown.[7] Multimodality therapy is associated with increased OS, but the sequence and combination of therapies are debated.[1,3,5]

When negative margins are achieved, surgery with adjuvant therapy has demonstrated improved survival compared with CRT.[8–11] Historically, tumor extirpation required open craniofacial resection; however, endoscopic approaches have shown reduced morbidity and comparable survival outcomes.[12,13] Henceforth, endoscopic techniques have been adopted widely in appropriate scenarios. When achieving negative margins is unlikely, primary surgical resection does not provide a survival benefit.[8]

IC has emerged as an important aspect of therapy. Potential benefits include organ preservation and cytoreduction, potentially enabling complete resection and the ability to address disseminated disease.[4] IC may also help guide the choice of definitive locoregional therapy as patients who have a complete response can be consolidated with CRT. In a recent large study, Amit et al showed that patients who responded to IC had improved 5-year survival when IC was followed with CRT compared with surgery. Conversely, nonresponders to IC have a significantly worse prognosis. In this subgroup, surgery plus adjuvant therapy can be considered but discussion of palliative options is also appropriate.[3]

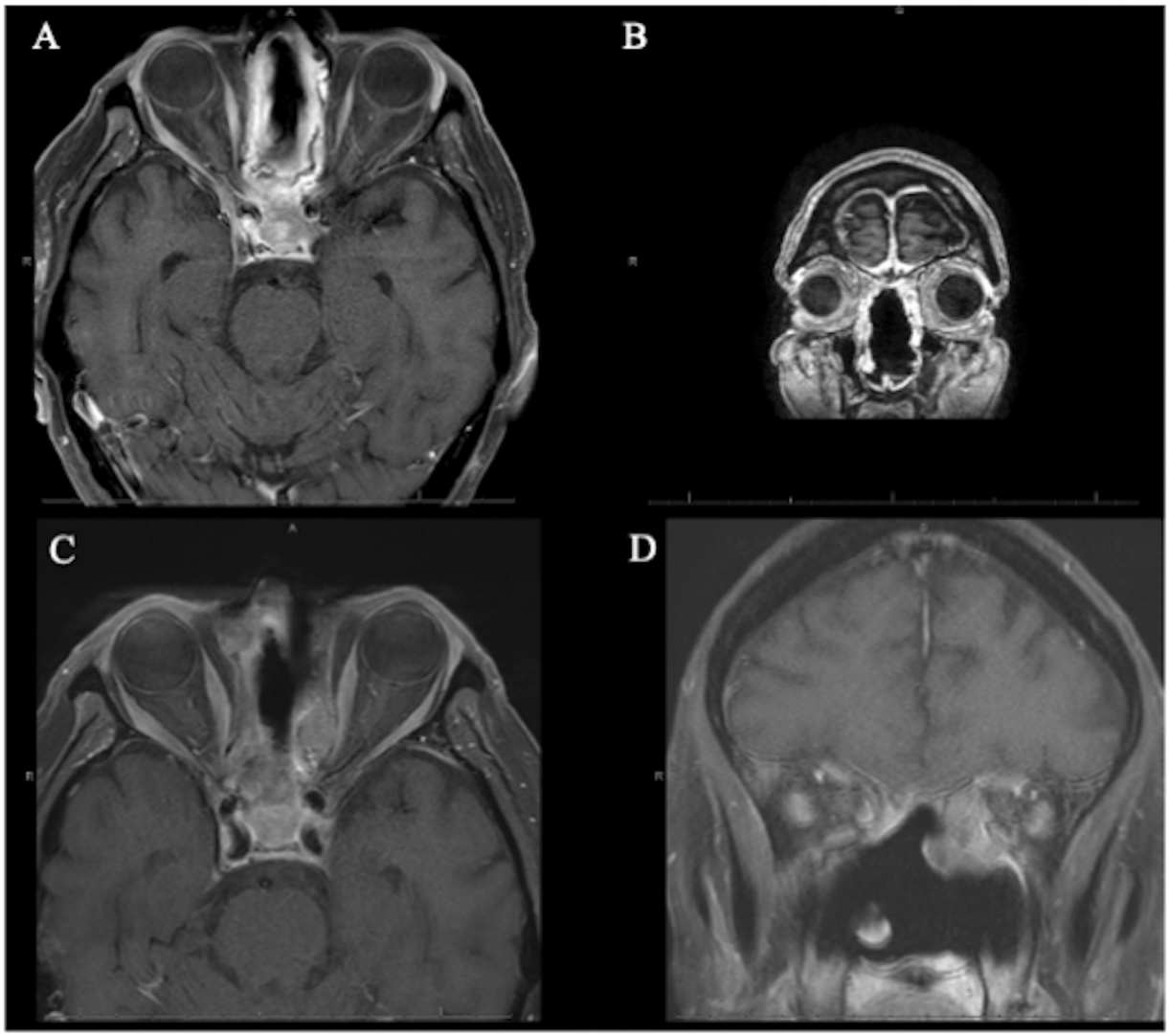

Fig. 2 Postoperative magnetic resonance imaging (MRI) (**A**, **B**) demonstrating changes consistent with extensive sinonasal surgery with skull base reconstruction. Post-incomplete chemoradiation therapy MRI (**C**, **D**) demonstrating recurrence of sinonasal tumor.

Locoregional recurrence following primary treatment is associated with a poor prognosis.[10,11] As such, elective neck treatment is recommended for most patients with advanced stage tumors (T3/T4), even if they present with an N0 neck.[14]

Conclusion

The optimal treatment regimen for SNUC has not been tested in a clinical trial. IC, followed by response-based further treatment, might prove to be a better paradigm. Prospective, multi-institutional studies, if possible, are needed to further validate this approach.

Conflict of Interest
None declared.

Acknowledgments
None.

References

1 Gamez ME, Lal D, Halyard MY, et al. Outcomes and patterns of failure for sinonasal undifferentiated carcinoma (SNUC): The Mayo Clinic Experience. Head Neck 2017;39(09):1819–1824
2 Perri F, Della Vittoria Scarpati G, Ionna F, et al. Clinical management of localized undifferentiated sinonasal carcinoma: our experience and review of the literature. Anticancer Drugs 2019; 30(03):308–312
3 Amit M, Abdelmeguid AS, Watcherporn T, et al. Induction chemotherapy response as a guide for treatment optimization in sinonasal undifferentiated carcinoma. J Clin Oncol 2019;37(06):504–512
4 Mehta GU, Raza SM, Su SY, Hanna EY, DeMonte F. Management of olfactory neuroblastoma, neuroendocrine carcinoma, and sinonasal undifferentiated carcinoma involving the skullbase. J Neurooncol 2020;150(03):367–375
5 Morand GB, Anderegg N, Vital D, et al. Outcome by treatment modality in sinonasal undifferentiated carcinoma (SNUC): a case-series, systematic review and meta-analysis. Oral Oncol 2017; 75:28–34
6 Chambers KJ, Lehmann AE, Remenschneider A, et al. Incidence and survival patterns of sinonasal undifferentiated carcinoma in the United States. J Neurol Surg B Skull Base 2015;76(02):94–100

7 Mendenhall WM, Mendenhall CM, Riggs CE Jr, Villaret DB, Mendenhall NP. Sinonasal undifferentiated carcinoma. Am J Clin Oncol 2006;29(01):27–31
8 Khan MN, Konuthula N, Parasher A, et al. Treatment modalities in sinonasal undifferentiated carcinoma: an analysis from the national cancer database. Int Forum Allergy Rhinol 2017;7(02): 205–210
9 de Bonnecaze G, Verillaud B, Chaltiel L, et al. Clinical characteristics and prognostic factors of sinonasal undifferentiated carcinoma: a multicenter study. Int Forum Allergy Rhinol 2018;8(09): 1065–1072
10 Reiersen DA, Pahilan ME, Devaiah AK. Meta-analysis of treatment outcomes for sinonasal undifferentiated carcinoma. Otolaryngol Head Neck Surg 2012;147(01):7–14
11 Gray ST, Herr MW, Sethi RK, et al. Treatment outcomes and prognostic factors, including human papillomavirus, for sinonasal undifferentiated carcinoma: a retrospective review. Head Neck 2015;37(03):366–374
12 Eloy JA, Vivero RJ, Hoang K, et al. Comparison of transnasal endoscopic and open craniofacial resection for malignant tumors of the anterior skull base. Laryngoscope 2009;119(05): 834–840
13 Revenaugh PC, Seth R, Pavlovich JB, Knott PD, Batra PS. Minimally invasive endoscopic resection of sinonasal undifferentiated carcinoma. Am J Otolaryngol 2011;32(06):464–469
14 Faisal M, Seemann R, Lill C, et al. Elective neck treatment in sinonasal undifferentiated carcinoma: systematic review and meta-analysis. Head Neck 2020;42(05):1057–1066