

COVID-19 and head and neck oncology

Deepa Danan, MD, MBA, MHA, FACS

From the Department of Otolaryngology, University of Florida, Gainesville, Florida



KEYWORDS

Head and neck cancer;
 COVID-19;
 Head and neck
 oncology

The COVID-19 pandemic has generated a plethora of unique challenges which have forced Otolaryngologists/Head and Neck Surgeons to adapt the ways in which patients with head and neck cancer are diagnosed and managed. This article aims to describe the impact of COVID-19 on the practice of head and neck oncology, as well as provide evidence-based management recommendations for head and neck cancer during a public health emergency such as the current pandemic.

© 2022 Elsevier Inc. All rights reserved.

Introduction

During the COVID-19 pandemic, healthcare systems across the globe have faced unprecedented struggles. With shortages of hospital beds, personal protective equipment, and ventilators, at times all elective procedures were suspended in an effort to save resources.¹ As head and neck surgeons know all too well, procedures are anything but elective to a patient sick with cancer. The pandemic has affected patients, healthcare workers, and head and neck cancer treatment in more ways than head and neck oncologists could have imagined. As research on the effects of the pandemic proceeds over the coming years, more light will be shed on how care of the head and neck cancer patient has changed. Two years after the pandemic began, head and neck oncologists across the globe are just beginning to see how COVID-19 has affected time to diagnosis and treatment, the role of telemedicine, patient and healthcare worker safety protocols, ethical considerations, as well as the management of head and neck cancer.

Time to diagnosis and treatment

Several studies have shown that cancer screening has decreased during the COVID-19 pandemic resulting in delays and initiation of cancer treatment for breast, colon, prostate, and lung cancer.² Many tertiary care institutions around the world have evaluated their own data regarding potential delays in diagnosis and treatment of head and neck cancer patients as a result of the pandemic. Multiple factors come into play when considering evaluation and treatment of patients during disasters such as a pandemic. According to the Centers for Medicare & Medicaid Services (CMS), the following factors should determine whether or not to proceed with a planned evaluation or procedure: the current and projected COVID-19 cases in the facility and region; supply of personal protective equipment, beds, ventilators, and staff in the facility; health and age of the patients; and urgency of the procedure.³

Several groups around the world have investigated whether the pandemic has been associated with potential diagnostic and/or treatment delays for patients with head and neck cancer, with varying results. In New York City, Yao et al found that time to diagnosis for head and neck cancers was delayed during a COVID-19 period compared to a pre-COVID-19 period, but that there was no evidence of delays in time to staging and time to treatment.⁴ Tevetoglu's group out of Turkey found a higher

Address reprint requests and correspondence: Deepa Danan MD, MBA, MHA, FACS, Department of Otolaryngology, University of Florida, PO Box 100264, Gainesville, FL 32610.

E-mail address: deepa.danan@ent.ufl.edu

<http://doi.org/10.1016/j.otot.2022.04.007>

1043-1810/© 2022 Elsevier Inc. All rights reserved.

rate of advanced stage disease as well as higher need for complex reconstruction during the pandemic.⁵ Similarly, in Germany, Metzger et al described both a significant delay in treatment as well as higher pathologic T stage in patients presenting in 2020 compared to prior.⁶ In contrast, in Sacramento, California, Solis et al showed a decrease in patients who were evaluated during the pandemic with no significant differences in time to diagnosis or surgery, or in treatment. There were, however, a larger proportion of advanced stage tumors and larger tumor sizes presenting during the pandemic.⁷ In Nashville, Tennessee, Stevens et al showed that there was no significant difference in tumor or metastasis staging, but that patients with mucosal squamous cell carcinoma presented with more advanced nodal staging during the pandemic. Their team also reported a slight increase in newly diagnosed malignancy during the pandemic.⁸ Thus, the data to date shows some variability depending on the location and timing of the study performed. As the various pandemic surges affected different parts of the world at slightly different times, and each institution adopted rules on ambulatory and surgical services based on the pandemic's severity in its region, it is not surprising that there would be such varied results reported in the literature. However, taken together, these studies have shown a tendency towards a more advanced cancer presentation as a result of the COVID-19 pandemic.

Telemedicine

The COVID-19 pandemic created an urgent need for many aspects of healthcare to move to a digital platform at a rapid pace.⁹ Telemedicine allows patients and providers to meet through a virtual visit and reduce their respective risks of exposure. The nature of otolaryngologic disease and clinical evaluation resulted in a slower uptake of telemedicine within the field of Otolaryngology/Head and Neck Surgery.¹⁰ From a provider perspective, the ability to thoroughly examine the upper aerodigestive tract via telemedicine is currently quite limited, and this is an important element in both cancer surveillance and the evaluation of a new head and neck cancer patient. Fassas et al found that patients with head and neck cancer preferred in-person visits over telemedicine for their cancer surveillance,¹¹ however studies performed both prior to and during the pandemic have found that telemedicine visits can be an effective means of evaluation of head and neck patients and result in high patient satisfaction.^{12,13}

In the early stages of the pandemic, recommendations were to limit non-urgent patient encounters such as those for benign disease or routine cancer surveillance in patients without any new or concerning symptoms. Recommendations also included using telemedicine when appropriate in place of face-to-face visits.¹⁴ These initial recommendations continue to be useful as regions and health care facilities experience surges and are again faced with limited resources and elevated risk.

Tam et al investigated associations between patient demographic characteristics and socioeconomic disparities and the engagement in telemedicine within their head and neck cancer population during the pandemic. They found that telemedicine could be used for a diverse patient population to provide multidisciplinary care in the event in-person care could not be delivered. There were no demographic, insurance, or socioeconomic differences observed between all patients seen either before or during the COVID-19 pandemic. However, they did note that uninsured patients, patients with Medicaid, and patients with lower median household incomes had less odds of completing a virtual care visit. This disparity did not carry over to telephone visits.¹⁵ Therefore, head and neck surgeons whose practice is largely derived from Medicaid, uninsured, and low-income patient populations may struggle connecting with their patients over a virtual platform and providing care for these complex patients. Additionally, surgical planning for head and neck reconstruction often involves close examination of the chest and extremities, evaluation of circulation, and an overall assessment of a patient's functional status which are significantly more difficult over a virtual platform. Telephone-only visits are possible for a larger proportion of the patient population, however, without any means of physical examination, providers are entirely reliant on symptomatology and patient-report.¹⁶ At a minimum, these telephone visits can assist in triage particularly during times of restricted in-person capacity. As both the pandemic and technology evolve, telemedicine will likely grow to play a larger role in the care of the head and neck patient.

Patient safety

Patient safety is of utmost importance to all healthcare institutions. Patients with cancer are considered high-risk for severe disease and poor outcomes, particularly patients with head and neck cancer as they often have multiple comorbid factors that also contribute to poorer outcomes such as smoking and cardiovascular disease.¹⁷ Elderly patients with head and neck cancer are at especially high risk.¹⁸ As discussed above, telemedicine has played a role in patient safety and reducing risk of patient exposure. Early on in the pandemic, the risk of nosocomial COVID-19 infection was higher, and in certain cases, such as in elderly patients where the risk of COVID-19 was especially high, surgery was not favored for head and neck cancer treatment due to poorer outcomes after head and neck surgery in the geriatric population coupled with their higher risk of severe disease and death due to COVID-19 infection.¹⁸ Hospital-acquired COVID-19 rates vary based on different studies, ranging from 2%¹⁹ to 15%.²⁰ Over time, as knowledge regarding transmission, testing capabilities, and access to personal protective equipment have increased, the risk of nosocomial COVID-19 infection has decreased.²¹ However, even as early as July 2020, the CovidSurg Collaborative published their findings of an international, mul-

ticenter, observational cohort study which found that head and neck cancer surgery in the COVID-19 era appeared safe even in situations when surgery is prolonged and complex.²² These recommendations evolved from the original practice guidelines as the study found that the perceived concerns for patient safety were not reflected in the outcomes, even in complex cases.²²

Not only is there increased risk of poor outcomes in head and neck cancer patients who contract COVID-19, but patients who undergo surgery while infected may have accelerated disease progression of COVID-19 and high rates of mortality.²³ Therefore, preoperative screening and COVID-19 testing is critical for head and neck cancer patients as well as providers. Due to the risk of COVID-19 spread between patients and surgeons, strict infection control and use personal protective equipment are urged.²²

Among head and neck cancer patients and survivors, total laryngectomy patients pose a unique challenge to maintaining patient safety due to their surgically altered airway. In addition to standard precautions, several additional recommendations have been made for laryngectomy patients in light of the COVID-19 pandemic, including covering the stoma with an HME filter (ideally with a viral filter); masking over their stoma, nose, and mouth; as well as ensuring that COVID testing includes both the upper and lower respiratory tract via stoma swab.²⁴

Provider and staff safety

The pandemic has also brought to light the occupational hazard that Otolaryngology providers and staff face. Otolaryngologists specialize in the upper airway which serves as both the entry-point and reservoir for SARS-CoV-2.²⁵ Additionally, nearly all subspecialties of Otolaryngology, particularly head and neck oncology, are reliant on aerosol-generating procedures as a part of our routine outpatient and inpatient work.²⁶ The surgeon's mucosal entry points for viruses including the nose, throat, and conjunctiva²⁷ are all close to the source of aerosol (patient's upper airway) during an aerosol-generating procedure, putting the surgeon at high risk based on particle density and the principles of diffusion.²⁸ As a result, Otolaryngologists are at particularly high risk for exposure to and transmission of SARS-CoV-2.²⁹ In addition to telemedicine initiatives which were previously discussed, new and evolving protocols have been created to reduce this risk among healthcare workers involved in the care of head and neck patients.

Preoperative testing

Determining COVID-19 status of patients preoperatively is recommended and has been widely adopted as test availability has improved.³⁰ When patients test positive for COVID-19, general recommendations are to delay elective surgery until the patient is no longer infectious and has recovered adequately from infection, and the CDC does not recommend retesting for COVID-19 within 90 days of

symptom onset.³¹ Though there are no head and neck specific guidelines yet in this regard, the American Society of Anesthesiologists recommend the following wait times for elective surgeries: (1) four weeks for an asymptomatic patient or recovery from only mild, non-respiratory symptoms; (2) six weeks for a symptomatic patient (eg, cough, dyspnea) who did not require hospitalization; (3) eight to 10 weeks for a symptomatic patient who is diabetic, immunocompromised, or hospitalized; (4) 12 weeks for a patient who was admitted to an intensive care unit due to COVID-19 infection.³¹ A recent study has found that post-operative pulmonary complications and 30-day mortality are reduced when elective surgery occurs at least 7 week after COVID diagnosis.³² While we do not have any data regarding timing of head and neck surgery after COVID-19 infection and though these time frames may not work for patients with aggressive head and neck cancer who need urgent surgery, it is important to educate patients on the potential increased risk associated with major surgery after recovering from COVID-19.

Flexible laryngoscopy

Flexible laryngoscopy provides an excellent evaluation of the upper aerodigestive tract but can also expose the provider to patient aerosols as a result of patient phonation, coughing, or gagging during the procedure. In 2020, recommendations were to limit flexible laryngoscopy procedures to situations where it is medically necessary,³³ such as in the diagnosis of new cancer patients and for surveillance of patients with new, concerning symptoms. This recommendation is also beneficial during surges when risk to the healthcare workforce is high and resources are limited.

When performing aerosol generating procedures in situations such as the COVID-19 pandemic, general recommendations include ensuring proper ventilation and air changes during these procedures. The Centers for Disease Control and Prevention (CDC) recommend a minimum of 6 air changes/hour (ACH) for airborne contaminant removal in the outpatient setting, such as Otolaryngology clinics. HEPA filters can be added as needed to improve air circulation in clinic/procedure rooms.^{34,35}

Prior to COVID-19, most otolaryngologists would not have given much consideration to the air handling in their clinic and procedural spaces. Engineers are of utmost value in determining the safety of the settings in which aerosol generating procedures are performed. At our head and neck clinic, hospital engineering was able to provide details regarding the ACH and ventilation of all our clinic rooms to optimize patient, provider, and staff safety. Additionally, hospital engineers were able to work with our clinic to easily convert some of our existing rooms to negative pressure rooms in accordance with the pre-existing ductwork in our facility. As a group, our clinic providers decided to limit flexible laryngoscopy to the negative pressure rooms during the pandemic. A 23-minute turnover was calculated to clear an estimated 99% of aerosols based on the rooms' ACH. Timers are used for each room, and all timers are

Table 1 Summary of considerations for flexible laryngoscopy during the COVID-19 pandemic with unknown preprocedure COVID status of patient

Preprocedure	Procedure	Postprocedure
Consult hospital/office engineering regarding procedure room ventilation and air changes per hour	Perform procedure in safest room possible considering air changes and ventilation	Wait for appropriate time lapse after procedure given clinic's air handling capabilities
Optimize ventilation and air changes when able; supplement with HEPA filtration systems as needed	Increase distance between provider and patient mucosal surfaces through use of scope tower or connected monitors	Room cleaning occurs after appropriate air changes have occurred to protect staff turning over the clinic room
Don appropriate PPE (ie, N95 mask) Prepare patient nose with pledgets rather than powered sprays		Limit direct handling of contaminated scope by providers and staff

brought to a single location near clinic staff so that they are immediately notified when a room is ready for turnover, thereby improving efficiency and eliminating the need to continually check on individual rooms. Staff only enter the room for cleaning after the air turnover is complete, protecting both our clinic staff and the subsequent patient in the room. Though the reduction in rooms where procedures are performed and the increase in turnover time has limited our capacity for daily number of procedures performed, this has been largely offset by limiting our procedures to those medically necessary.

Additional precautions such as performing laryngoscopy with a tower and monitor to increase the distance between the provider's and patient's face, as opposed to using the eyepiece on the scope itself have helped to minimize exposure to potential aerosols during procedures. Scope handling was also modified: the provider immediately places the used scope in a biohazard bag within a covered container with a tight lid, thereby limiting handling of the contaminated scope by clinic staff who perform equipment sterilization and limiting risk of contaminant spread during transit to the scope handling room. These modifications were developed through collaboration among all clinic staff and providers, as well as trial and error, and have been successful for our clinic. Our clinic's medical assistants were indispensable in finding innovative ways to make our procedures as safe and efficient as possible during this pandemic, highlighting the importance of collaboration at all levels when working on process improvement and safety measures. See [Table 1](#) for flexible laryngoscopy safety considerations during the COVID-19 pandemic.

Ethics

Head and neck oncology is one of most affected areas of Otolaryngology during the COVID-19 pandemic.²⁹ The added difficulty stems not only from the nature and anatomical location of the work, but because of the ethical challenges posed by cancer care during a public health emergency.

Medicine versus public health

As previously discussed, nosocomial spread of COVID-19 was a significant consideration during the early stages of the pandemic. Data has shown that head and neck oncologic surgical teams are potentially highly vulnerable to acquiring COVID-19 during aerosol-generating procedures.²² However, the care of a single head and neck cancer patient can pose risk not only to the surgical team, but many other members of the healthcare system. For example, a single patient who undergoes a major cancer operation could require an intermediate or intensive care bed for a week, and encounter well over 10 healthcare workers throughout each day. At an academic institution, that number is even higher largely due to the presence of trainees and the number of multidisciplinary services that could be involved with a single patient. A postoperative head and neck patient in a surgical unit (intermediate or intensive care) encounters several staff on a daily basis: an ICU attending, resident, fellow, and advanced practice provider; a surgical attending and resident; a day and night shift nurse; a day and night patient care technician; a phlebotomist; a respiratory therapist; a physical therapist and occupational therapist; a nutritionist; and potentially several other consulting services. Taking care of 1 patient could not only expose the patient to COVID-19, but could expose the tens of staff who encountered that patient during the hospital stay to COVID-19. In some ways, the interests of public health and medicine were at odds with each other during this pandemic: caring for 1, but putting many caretakers at risk. With the increase in testing availability, these risks are far less dramatic in the United States, but still present here and even more so abroad. The CovidSurg Collaborative studied global wealth disparities and their association with COVID-19 safety in head and neck surgery. They found significant global inequality in vaccine access among surgical staff in low- and middle-income countries, and higher reported COVID-19 infections amongst head and neck surgeons in countries that had not yet received nationwide vaccination.³⁶

Additionally, the pandemic brought another discord between clinical medicine and public health. In a resource-constrained environment, population interests may supersede the individual interests, prohibiting head and neck oncologists from consuming resources (such as a ventilator, ICU bed, PPE, hospital staff) on a single patient when scarce resources need to be preserved for others. Although head and neck surgeons are usually focused on individual patients, the pandemic has created population needs that must be taken into consideration.³⁷

In many regions, head and neck surgeons had to triage patients based on urgency and suspected outcome when there was a shortage of operating room time, ventilators, and postoperative beds.²⁹ There was a documented reduction in the care of head and neck cancer patients by April 2020 as many institutions had to limit care to the most urgent cancer patients only.³⁸ Certain necessary procedures in patients with more indolent pathology were forced to wait until resources were freed, and some cancer care was delayed when necessary. The impact of these delays on survival outcomes has yet to be determined.

Management

The management of head and neck cancer patients has faced changes as a result of the pandemic. New protocols were created to provide surgeons with evidence-based guidelines on how to approach patient care with limited resources. Several key points should be highlighted as we continue to experience surges and reduction in OR capacity during the pandemic. These evidence-based considerations are consolidated into an algorithm in [Figure 1](#).

Multidisciplinary care

A multidisciplinary team approach remains a key element of head and neck cancer care during a pandemic. This team approach is important not only in determining which surgical cases are the most essential, but also to develop non-surgical treatment approaches, maintain patient’s nutrition and rehabilitation, as well as facilitate early discharge planning particularly during times of bed shortages.³⁹

A cornerstone of multidisciplinary care is regular meetings by a multidisciplinary tumor board. With a swift conversion to a digital platform, institutions could maintain these meetings throughout the pandemic, regardless of board members’ individual location. In many cases, a virtual tumor board meeting fosters more inclusion of multidisciplinary care team members who may have struggled attending tumor board pre-pandemic.

Triage guidelines

Several studies have suggested ways to prioritize head and neck cancer cases in a resource-limited setting. Risks of delaying surgery such as cancer progression resulting in more extensive surgery or unresectable disease should

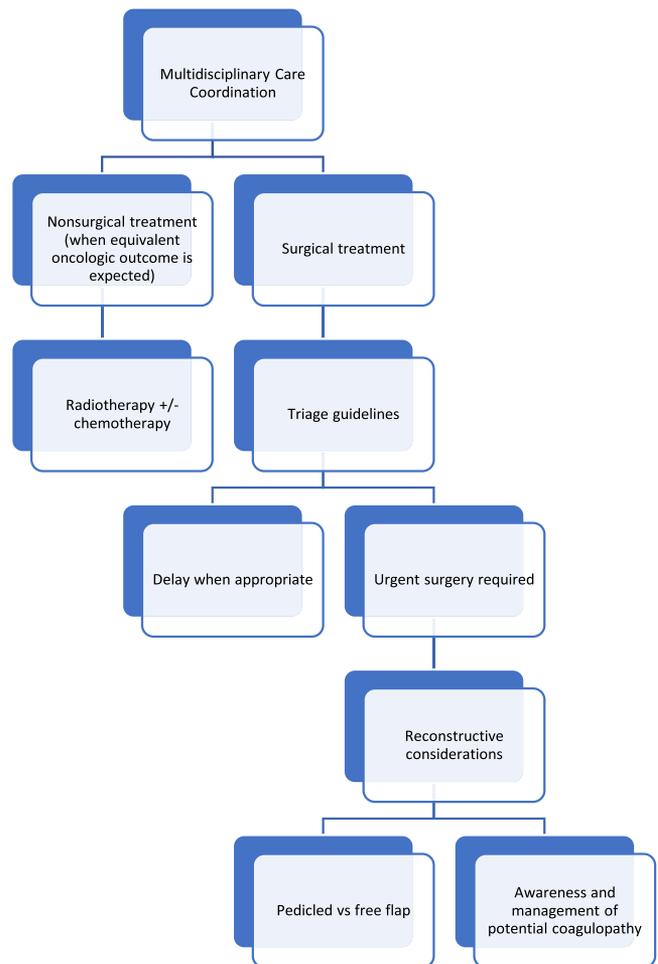


Figure 1 Summary of evidence-based algorithm for management of head and neck cancer during COVID-19 pandemic surges. (Color version of figure is available online.)

be weighed against the institution’s current resources and impact from the pandemic. The most urgent head and neck cases include advanced oral cavity cancers, high grade salivary gland cancers, and advanced or aggressive cutaneous malignancies. Most low-risk papillary thyroid cancers, early/low risk basal cell carcinomas, and benign disease can be postponed if needed for resource preservation.^{40,41} Tofp et al provide clear stratification of common head and neck surgery cases, shown in [Table 2](#).⁴²

Reconstructive considerations

Complex reconstructive surgery is one of the more resource-heavy components of head and neck surgery, often necessitating longer operating room time, an intensive or intermediate care bed, longer hospital stays, and multiple-surgeon cases. As a result, some surgeons relied on pedicled flaps as their reconstructive workhorse during the most challenging times of the pandemic. In Pakistan, Rashid et al describe their experience and successful results using pedicled flaps for major head and neck ablative cases on 31 patients during the pandemic in order to reduce

Table 2 Stratification of common head and neck surgery cases by urgency*Urgent—Proceed with surgery*

HPV-negative HNSCC (especially those with airway concerns)
 HPV-positive HNSCC with significant disease burden or delay in diagnosis
 HNSCC patients with complications of cancer treatment
 Recurrent HNSCC
 Thyroid

- Anaplastic thyroid carcinoma
- Medullary thyroid carcinoma
- Large (>4 cm) follicular lesions, neoplasms, or even indeterminate nodules
- PTC with suspicion or identified metastatic disease
- Locally aggressive PTC
- Revision PTC with active progression of disease

Parathyroidectomy with renal function declining

Skull base malignancy

Salivary cancer

- Salivary duct carcinoma
- High-grade mucoepidermoid carcinoma
- Adenoid cystic carcinoma
- Carcinoma ex pleomorphic adenoma
- Acinic cell carcinoma
- Adenocarcinoma
- Other aggressive, high-grade salivary histology

Skin cancer

- Melanoma > 1 mm thickness
- Merkel cell carcinoma
- Advanced-stage, high risk squamous cell carcinoma
- Basal cell carcinoma in critical area (ie, orbit)

Less urgent—Consider postpone > 30 d

Low-risk PTC without metastasis

Low-grade salivary carcinoma

Less urgent—Consider postpone 30-90 d; reassess after pandemic appears to be resolving

Thyroid

- Goiter without airway/respiratory compromise
- Routine benign thyroid nodules and thyroiditis
- Revision PTC with stable or slow rate of progression

Parathyroidectomy with stable renal function

Benign salivary lesions

Skin cancer

- Melanoma ≤ 1 mm thickness
- Basal cell carcinoma where cosmetic impact/morbidity is likely low with further growth
- Low-risk squamous cell carcinoma

Case-by-case basis

Rare histology with uncertain rate of progression

Diagnostic procedures, such as direct laryngoscopy with biopsy

Reprinted with permission from: Topf, MC, Shenson, JA, Holsinger, FC, et al. Framework for prioritizing head and neck surgery during the COVID-19 pandemic. *Head & Neck*. 2020; 42: 1159– 1167. <https://doi.org/10.1002/hed.26184>.

operative time and crowding in the OR. The locoregional flaps used included temporalis muscle flap, pectoralis major myocutaneous, supraclavicular artery flap, temporalis major flap as well as forehead and cheek rotation flaps for a wide variety of head and neck malignancies. All 31 flaps survived and patient-reported quality of life improved

after the procedures. Regional flaps are excellent options for many situations such as when patients have several comorbidities necessitating a shorter operative duration, when OR crowding or number of surgical team members is of concern, or when a patient's vascular disease does not allow for free tissue transfer.⁴²

Another consideration is the risk of coagulopathy with COVID infection, particularly in patients with cancer. COVID-19 is associated with thrombocytopenia and elevation of D-dimer, as well as coagulopathy as part of the systemic inflammatory response syndrome as a feature of severe COVID-19. Approximately 20%-50% of hospitalized patients with COVID-19 have hematologic changes in coagulation tests (elevated D-dimer, prolonged PT, thrombocytopenia, and/or low fibrinogen levels), leading to more thrombotic than hemorrhagic events.⁴³ Zavras et al found that cancer patients with COVID-19 have high overall rates of thromboembolism with significant incidence of arterial events.⁴⁴ Despite preoperative testing, there is still risk of hospital-acquired COVID infection in the postoperative period. While we hope the risk of nosocomial infection is relatively low, it was reported as 12%-15% in early 2021.²¹ There is also risk of patients acquiring SARS-CoV-2 after discharge from the hospital, while still in the healing phase of their reconstructive surgical sites. Therefore, free tissue transfer in the era of COVID should take into consideration the risk of COVID-induced coagulopathy in the postoperative patient. Free tissue transfer requires revascularization not only of the free flap, but many times of the skin graft used for reconstruction of the donor site. Inouye et al describe 2 cases of patients who underwent uncomplicated segmental mandibulectomy with fibula flap reconstruction and contracted COVID-19 during the postoperative period. Both patients suffered significant wound infection and wound healing complications at the fibula donor site, and 1 had dehiscence of the fibula flap. The severe infectious sequelae were presumed to be due to COVID-19 infection as they otherwise had an uncomplicated initial postoperative course, with the development of significant wound-healing problems and flap/graft loss only following COVID-19 infection.⁴⁵ Nassar et al also described a case of a young healthy male with asymptomatic COVID infection who developed wound dehiscence, hardware infection, and skin necrosis after open reduction internal fixation of a closed right tibial pilon and calcaneus fractures. He subsequently underwent free tissue transfer for reconstruction. The authors report that due to COVID-related coagulopathy, the flap had multiple arterial clots and was eventually lost.⁴⁶

Nonsurgical management

When surgical services are limited in their capacity, nonsurgical management can carry some of the load with similar oncologic outcomes. Spencer et al suggest that an increase in radiotherapy treatments for some types of cancer (particularly for rectal, bladder, and esophageal cancers) in the United Kingdom during the pandemic compensated for reduced surgical activity, allowing maintenance of curative treatment even in the face of limited surgical resources.⁴⁷ Much of the literature out of the United States recommends stronger consideration of nonsurgical treatment (radiotherapy \pm chemotherapy) for head and neck

cancer in situations when elective surgical services are limited *and* where surgical and nonsurgical treatments have comparable outcomes, such as many oropharyngeal and laryngeal tumors, as well as some cutaneous malignancies.^{41,48} However, some have argued that daily radiotherapy treatments and frequent infusions may result in increased cumulative exposure for both the patient and the healthcare system, and that a primary surgical approach may be favored pending multidisciplinary tumor board recommendations.⁴²

Discussion

Head and neck oncology has been affected by the COVID-19 pandemic in several ways. Studies have shown a delay in diagnosis and more advanced cancer presentation as a result of the pandemic restrictions. Telemedicine has an ever-growing role in the care of the head and neck patient, and although the pandemic was the instigator for telemedicine's increased application within head and neck oncology, the value added for patients and providers suggests that it is here to stay. While patient safety is always a top priority, healthcare worker safety came to the forefront of discussion during this pandemic. Head and neck oncologists are particularly susceptible to COVID infection due to the nature of the specialty, and several recommendations have been made for provider safety including PPE, preoperative COVID testing, clinic space upgrades, and limiting aerosol-generating procedures to the most necessary when the risk is high.

Head and neck oncologists faced ethical challenges as well, arguably the most significant of all Otolaryngology subspecialties, trying to balance individual interests and the care of cancer patients with large-scale population needs and resource utilization. New guidelines were made to triage urgency of head and neck pathology to provide fair and consistent decision-making across head and neck practices. Alternatives to complex reconstruction as well as consideration of nonsurgical therapies became more prominent as a result of the pandemic.

Even though COVID-19 created unexpected and unprecedented challenges for head and neck oncologists, colleagues from around the world rapidly shared data and recommendations to help one another. Despite the novelty of the issues faced during the past 2 years, the number of resources available with recommendations and consensus guidelines for head and neck cancer care developed over this short timeframe is astonishing. Further research will be critical in determining the impact our COVID-19 recommendations have had on survival outcomes for patients with head and neck cancer. As head and neck oncologists continue to rise to these challenges and share information with colleagues, we are even more prepared to continue taking care of our head and neck cancer patients despite the challenges we face in this new era of COVID-19 versus Cancer.

Disclosure

The author reports no potential conflict of interest.

References

- CMS Releases Recommendations on Adult Elective Surgeries, Non-Essential Medical, Surgical, and Dental Procedures During COVID-19 Response, Baltimore: BMS, 2020. <https://www.cms.gov/newsroom/press-releases/cms-releases-recommendations-adult-elective-surgeries-non-essential-medical-surgical-and-dental>. Accessed January 15, 2022.
- Patt D, Gordan L, Diaz M, et al: Impact of COVID-19 on cancer care: How the pandemic is delaying cancer diagnosis and treatment for American seniors. *JCO Clinical Cancer Informatics* 1059–1071, 2020. doi:10.1200/cci.20.00134.
- Siddiqui S. CMS Adult Elective Surgery and procedures recommendations [version 3.15.20], Baltimore: CMS, 2022. <https://www.cms.gov/files/document/cms-non-emergent-elective-medical-recommendations.pdf>, Accessed January 15, 2022.
- Yao P, Cooley V, Kuhel W, et al: Times to Diagnosis, Staging, and treatment of head and neck cancer before and during COVID-19. *OTO Open*, 2021. doi:10.1177/2473974X211059429.
- Tevetoğlu F, Kara S, Aliyeva C, et al: Delayed presentation of head and neck cancer patients during COVID-19 pandemic. *Eur Arch Otorhinolaryngol* 278:5081–5085, 2021. doi:10.1007/s00405-021-06728-2.
- Metzger K, Mrosek J, Zittel S, et al: Treatment delay and tumor size in patients with oral cancer during the first year of the COVID-19 pandemic. *Head Neck* 43:3493–3497, 2021 Nov Epub 2021 Sep 8. PMID: 34494330; PMCID: PMC8652728. doi:10.1002/hed.26858.
- Solis RN, Mehrzad M, Faiq S, et al: The impact of COVID-19 on head and neck cancer treatment: Before and during the pandemic. *OTO Open* 5, 2021 2473974X211068075. doi:10.1177/2473974X211068075.
- Stevens MN, Patro A, Rahman B, et al: Impact of COVID-19 on presentation, staging, and treatment of head and neck mucosal squamous cell carcinoma. *Am J Otolaryngol* 43 103263, 2022. doi:10.1016/j.amjoto.2021.103263.
- Portnoy J, Waller M, Elliott T: Telemedicine in the era of COVID-19. *J Allergy Clin Immunol Pract* 8:1489–1491, 2020. doi:10.1016/j.jaip.2020.03.008.
- Layfield E, Triantafillou V, Prasad A, et al: Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head Neck* 42:1681–1689, 2020. doi:10.1002/hed.26285.
- Fassas S, Cummings E, Sykes KJ, et al: Telemedicine for head and neck cancer surveillance in the COVID-19 era: Promise and pitfalls. *Head Neck* 43:1872–1880, 2021. doi:10.1002/hed.26659.
- Rimmer RA, Christopher V, Falck A, et al: Telemedicine in otolaryngology outpatient setting-single center head and neck surgery experience. *Laryngoscope* 128:2072–2075, 2018. doi:10.1002/lary.27123.
- Layfield E, Triantafillou V, Prasad A, et al: Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head Neck* 42:1681–1689, 2020. doi:10.1002/hed.26285.
- Givi B, Schiff BA, Chinn SB, et al: Safety recommendations for evaluation and surgery of the head and neck during the COVID-19 pandemic. *JAMA Otolaryngol Head Neck Surg* 146:579–584, 2020. doi:10.1001/jamaoto.2020.0780.
- Tam S, Wu VF, Williams AM, et al: Disparities in the uptake of telemedicine during the COVID-19 surge in a multidisciplinary head and neck cancer population by patient demographic characteristics and socioeconomic status. *JAMA Otolaryngol Head Neck Surg* 147:209–211, 2021. doi:10.1001/jamaoto.2020.3052.
- Triantafillou V, Rajasekaran K. A commentary on the challenges of telemedicine for head and neck oncologic patients during COVID-19. *Otolaryngology–Head and Neck Surgery*. 2020;163:81–82. doi:10.1177/0194599820923622
- Yan F, Nguyen SA: Head and neck cancer: high-risk population for COVID-19. *Head Neck* 42:1150–1152, 2020. doi:10.1002/hed.26209.
- Sharma A, Crosby DL: Special considerations for elderly patients with head and neck cancer during the COVID-19 pandemic. *Head Neck* 42:1147–1149, 2020. doi:10.1002/hed.26216.
- Tani Y, Sawano T, Kawamoto A, et al: Nosocomial SARS-CoV-2 infections in Japan: A cross-sectional newspaper database survey. *Int J Health Policy Manag.*, 2020. doi:10.34172/ijhpm.2020.75.
- Rickman HM, Rampling T, Shaw K, et al: Nosocomial transmission of coronavirus disease 2019: A retrospective study of 66 hospital-acquired cases in a London teaching hospital. *Clin Infect Dis* 72:690–693, 2021. doi:10.1093/cid/ciaa816.
- Barranco R, Vallega Bernucci Du Tremoul L, Ventura F: Hospital-acquired SARS-Cov-2 infections in patients: Inevitable conditions or medical malpractice? *Int J Environ Res Public Health* 18:489, 2021 Published 2021 Jan 9. doi:10.3390/ijerph18020489.
- COVIDSurg Collaborative Head and neck cancer surgery during the COVID-19 pandemic: An international, multicenter, observational cohort study. *Cancer* 127:2476–2488, 2021 Jul 15 Epub 2020 Dec 21. PMID: 33345297. doi:10.1002/cncr.33320.
- Lei S, Jiang F, Su W, et al: Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClinicalMedicine* 21 100331, 2020 PMID: 32292899; PMCID: PMC7128617. doi:10.1016/j.eclinm.2020.100331.
- Hennessy M, Bann DV, Patel VA, et al: Commentary on the management of total laryngectomy patients during the COVID-19 pandemic. *Head Neck* 42:1137–1143, 2020. doi:10.1002/hed.26183.
- Wang D, Hu B, Hu C, et al: Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 323:1061–1069, 2020. doi:10.1001/jama.2020.1585.
- Khariwala SS, Weinreich HM, McCoul ED, et al: Leveraging COVID-19-inspired changes to advance otolaryngology—Here to stay. *JAMA Otolaryngol Head Neck Surg* 146:605–607, 2020. doi:10.1001/jamaoto.2020.1188.
- Jones RM, Brosseau LM: Aerosol transmission of infectious disease. *J Occup Environ Med* 57:501–508, 2015.
- Mason EA, Kronstadt B: Graham's laws of diffusion and effusion. *J Chem Educ* 44:740, 1967. doi:10.1021/ed044p740.
- Piccirillo JF: Otolaryngology–Head and neck surgery and COVID-19. *JAMA* 324:1145–1146, 2020. doi:10.1001/jama.2020.15779.
- Kavanagh FG, Callanan D, Connolly C, et al: Pre-operative testing for SARS-CoV-2 and outcomes in otolaryngology surgery during the pandemic: A multi-center experience. *Laryngoscope Invest Otolaryngol* 6:773–779, 2021 Published 2021 Jul 5. doi:10.1002/lio2.613.
- American Society of Anesthesiologists and Anesthesia Patient Safety Foundation Joint Statement on Elective Surgery and Anesthesia for Patients after COVID-19 Infection, 2020. <https://www.asahq.org/in-the-spotlight/coronavirus-covid-19-information/elective-surgery>. Accessed January 2022.
- Rohatgi N, Smilowitz NR, Reejsinghani R: Perioperative cardiovascular considerations prior to elective noncardiac surgery in patients with a history of COVID-19. *JAMA Surg* 157:187–188, 2022. doi:10.1001/jamasurg.2021.6953.
- Maniakas A, Jozaghi Y, Zafereo ME, et al: Head and neck surgical oncology in the time of a pandemic: Subsite-specific triageguidelines during the COVID-19 pandemic. *Head & Neck* 42:1194–1201, 2020. doi:10.1002/hed.26206MANIAKASET AL.1201.
- Centers for Disease Control and Prevention (CDC). National Center for Emerging and Zoonotic Infectious Diseases (NCEZID), Division of Healthcare Quality Promotion (DHQP). Appendix B. Air. Guidelines for Environmental Infection Control in Health-Care Facilities. Atlanta, GA: CDC, 2003. <https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html>. Accessed January 15, 2022.
- Liu DT, Phillips KM, Speth MM, et al: Portable HEPA purifiers to eliminate airborne SARS-CoV-2: A systematic re-

- viewsss. *Otolaryngol–Head and neck surg*, 2021. doi:[10.1177/01945998211022636](https://doi.org/10.1177/01945998211022636).
36. Collaborative COVIDSurg: Global wealth disparities drive adherence to COVID-safe pathways in head and neck cancer surgery. *BJS Open* 5:zrab112, 2021. doi:[10.1093/bjsopen/zrab112](https://doi.org/10.1093/bjsopen/zrab112).
 37. Shuman AG, Campbell BH: AHNS Ethics & Professionalism Service. Ethical framework for head and neck cancer care impacted by COVID-19. *Head Neck* 42:1214–1217, 2020. doi:[10.1002/hed.26193](https://doi.org/10.1002/hed.26193).
 38. Patel RJ, Kejner A, McMullen C: Early institutional head and neck oncologic and microvascular surgery practice patterns across the United States during the SARS-CoV-2 (COVID19) pandemic. *Head & Neck* 42:1168–1172, 2020. doi:[10.1002/hed.26189](https://doi.org/10.1002/hed.26189).
 39. Han AY, Miller JE, Long JL, et al: Time for a paradigm shift in head and neck cancer management during the COVID-19 pandemic. *Otolaryngol Head Neck Surg* 163:447–454, 2020. doi:[10.1177/0194599820931789](https://doi.org/10.1177/0194599820931789).
 40. Anderson MD: Head and Neck Surgery Treatment Guidelines Consortium; Consortium members, Maniakas A, et al. Head and neck surgical oncology in the time of a pandemic: Subsite-specific triage guidelines during the COVID-19 pandemic. *Head Neck* 42(6):1194–1201, 2020. doi:[10.1002/hed.26206](https://doi.org/10.1002/hed.26206).
 41. Topf MC, Shenson JA, Holsinger FC, et al: Framework for prioritizing head and neck surgery during the COVID-19 pandemic. *Head & Neck* 42:1159–1167, 2020. doi:[10.1002/hed.26184](https://doi.org/10.1002/hed.26184).
 42. Rashid HU, Rashid M, Khan N, et al: Taking a step down on the reconstruction ladder for head and neck reconstruction during the COVID-19 pandemic. *BMC Surg* 21:120, 2021. doi:[10.1186/s12893-021-01134-1](https://doi.org/10.1186/s12893-021-01134-1).
 43. Gómez-Mesa JE, Galindo-Coral S, Montes MC, et al: Thrombosis and coagulopathy in COVID-19. *Curr Probl Cardiol* 46 100742, 2021. doi:[10.1016/j.cpcardiol.2020.100742](https://doi.org/10.1016/j.cpcardiol.2020.100742).
 44. Zavras PD, Mehta V, Goel S, et al: Increased incidence of thrombosis in a cohort of cancer patients with COVID-19 [published online ahead of print, 2021 Oct 19]. *Acta Haematol* 1–8, 2021. doi:[10.1159/000519292](https://doi.org/10.1159/000519292).
 45. Inouye D, Zhou S, Clark B, et al: Two cases of impaired wound healing among patients with major head and neck free-flap reconstruction in the setting of COVID-19 infection. *Cureus* 13:e20088, 2021. doi:[10.7759/cureus.20088](https://doi.org/10.7759/cureus.20088).
 46. Nassar AH, Maselli AM, Dowlatshahi AS: Microvascular free tissue transfer in the setting of COVID-19 associated coagulopathy: A case report. *Orthoplastic Surg* 4:20–22, 2021. doi:[10.1016/j.orthop.2021.02.002](https://doi.org/10.1016/j.orthop.2021.02.002).
 47. Spencer K, Jones CM, Girdler R, et al: The impact of the COVID-19 pandemic on radiotherapy services in England, UK: A population-based study [published correction appears in *Lancet Oncol*. 2021 Jun;22(6):e239]. *Lancet Oncol* 22:309–320, 2021. doi:[10.1016/S1470-2045\(20\)30743-9](https://doi.org/10.1016/S1470-2045(20)30743-9).
 48. Crosby DL, Sharma A: Evidence-based guidelines for management of head and neck mucosal malignancies during the COVID-19 pandemic. *Otolaryngol Head Neck Surg* 163:16–24, 2020. doi:[10.1177/0194599820923623](https://doi.org/10.1177/0194599820923623).