Time for a paradigm shift in head and neck cancer management during the COVID-19 pandemic

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Abstract
Objective: The coronavirus disease 2019 (COVID-19) pandemic has caused physicians and surgeons to consider restructuring traditional cancer management paradigms. We aim to review the current evidence regarding the diagnosis and management of head and neck cancer, with an emphasis on the role of the multidisciplinary team (MDT) during a pandemic.

Data Sources: PubMed, Google Scholar, the American Academy of Otolaryngology—Head and Neck Surgery and the American Head and Neck Society COVID-19 resources were examined.

Review Methods: Studies on the treatment of head and neck cancer guidelines during COVID-19 setting were reviewed. A total of 54 studies were included. Given the continuously evolving body of literature, the sources cited includes the latest statement from medical/dental societies.

Results: The unpredictable fluctuation of hospital resources and the risk of the nosocomial spread of SARS-CoV-2 have direct effects on head and neck cancer management. Using an MDT-approach to help define “essential surgeries” for immediately life- or function-threatening disease processes in the context of available hospital resources will help to maximize outcomes. Early enrollment in an MDT is often critical for considering non-surgical options to protect...
patients and health care workers. The role of MDT continues after cancer treatment if delivered, and the MDT plays an essential role in surveillance and survivorship programs in these challenging times.

Conclusion: Head and neck cancer management during the COVID-19 pandemic poses a unique challenge for all specialists involved. Early MDT involvement is important to maximize patient outcomes and satisfaction in the context of public and community safety.

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Introduction

The current coronavirus 2019 (COVID-19) pandemic is a systemic viral syndrome caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Since its discovery in Wuhan, the rapid propagation of SARS-CoV-2 has led to unprecedented and extreme public health measures to limit its communal and hospital spread. The American College of Surgeons initially recommended postponing all non-emergent surgeries during this pandemic with recent plans to resume elective cases in a step-wise fashion. The American Academy of Otolaryngology—Head and Neck Surgery (AAO-HNS) and the American Head and Neck Society recommended minimizing mucosal aerosolizing procedures and surgeries, including tracheostomy. As the medical community has become more familiar with natural history, several guidelines and commentaries have been published in various capacities to provide insights into the impact of COVID-19 on head and neck cancer care.

The current pandemic situation resembles other natural disasters such as floods and earthquakes. After Hurricane Katrina in 2005, delays in care occurred because hospital capacity was reduced by 80%, and head and neck cancer patients from all sociodemographic backgrounds had difficulty obtaining cancer treatment. During natural disasters, patients often ignore ominous symptoms and signs of cancer due to the more immediate needs of finding food and shelter. After the Fukushima earthquake in 2011, delays in seeking medical consultation among patients with a high risk of breast cancer lingered for 5 years. During the 1918 influenza pandemic, three separate “waves” were observed, with the second wave of the pandemic in the fall of 1918 being responsible for most of the deaths from the pandemic. Thus the immediate and long-term effects of the current COVID-19 pandemic could linger for a decade.
For many patients with head and neck cancer, surgery is the mainstay of therapy, with the head and neck surgeon assuming the greatest patient advocate role prior to diagnosis. Guidelines on subsite-specific surgery\textsuperscript{12} and the protection of healthcare workers (HCW) during surgery\textsuperscript{13} have been released. However, during in the wake of initial “wave” of this unprecedented pandemic, our approach to head and neck cancer must be restructured to provide patient-centered care while dynamically measuring public health concerns and hospital resources. We encourage early involvement of the MDT in managing head and neck cancer patients to discuss the optimal treatment plans and the indications of an “essential surgery” (a life- or function-threatening surgery) within the confines of the pandemic. Furthermore, we emphasize patient empowerment for early discharge and the prevention of unnecessary emergency room visits. The roles of patient-centric MDT should be expanded to include non-medical support staffs, including psychologists and social workers, to provide comprehensive cancer care during survivorship.

Methods

A literature review was conducted via PubMed and Google Scholar searches and through examination of the AAO-HNS COVID-19 Resources and the AHNS COVID-19 Bulletin and the Head & Neck COVID vs Cancer Special Collections. A total of 54 studies were included. Given the continuously evolving body of literature as well as the recent nature of the COVID-19 outbreak, the cited sources include journal pre-proofs that have been accepted for publication.

The initial approach to a head and neck cancer patient

Patient safety, community infection prevention, and the safety of HCWs must be considered during the COVID-19 pandemic. First and foremost, cancer patients are one of the
most vulnerable subpopulations during this pandemic. Cancer patients, especially those immunocompromised from therapy, are at a greater risk of contracting COVID-19,\textsuperscript{14} and they are more likely to require intensive treatment or to result in mortality once infected (38\% compared to 8\% for the general population based on a patient cohort in China).\textsuperscript{15} The head and neck surgeon is often the first specialist to be involved in the care for suspected head and neck cancer. In the traditional paradigm, the head and neck surgeon assesses the extent of tumor invasion for staging, performs a tissue biopsy for accurate histopathologic diagnosis, and discusses the risks and benefits of surgery. In the COVID-19 era, we recommend a greater reliance on cross-sectional imaging as well as minimally invasive approaches for tissue sampling (e.g., FNA of the lymph node). Furthermore, we recommend direct referral to the MDT (also known as the multidisciplinary tumor board) for patients who already have a tissue-confirmed diagnosis and adequate cross-sectional imaging.

Head and neck cancer patients require a face-to-face visit with a head and neck surgeon prior to the MDT meeting due to the need for endoscopy for accurate staging or tissue procurement. These visits would be considered “essential visits.” Examples include patients with laryngeal cancer who need a functional evaluation of their vocal cords and patients with suspected oral cavity squamous cell carcinoma without nodal disease who need a biopsy of the mucosal lesion. The NCCN Best Practice Feature recommends that every institution develop a criteria for an “essential visit” in the context of the infection-prevention protocol.\textsuperscript{16} These “essential visits” must entail strict infection control and prevention, as discussed elsewhere.\textsuperscript{7,13}

Patient-centric multidisciplinary care of head and neck cancer
The MDT meeting serves as a collaborative forum in head and neck cancer management. Maintaining clear communication between all specialists is critical during this uncertain time with fluctuating availability of hospital resources. The MDT is designed to centralize care with specialization and improve cost-effectiveness within the accepted standard of care.\textsuperscript{17-19} The MDT has also been shown to increase the utilization of nonsurgical multimodal therapies and improve overall survival when age, stage, and year of diagnosis were controlled.\textsuperscript{20,21} Furthermore, patient participation in an MDT program reduces travel time, improves communication between specialists, and enhances continuity of care.

In order to minimize the number of hospital visits and reassess the available treatment modalities due to the surge in hospitalizations, early enrollment in an MDT program is encouraged for any patients with mucosal cancer involving the upper aerodigestive tract. This is in contrast to the traditional paradigm and recent COVID-19 guidelines recommending MDT involvement only when there is uncertainty regarding multidisciplinary involvement.\textsuperscript{22,23} Virtual MDT meeting during the COVID-19 era have allowed providers as far as 200 miles away to participate.\textsuperscript{24} Patients are often requested to meet face to face with the MDT following the tumor board to discuss their treatment options. During this time of pandemic, patients may meet with the MDT via telemedicine, which has previously been shown to preserve accurate staging and decision-making.\textsuperscript{25} We anticipate that patient participation in this discussion will greatly facilitate treatment decision-making with the patient.

While the treatment decision will depend on multiple factors surrounding the patient, given the extraordinary circumstances, we recognize the possible need to deviate from practices during the COVID-19 pandemic. Here, we provide some guidelines for treatment decision-making. Every effort must be made to provide or achieve equivalent outcomes to those of the
traditional standard-of-care therapy. The cancer treatment should be provided within 60 days
after the diagnosis to prevent decreased survival related to treatment delay\textsuperscript{26}; a target of within
30 days for surgical therapy is even more efficacious.\textsuperscript{27-29}

The decision for surgery should consider for patient survival, optimal oncologic control
and protection of the patient, caregiver, and health care workers (HCWs). We propose the term
“essential surgery” to define planned surgical interventions for preventing significant
compromise of the patient’s survival or function. This is in contrast to the term “urgent surgery”
used in other guidelines.\textsuperscript{23} Key leaders of the departmental/divisional surgical committee should
be present at MDT meetings for a timely discussion of whether surgery is feasible from
administrative point of view, instead of having a surgical/departmental committee and a separate
MDT as described previously.\textsuperscript{22,23} The variables for determining what is an “essential surgery”
include the need for a secure airway, the operative time, the length of planned hospital stay,
anticipated unplanned hospital visits due to complications, and the duration of mucosal
aerosolization following tracheostomy, and the anticipated need for adjuvant treatment
(postoperative visits). The ACS has put forth the Elective Surgery Acuity Scale (ESAS) as part
of its guidance for triage of non-emergent surgical procedures.\textsuperscript{2} According to these guidelines,
most cancers with highly symptomatic patients fall under Tier 3a and 3b (high acuity surgery in
healthy and unhealthy patients, respectively). Currently, the ESAS recommends “do not
postpone” status for Tiers 3a and 3b. The “essential surgery” described here would correspond to
Tier 3a and 3b. A judicious consideration of prophylactic tracheostomy is recommended because
it can create an infection risk for the patient, caregiver, and HCWs, even at a skilled nursing
facility. In this framework, the best candidates for surgery would be patients with localized
mucosal cancer (e.g., superficial T1 oral tongue squamous cell carcinoma that will likely result
in negative margin resection\(^\text{30}\)) who can be discharged on the same day without a tracheostomy.

Given the possible surge in hospitalizations and the likelihood of delays for surgery
during subsequent “waves” of the COVID-19 pandemic, the utility of non-surgical treatment
using radiation or chemoradiation should be fully explored.\(^\text{31,32}\) This includes preferential
attempts at a traditional organ preservation approach that can be followed by surgical salvage.\(^\text{33}\)
Especially in extreme circumstances in which the operating facility becomes unavailable, the
benefits of timely but traditionally substandard non-surgical therapy should be weighed against
the diminished benefits of delayed surgery, which may pose suboptimal oncologic control and
heightened infection risks for the patient and caregivers. Additionally, despite the promising
success of early clinical trials using pembrolizumab, the utility of immunotherapy currently
appears to be limited.\(^\text{34}\)

**UCLA Head and Neck Cancer Program: Case Study**

The patient-centric MDT at UCLA comprises head and neck surgeons, medical
oncologists, radiation oncologists, neuroradiologists, head and neck pathology specialists,
maxillofacial prosthodontists, nutritionists, head and neck mind and body psychologists, and a
social worker. The weekly meeting is presided over by a full-time head and neck cancer program
coordinator. Prior to the meeting, a head and neck cancer nurse practitioner compiles clinical
data for discussion. Since the COVID-19 outbreak, our patient-centric MDT has moved to an
online group meeting platform. After extensive discussion about the patient and his/her treatment
options, a consensus is developed or further work-up is requested. The feasibility of scheduling
“essential surgery” in the context of current hospital constraints is discussed without delay, further streamlining patient care.

The unique aspect of the patient-centric MDT at UCLA is that it involves a real-time conversation with the patient regarding the treatment recommendation and salient issues (impacts of the treatment on survival, speech, swallowing, and aesthetics) in a unified voice. During this conversation, a head and neck mind and body specialist and a social worker are present to assist the patient with navigating the health care system during the vulnerable times. The conversation during this encounter is more critical than ever before. Before COVID-19, this patient encounter typically took place in person and all relevant practitioners would participate. Those patients who could not attend in person due to geographic or other restrictions would have a telephone conversation with a lead provider, with other referrals for in-person care organized as needed. With meeting restrictions during the COVID-19 pandemic, this patient encounter has transitioned to an online video meeting with one or more providers. While it may still be a second choice to an in-person encounter, the video meeting does offer several advantages over a telephone meeting that was previously conducted for many patients. The group video meeting enables patient family members to be present more fully in the encounter, which is essential for patient support. The visual cues from patient and family members also offers insights to the provider about patient comprehension, support structure, need for ongoing mental health services, and prognosis for recovery after a major surgery. Finally, the video platform allows greater physician-patient rapport than telephone alone. Specifically in the time of COVID-19 it can be very helpful for both patients and providers to see each other unmasked, even if separated by a video platform, to maintain recognition of each other’s humanity and a caring physician-patient relationship.
Perioperative considerations for patients undergoing essential oncologic surgery

For patients deemed to require “essential surgery” after the MDT discussion, we recommend taking the utmost precautions to protect the patient, caregivers, and HCWs from nosocomial SARS-CoV-2 infections. Several guidelines have been put forth regarding preoperative and airway management. Briefly, the recommendations include safe and swift utilization of technology, early paralysis, minimal use of facemasks, abstinence from non-invasive ventilation, and the use of only low-flow nasal cannula. Before induction of anesthesia, the surgical team should have a clear post-operative plan with an anticipated duration of stay in the hospital as well as disposition plans. This will allow the house staff to coordinate home nursing or auxiliary services during surgery.

The surgical team should practice techniques that minimize the aerosolization of mucosa and blood as discussed elsewhere. Drills and ultrasonic shears (e.g. Ethicon® Harmonic) can vaporize blood on contact. Previous studies have shown the presence of HPV DNA in the vapors of CO2 lasers and electrocautery. In addition, HIV-1 has been found in cool aerosol and vapors from surgical power instruments similar to the Stryker® oscillating bone saw. While traditional closed-suctioning should be used for large defects prone to hematoma, a Penrose drain may be considered in lieu of closed-suctioning in selective or supraomohyoid neck dissections.

During the immediate post-operative period, the surgical team, nursing staff, and support specialists of MDT (e.g., social worker) must prevent non-essential delays for hospital discharge, including delays in placement, transportation and home health. This includes empowering patients and family with early trach teaching, providing drain care instructions, and educating patients regarding post-operative care to prevent unnecessary emergency room visits. Indeed,
early systematic discharge planning after admission increases the successful discharge rate and decreases unplanned readmission. 41 Involvement of mind and body specialists and social workers of the MDT will provide continuity of care and enhance patient compliance. Written discharge instructions must include visual representations of key information to aid recall. 42 Patients may be discharged with closed suction and Penrose drains, with the goal of removal in the clinic or even at home by the patient. 40 Of course, an early transition to self-care at home must be sensitive towards patients who may feel inadequately prepared for discharge.

After the patient is discharged from the hospital, the surgical team must be proactive in seeking postdischarge concerns at home. Previous studies have shown that about 8.4% of patients return to the ED after a head and neck surgery, mostly due to pain and infection, with an unplanned readmission rate of 3.2-5.1%. 43,44 The unplanned readmission rate is even higher (11.6%) in patients who received free flap reconstruction. 45 To prevent unnecessary emergency room visits, a surgical team member should be available for telehealth consultation. Clear and efficient communication via telehealth would allow the preemptive identification of patients with pain, infection and other post-operative concerns. High-risk patients, including those who have undergone free flap reconstruction or neck dissections, complain of xerostomia, and have medical comorbidities may require aggressive pain management. 46 A preemptive 24-hour follow up phone call to these patients may result in enhanced patient care. 47 We also recommend an empiric outpatient antibiotic regimen for suspected surgical site infections after telemedicine examinations performed using photographs or videos.

The patient’s scheduled post-operative visit should be performed via telemedicine for a wound check and a discussion of the final pathology. Although patients in previous published studies generally favored in-person visits over telemedicine visits, 48 more than 95% of patients
were satisfied with a telemedicine visit to an otolaryngologist. Wait time and technical difficulties were mentioned as reasons for dissatisfaction. Institutions, individual health care plans, and potentially the government should collaborate to assist patients with telecommunications infrastructure. At the post-operative telehealth visit, the patient may be referred to a radiation oncologist, medical oncologist, and/or the MDT as needed.

**Head and neck cancer surveillance**

Head and neck cancer surveillance via telemedicine directly affects a physician’s ability to adhere to the NCCN surveillance guidelines. For this reason, it is critical to empower patients to be vigilant about any symptoms of recurrence. The need to reduce in-person clinic visits, in conjunction with the risks associated with endoscopic examination of the upper aerodigestive tract, has generated queries regarding the optimal timing and method for head and neck cancer surveillance. Head and neck surgeons may start to rely more heavily on cross-sectional imaging for detecting cancer recurrence. Current NCCN guidelines recommend a positron emission tomography/computed tomography (PET/CT) scan within 3-6 months of definitive head and neck cancer treatment. After this initial post-treatment scan, no consensus guidelines exist on the frequency or modality of surveillance imaging in an asymptomatic patient due to the lack of survival benefits. However, when routine flexible endoscopy and clinical surveillance are discouraged due to the pandemic, cross-sectional imaging and PET/CT would have greater utility in head and neck cancer surveillance.

In addition to monitoring patients for cancer recurrence, it is important that providers also continue standard post-treatment care including routine blood tests. The NCCN also recommends that all patients who receive significant intraoral radiation therapy undergo a dental evaluation at
least once every 6 months, to minimize the risk of radiation complications such as xerostomia, trismus, dental caries, osteoradionecrosis, and oral candidiasis.\textsuperscript{50} There is an increased risk for cross infection of COVID-19 between dental practitioners and patients; thus the latest guidelines from the American Dental Association should be consulted.\textsuperscript{53,54}

**Head and neck cancer survivorship**

Survivorship refers to the significant impacts of both the diagnosis and treatment of cancer on adult survivors, specifically its potential impact on health, physical and mental states, health behaviors, professional and personal identity, sexuality, and financial standing.\textsuperscript{50,55} The holistic treatment of patients with head and neck cancer has always been an integral aspect of care; however, with the ongoing COVID-19 pandemic, providers need to be hypervigilant in addressing patients’ psychosocial needs. Stay-at-home orders intended to promote social distancing also result in social isolation, particularly for those living alone. Increased rates of panic disorder, anxiety, and depression during the COVID-19 pandemic have been described.\textsuperscript{56} Patients with head and neck cancer are at increased risk for depression and have a suicide incidence rate 3 times higher than that of the general population.\textsuperscript{57} A review of head and neck survivorship predicted a greater mental health toll during the COVID-19 pandemic.\textsuperscript{58} Since cancer patients are already at an increased risk for mental health disorders, policymakers must ensure that mental health resources are readily accessible during this time.

Head and neck surgeons should play an active role in screening their patients for depression and anxiety. As part of the MDT, professionally trained psychologists can help with a formal assessment and refer patients to specialized mental health resource as needed.\textsuperscript{59} Since most in-person appointments with mental health professionals have come to a halt, patients now
need to rely on online counseling services in lieu of face-to-face visits. In China, the use of online mental health services has increased in response to the widespread anxiety, fear, and depression surrounding COVID-19.\textsuperscript{60,61} In the United States, the availability of mental health services varies widely by location, and it is the responsibility of the MDT to be familiar with its institutional resources and protocols so that patients can receive optimal care.

The Crisis Counseling Assistance and Training Program (CCP) is a grant program designed to help individuals and communities recover following a major disaster. Following Hurricane Katrina in 2005, there was a large spike in the number of individuals with mental health problems such as depression, anxiety and post-traumatic stress disorder (PTSD).\textsuperscript{62} In response to this natural disaster, new programs were created via the CCP emphasizing outreach, supportive counseling, education, consultation, and linkages to other services. Thus, during this current time of crisis, it is important for local and state legislatures to identify and apply for resources to increase the accessibility of mental health services.
Conclusions

Head and neck cancer management during the COVID-19 pandemic poses a unique challenge for all specialists involved, especially head and neck surgeons. Given the numerous variables involved and the dynamic nature of resource availability and hospital policies, early patient-centric MDT involvement is important to maximize patient outcomes and satisfaction, in the context of public and community safety. Furthermore, proactive survivorship programs play an integral role in preemptively identifying of patients at risk for not only medical or oncological problems but also psychological distress during this time of heightened social isolation.
Summary of key points

1. Patients with newly diagnosed head and neck cancer, with a biopsy and adequate imaging should be directly referred to a multidisciplinary team (MDT) involving head and neck surgeons, medical oncologists, radiation oncologists and other ancillary staff. The MDT meeting should be a venue for conversation between the patient and a unified voice of cancer specialists.

2. Due to the risk of nosocomial spread, maximal use of cross-sectional imaging in staging and surveillance would be an ideal alternative to flexible endoscopy unless the latter is deemed essential.

3. Encounters with the head and neck surgeon prior to the MDT meeting must be limited to surgical emergencies and “essential” visits necessary for accurate staging or tissue procurement that would otherwise result in suboptimal treatment. In-office procedures involving the mucosa should meet the same standards as those held in operating rooms.

4. Surgery is traditionally the primary modality therapy for most head and neck cancers, but non-surgical alternatives must be carefully considered in anticipation of treatment delays and the risk of nosocomial spread of SARS-CoV-2 during and after surgery.

5. With the MDT, the head and neck surgeon should determine whether the surgery is “essential” to the patient. “Essential” surgery is defined as a surgery that would prevent significant survival- or functional-deficits as compared to non-surgical alternatives.

6. Once the decision is made that the patient requires “essential” surgery, the surgical team and non-medical support specialists of the MDT (mind and body psychologists and social workers) must plan for early discharge and empower the patient for self-care. Every effort must be made to prevent prolonged hospitalization due to non-medical reasons, including due to patient placement and transportation.
7. Detailed discharge education, including written instructions enhanced with diagrams, will prevent unplanned emergency room visits and readmissions.
8. Immediate post-operative visits and cancer surveillance should be performed via telemedicine, when possible; face-to-face encounters should be reserved for any concerning symptoms or emergencies.
9. Following the acute phase of cancer treatment, patients should be enrolled in institutional cancer survivorship programs that include non-medical support specialists of the MDT, to monitor for long-term side effects, including psychological distress from diagnosis and treatment. Local municipal public health agencies are encouraged to work with hospitals to develop mental health screening programs during this time of pandemic.
10. Patient safety and optimal oncologic control are the primary goals in this line of duty, but strict infection prevention measures should be upheld to protect physicians and other hospital care workers involved in caring for patients.
Figure 1. Overview of head and neck cancer management in the COVID-19 era.


Figure 1

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