

# Ethical Surgical Triage of Head and Neck Cancer Patients during the COVID-19 Pandemic

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## Abstract

### BACKGROUND

Coronavirus has serially overtaken our metropolitan hospitals. At peak, patients with acute respiratory distress syndrome may outnumber mechanical ventilators. In our Miami hospital system COVID-19 cases have multiplied for 4 weeks and elective surgery has been suspended.

### METHODS

An otolaryngologic triage committee was created to appropriately allocate resources to patients. Hospital ethicists provided support. Our tumor conference screened patients for non-surgical options. Patients were tested twice for Sars-CoV-2 before performing urgent contaminated operations. N95 masks and protective equipment were conserved when possible. Patients with low-grade cancers were advised to delay surgery, and other difficult decisions were made.

### RESULTS

Hundreds of surgeries were cancelled. Sixty-five cases supervised over three weeks are tabulated. Physicians and patients expressed discomfort regarding perceived deviations from standards, but risk of Covid-19 exposure tempered these discussions.

### CONCLUSIONS

We describe the use of actively managed surgical triage to fairly balance our patient's health with public health concerns.

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**ABSTRACT**

**BACKGROUND**

Coronavirus has serially overtaken our metropolitan hospitals. At peak, patients with acute respiratory distress syndrome may outnumber mechanical ventilators. In our Miami hospital system COVID-19 cases have multiplied for 4 weeks and elective surgery has been suspended.

**METHODS**

An otolaryngologic triage committee was created to appropriately allocate resources to patients. Hospital ethicists provided support. Our tumor conference screened patients for non-surgical options. Patients were tested twice for Sars-CoV-2 before performing urgent contaminated operations. N95 masks and protective equipment were conserved when possible. Patients with low-grade cancers were advised to delay surgery, and other difficult decisions were made.

**RESULTS**

Hundreds of surgeries were cancelled. Sixty-five cases supervised over three weeks are tabulated. Physicians and patients expressed discomfort regarding perceived deviations from standards, but risk of Covid-19 exposure tempered these discussions.

**CONCLUSIONS**

We describe the use of actively managed surgical triage to fairly balance our patient's health with public health concerns.

**INTRODUCTION**

Our tradition in medicine, dating back to the Hippocratic oath in the fifth century BC,<sup>1</sup> has emphasized the importance of putting our patient first, avoiding choices that might harm them, and not considering issues unrelated to that particular patient's health as we make our medical decisions. Public health considerations involving risks to providers and other patients have not normally been factored into the decision. Furthermore, what we have known to be best for the patient in the past, has not involved calculating the risk of contracting a potentially fatal infectious disease while merely walking into the hospital.

Recently, however, the unprecedented and now-familiar events related to the COVID-19 pandemic have affected communities all over the globe,<sup>2,3,4</sup> including South Florida. By the time of this writing, Newsweek reported, based on U.S Center for Disease Control and Prevention (CDC) data, that coronavirus had surpassed heart disease and cancer as the number one killer of Americans on a daily basis.<sup>5</sup>

On March 14, US Surgeon General Jerome Adams recommended in a tweet that hospitals stop all elective procedures amid the COVID-19 outbreak.<sup>6</sup> The same day our two hospitals' administrations issued an

electronic communication asking surgeons to cancel all elective surgeries at our facilities. On March 20 the Governor of Florida issued a formal ban on elective surgery<sup>7</sup>. Permissible procedures included “removal of cancerous tumors, transplants, limb-threatening vascular surgeries, trauma-related procedures, and dental care related to the relief of pain and management of infection.”<sup>7</sup> In practice, in oncologic surgery, it was left to each institution to determine what was urgent, and which patients would be best served by receiving surgery, despite increased risk to the patient, providers, and other patients during the pandemic.

Our approach, as we addressed surgical triage, was to consider each patient’s risk of complications related to receiving surgery in the midst of the pandemic and deciding if that risk “tipped the scales” towards delaying care or planning an alternative treatment. Though data was scarce, experience in China and Italy indicated that the risk of either directly developing a coronavirus infection, or of ending up with a complication requiring care in the midst of a situation of inadequate medical resources, might outweigh the benefit of receiving cancer surgery earlier in certain cases.<sup>3,4,8</sup>

The greatest paradigm shift that occurs in times of crisis, however, is the concept that the good of society, and the health of the caregivers and other patients, may have some weight in the equation, even as clinicians continue to make our patients’ well-being our primary goal. Considering these additional factors is the part that we may find most difficult to adjust to. Furthermore, as we approach so called “surge” conditions in any disaster, and resources approach the point of being overwhelmed, these factors may become more important, and even approach or surpass those of the patients themselves.<sup>9,10</sup>

In times of crisis, it is clearly recognized that standards of medical care may have to be altered. In an almost clairvoyant publication, intensivist and disaster management expert Michael Christian, MD, published an essay entitled “Triage” in October 2019,<sup>9</sup> just before anyone imagined the events that were about to unfold in Wuhan, China. He defines triage as “allocating scarce resources in order to do the greatest good for the greatest number”. He emphasizes that appropriately performed triage, while difficult, can save large numbers of lives, by preserving resources for “salvageable” patients. One must add to this equation the need to protect caregivers so they can attend to other patients. There is an extensive literature on appropriate crisis triage, based on experience during warfare<sup>11,12,13</sup> and natural disasters.<sup>14,15</sup> This was most recently seen in our own country with the crisis in New Orleans in the aftermath of Hurricane Katrina, when physicians in hospitals had to triage civilian patients in a manner normally seen only in the midst of battle.<sup>14,15</sup>

While we can extrapolate from triage and management models developed for times of war or natural disaster, this global pandemic is a different entity entirely, affecting almost the entire planet at once.<sup>2,3,4</sup> It involves an ascension to a peak volume and then a descension, rather than a single disaster date as would occur with a natural disaster or act of war, and it is affecting Asia, Europe, Africa, and the Americas within months of each other.<sup>2,3</sup> The SARS-CoV-1 epidemic of 2001-2004,<sup>16</sup> the H1N1 influenza epidemic of 2009-2010,<sup>17</sup> the Middle Eastern Respiratory Syndrome (MERS) of 2012,<sup>18</sup> and the West African Ebola epidemic<sup>19</sup> of 2013-14, were much more geographically confined. Perhaps for this reason, there are no published reports of a need for cancer patient triage during such epidemics. H1N1 Influenza, in particular, was known to be virulent in patients with hematological malignancies<sup>17</sup>, especially if undergoing treatment, but we found no reports that access to health care was threatened, requiring triage of solid cancers. There were limited anecdotal reports of health access issues during the Ebola crisis in West Africa; they hinted at some of the issues we currently face.<sup>20,21,22</sup>

The ethics of triage and management in situations of crisis including pandemics have been extensively discussed, modeled and prepared for, and it is widely accepted that the rules need to be adjusted to each new situation.<sup>9</sup> Biddison et al.,<sup>10</sup> in a consensus statement in the critical care literature, identify 23 ethical guidelines for crisis situations. The importance of communication with patients and families and the possibility of consulting ethicists is emphasized. Moreover, they comment: “We suggest critical care resources be allocated based on specific triage criteria, irrespective of whether the need for resources is related to the current disaster/pandemic or an unrelated critical illness or injury. “

Our purpose here is to provide a practical working example of how one large head and neck oncology

group sought to ensure that patients requiring head and neck surgery received appropriate triage during the pandemic, and were neither put at increased risk of a poor outcome from their tumor nor from Covid-19 infection.

## MATERIALS AND METHODS

As of this writing we continue to experience the ascending portion of the COVID-19 crisis, where resources are being protected but are still available. We have not had to deny access to surgery in a way that would not meet normal standards of care, but we did have to make choices that would not have been made in normal times. We would like to share the process and approach that was used to make these decisions in three example cases, and provide a table listing 65 patients triaged over a three-week period with their diagnosis, history and disposition (Table 1).

Our system of triage evolved over this period of time, both in terms of the number of negative SARS-Cov-2 tests required to approve patients for surgery, and in terms of the emphasis on avoiding surgery. We sought to maintain current standards of care, while making adjustments based on the ascending COVID-19 crisis. The primary goal was always the well-being of the patient. If any potential harm from not proceeding immediately with surgery was not felt to be outweighed by the benefit of keeping the patient away from the hospital during the pandemic, then the surgery was performed, albeit with technical modifications to increase safety. In cases where delays were believed to have little impact, or where non-surgical therapies were thought to represent reasonable alternatives, the benefit of keeping the patient safe from viral infection or the risk of unknowingly operating during the prodrome of a COVID-19 infection,<sup>20</sup> might be judged to tip the scales away from surgery. The public health benefits related to other patients and providers were noted but assigned lower weight.

We created a committee of six senior faculty from a department of 32 clinical otolaryngologists. This Surgical Review Committee reviewed all proposed operative cases from our university and county hospitals, nearly all of which involved head and neck tumors.

There were five stages to the triage process:

The primary surgeons evaluated their preoperative (preop) patients and made decisions with each patient regarding treatment adjustment. If a variation occurred relative to the original plan or to our standard practice, it generally was one of the following:

- a. Delay of surgery for two to three months
- b. Transfer to a non-surgical treatment, only if that approach met normal standards of care.
- c. Change in surgical approach (i.e. reduction of powered instrumentation during endoscopic transnasal resection of neoplasms).
  1. In all but the most straightforward cases, the surgeon as a next step would consult electronically with a colleague from the Surgical Review Committee. This allowed for an initial review of the case prior to the formal committee discussion.
  2. Multidisciplinary questions were taken to a Head and Neck Tumor Board (conducted virtually), where issues related to triage during the pandemic drove the discussion. Subspecialized medical and radiation oncologists participated and could confirm agreement with the plans and acceptance of patients in those cases where a shift to nonsurgical care was advised.
  3. For those cases in which the surgeon felt surgery was essential, the discussion was taken to the formal Surgical Review Committee again conducted "virtually". Presentation at the committee could result in suggested alterations of the surgical plan, delay of surgery, or transfer to a non-surgical approach.
  4. If the surgeon, colleagues, or committee members, felt uncomfortable with the committee recommendations, consultation with our hospital ethicists was an option. Later, if uneasiness was expressed by the patient or family, involvement of the ethicist was again considered. In fact, we consulted with individual ethicists intermittently regarding our processes and approach, but never needed to involve the formal university ethics committee regarding specific patients.

Various new standards evolved during this process. Some of these overlap with those suggested by Day et al in their recent guidelines.<sup>23</sup> Some were uncontroversial, such as a delay of surgery for most benign diagnoses. Yet even a benign diagnosis can entail critical airway obstruction or aspiration, or other acute loss of vital function for which the window of intervention could not be extended. When MRI or CT findings suggested a more aggressive and rapidly evolving process despite a benign biopsy, clinical features and imaging took precedence. An example of this was an intranasal mass, suspected to be a benign inverted papilloma or juvenile angiofibroma, with progressive optic nerve compression and increasing vision loss. A second standard was to consider delay of surgery for slow-growing low-grade malignant tumors. Equivocal fine needle aspiration cytologic results could create uncertainty, but these situations were usually resolved by examining the clinical scenario and comparing serial imaging. In some cases, repeat biopsy or imaging was suggested, but the additional risk of more medical interventions to the patient and staff in the coronavirus setting was always weighed. Delays were justified for these more indolent malignancies, particularly if serial observation confirmed stability on physical examination and/or imaging, and if the patient had risk factors for a worse outcome with COVID-19 infection. However, given the reports of poor outcomes in healthy patients operated on during the prodrome of a COVID-19 infection<sup>8</sup>, even healthy patients were considered at risk. A third standard was the transfer of the patient from a high-risk surgical procedure to non-surgical therapy when this represented an equivalent standard of care. The most common type of surgery for which this transition occurred was for T1 and T2 oropharyngeal cancer, with negative or early stage neck disease, where radiation with or without chemotherapy is a standard alternative treatment. Endoscopic LASER resections (Transoral LASER Microscopic Surgery or TLM), usually performed for supraglottic or glottic cancer at our institution, represented a similar category. The possibility of inhalation of smoke plume and the proximity of the surgeon to the endoscope and the patient's oral cavity make these high-risk procedures for viral transmission in either direction. A fourth standard was that if delay or transfer to non-surgical therapy could not be justified, such as for high-grade cancers, an unsafe wound needing reconstruction, or respiratory issues, then surgery should proceed as soon as possible, but - with the exception of immediate life or death emergencies - should wait for appropriate COVID-19 testing. We quickly realized however, that even with negative testing we still needed to proceed with full personal protective equipment (PPE) especially for high risk procedures involving mucosal incisions or use of instrumentation resulting in potential aerosolization of viral particles, as testing could give a false sense of security. Initially one negative SARS-Cov-2 test was required, but early on, after Case 3 (below), this was converted to two negative test results with the last negative result within 24 hours of surgery. Apparent false negatives and false positives occasionally occurred, disrupting surgical planning and postoperative care. This is consistent with early reports from China, which report false negative rates as high as 30% in known COVID-19 patients.<sup>24</sup> No data is available on sensitivity and specificity of routine testing of asymptomatic preop patients. We were greatly assisted by the rapid institution of reverse transcription polymerase chain reaction (RT-PCR) testing for Sars-CoV-2 by our clinical laboratories, progressing within 10 days from a test that took 3 or 4 days to produce results to one that produced results in a few hours. Quigen Rotorgene Platform using U.S. Centers for Disease Control and Prevention primer pairs and the Genmark platform were the two types of tests used.<sup>25,26</sup> If proceeding with surgery, suggestions were often given to reduce the scope of surgery or make the surgical technique safer. For example, in one case it was thought unjustified to send an early, relatively superficial T1 supraglottic cancer in a young patient to radiation, but it was excised by cold technique instead of LASER, in order to avoid the aerosolized LASER plume. Another modification was the use of plastic covers for nasal endoscopic skull base surgery (Figure 1) along with additional suctions used to evacuate bone dust and cautery induced plumes, similar to smoke evacuators used in LASER surgery. A fifth standard was that scheduling of tracheostomy required special consideration. Tracheostomy is potentially one of the highest risk operations we perform for possible COVID-19 transmission due to the possibility of aerosolized secretions. At the same time, tracheostomy on an intubated patient may allow for weaning from the ventilator and exit from the intensive care unit (ICU), freeing the spot for another patient. Tracheostomy in a COVID-19 positive patient presents a high risk. The likelihood that tracheostomy would truly facilitate weaning for a particular patient was carefully considered, and several guidelines and publications and recommendations from our recently created departmental covid-19 tracheotomy advisory committee were seriously weighed.

Our department developed institutional guidelines and protocol for tracheotomy during the pandemic based on available published national and international guidelines, taking into account the specific situation of our institution during the pandemic. Current guidelines recommend delay of tracheostomy when appropriate in the setting of acute SARS-Cov-2 infection until the patient becomes less infectious.<sup>27</sup>**RESULTS**From February 14 to April 10, 2020, we saw 129 new or suspected head and neck cancers and 83 benign tumors at our NCI designated cancer center. Suspected benign processes were all rescheduled from clinic after March 9, so the benign tumors were all seen before that. In addition, 13 new cancers were seen at our county hospital over the same period, along with 8 benign tumors. Patients needing surgery from among the patients seen at both institutions would largely have been operated on in March and April. Between March 15 and March 20, 2020, when our hospital instituted the policy forbidding "elective" surgery, 281 otolaryngology procedures already on the surgical schedule were cancelled at the University hospital based on the initial determination by the surgeons and their coordinators that they were elective. Another 215 patients had been pending surgical scheduling in our otolaryngology department but did not yet have an assigned date. An additional smaller number of scheduled ears, nose, and throat procedures were at some point in scheduling at our county hospital and were also cancelled or not scheduled, approximately 50 cases. One hundred and eleven cases were left on the surgical schedule by otolaryngologists after March 20, for consideration as urgent. In addition, an unquantified, and probably larger group of patients were in the process of being prepared for surgery, and soon to be scheduled, and were "self-triaged" to wait or treat non-surgically by the surgeons or by patients who were themselves concerned about coronavirus infection despite having another serious diagnosis. Thus, hundreds of patients were cut off from "normal" head and neck surgical care. Those with urgent, mostly neoplastic diagnoses, were triaged through the processes described under "Materials and Methods". Table 1 lists the first 65 patients that were triaged during the initial three weeks after suspension of elective surgery. All patients who made it on to the surgical schedule during these three weeks are listed. Diagnosis, patient history, original surgical plan, and committee recommendations and disposition are included. Patients who were transferred to non-surgical care or delayed at the time of the primary surgeon's clinic evaluation or through our tumor conference are not all included. Benign tumors without airway issues are not included unless the surgeon decided to request approval for surgery. Surgeries presenting through the Emergency Room or Trauma Unit were also not included, but transfers from other hospitals were evaluated just as outpatients would be. Our goal is to provide an overview of the process that occurred. Three unique cases are described below:

## CASE PRESENTATIONS

### Case 1 Suspected Malignancy in Retropharyngeal Nodes

An asymptomatic 37-year old woman with a history of papillary cancer of the thyroid, presented in December 2019, referred for suspected malignancy involving high retropharyngeal lymph nodes bilaterally, detected on a contrasted Computed Tomography (CT) in October 2019 (figure 2).

The patient had four previous surgeries for well-differentiated papillary thyroid cancer at other institutions. In 2006 she underwent total thyroidectomy, removal of one central compartment node, and 9 lateral neck lymph nodes of which 6 contained malignancy. Based on abnormal ultrasounds and thyroglobulin levels over the years, the patient was taken back to surgery on three subsequent occasions, including a comprehensive procedure in 2018, with revision neck dissection bilaterally including level 6 and left level 5. Seven of 31 lymph nodes were positive.

Her only medication was oral levothyroxine. Head and neck physical examination was notable only for surgical scars.

Due to the unusual location of these lymph nodes, there was concern that these might represent a more aggressive lesion. The CT was indistinct in evaluating the borders of the lesions. There were additional involved lymph nodes more inferiorly in the right neck and some questionable lymph nodes by CT criteria on the left. Review of her surgical pathology from 2018 confirmed classical papillary thyroid cancer. Her Thyroglobulin was 6.0 unstimulated. Stimulated Thyroglobulin elevated to 29.3.

We advised contrasted magnetic resonance imaging (MRI), and Positron Emission Tomography/ Computed Tomography (PET-CT) to further evaluate, along with presentation at our multidisciplinary head and neck tumor conference. The MRI showed the well-encapsulated cystic retropharyngeal lymph nodes more distinctly (figure 3), with 2 cm as the largest dimension. The PET-CT was negative for Fluorodeoxyglucose uptake, suggesting low-grade lesions. The retropharyngeal lesions were felt to be inaccessible for fine needle aspiration.

We recommended bilateral revision neck dissection followed by bilateral exploration of the parapharyngeal space, carefully following the carotid upwards to excise the retropharyngeal lymph nodes. Laryngeal nerve integrity monitoring would be used. Mobilization of the tail of parotid, ligation of the external carotid artery, and possible identification of the facial nerve in the parotid were felt to be potentially necessary to achieve the exposure of the retropharyngeal nodes. The patient was consented appropriately regarding risks, including cranial neuropathies and first bite syndrome.

The patient obtained second opinion and presented again in early March, and surgery was scheduled two weeks later. By March 15 the COVID-19 pandemic was in ascendance and elective surgery was suspended. The working rule in our Case Review Committee had been to delay surgery for well-differentiated thyroid cancer. This case was pre-reviewed by committee members because of the unusual anatomic location of the lesions. The recommendation was to repeat the MRI to confirm stability on two similar studies. Repeat MRI confirmed no changes in the lesions between January and April. Based on this, we recommended not to hospitalize during the pandemic and planned surgery in three months.

#### CASE 2 Massive Goiter with Severe Tracheal Compression

A 62-year old woman presented to our county hospital emergency department reporting dyspnea on exertion.

She now was noted to have reduced oxygen saturation after exertion. CT with iodinated contrast at our facility confirmed severe tracheal compression and a 5 mm tracheal width (figure 4). The compression was positional and on certain axial images the tracheal lumen appeared completely obscured (figure 5). The patient received intravenous dexamethasone during this admission, respiration improved, and she was discharged and counseled to avoid heavy exertion and avoid laying on the right side.

The patient also had several elevated calcium levels and parathyroid hormone levels (PTH), with her highest preoperative PTH at 110 pg/ml and calcium at 11.4 mg/dl. Subsequent ultrasound and "Four Dimensional" CT (Respiration correlated /parathyroid protocol CT) did not localize a parathyroid adenoma.

The next week the patient was back in the emergency room with dyspnea. Due to breathing difficulties we cancelled a planned parathyroid (technetium 99 sestamibi) nuclear scan, and surgery was scheduled urgently. The plan for airway management was awake fiberoptic intubation with the smallest reinforced endotracheal tube that would fit over a flexible bronchoscope and was long enough to reach beyond the narrowing of the trachea, which was estimated to be a size six tube. We would not be able to use the larger diameter tubes with electrodes for nerve integrity monitoring. The emergency backup plan for airway management was a cricothyroidotomy to allow placement of a smaller diameter, shorter, pediatric size tube. At this point the pandemic was in its ascendance. Significant questions were raised regarding the risk of infection of the team during emergency airway management. Therefore, given that she was comfortable on room air at rest, the patient was discharged, and surgery was delayed for a few days so that it could be moved to a cardiac bypass operating room which was set up for extracorporeal membrane oxygenation (ECMO). She also was tested and negative for COVID-19 by nasopharyngeal swab polymerase chain reaction (RT-PCR) assay.

At surgery all staff in the room wore N95 masks and full PPE, including face shields, hats and gowns. Under local anesthetic, the patient underwent bilateral femoral line placement to allow for more rapid conversion to ECMO if necessary. The nose and throat were topically anesthetized with sparing use of topical lidocaine cream, avoiding aerosolized topical anesthetic. She was successfully intubated awake using a fiberoptic bronchoscope and size 6 reinforced tube, which just reached the distal obstruction. The plan had been to initiate ECMO if fiberoptic intubation failed, in order to reduce risk of aerosolization of viral particles during

an awake cricothyroidotomy.

The multinodular goiter was excised with visualization and preservation of the recurrent laryngeal nerve. The goiter was bluntly delivered from the mediastinum. Two obviously enlarged parathyroids were encountered, and frozen section biopsy suggested parathyroid hyperplasia. We removed both ipsilateral parathyroids and the intraoperative PTH dropped to 48. Representative frozen section biopsy confirmed benign colloid nodule. At this point, we elected not to explore contralaterally.

The patient recovered uneventfully with no respiratory issues and was discharged 24 hours after surgery. Final pathology confirmed the intraoperative diagnoses.

### CASE #3 Advanced Oral Cavity Cancer With False Positive COVID-19 RT-PCR

A 60-year old man presented with a 7-month history of a right sided oral lesion, progressive over time and increasingly painful.

A biopsy showed invasive moderately differentiated squamous cell carcinoma. Past medical history included myocardial infarction and angioplasty 3 years before. His only medication was aspirin. Patient had smoked cigarettes for twenty-five years, used chewing tobacco, and drank 4 drinks of liquor daily.

Physical examination revealed a right posterior buccal lesion, bulging into the cheek and extending from inferior alveolar ridge to superior alveolar ridge with trismus.

CT with iodine-based contrast media and PET-CT demonstrated the oral lesion with limited bone erosion at the superior alveolar ridge. A one-centimeter round level 1B node was positive on PET-CT.

The patient was scheduled for tracheostomy, full-thickness buccal resection, marginal mandibulectomy, partial maxillectomy, right neck dissection, and anterolateral thigh free flap reconstruction. Committee review classified surgery as urgent and without equivalent non-surgical alternatives. He had one negative COVID-19 RT-PCR performed three days before surgery.

Shortly before surgery our policy changed to require that all urgent mucosal surgeries have two COVID-19 RT-PCR tests. Since testing had a 3-day turnaround time, a second test was sent on the morning of surgery, but surgery proceeded. The operation was uncomplicated. Staff wore N95 masks, face shields, and gowns. His postoperative course was typical, but on postoperative day 3 his preop COVID-19 RT-PCR test resulted positive and the patient was moved to a COVID-19 ward. The patient never had symptoms.

Significant controversy arose because residents and nurses had been caring for his tracheostomy using N95 masks and face shields, but not always with full PPE. The surgeons involved had to defend the ethics of proceeding to surgery with a pending COVID-19 RT-PCR. All future mucosal cases were subsequently required to have two tests with results completed before surgery. Fortunately, our facility concurrently acquired a rapid test with two-hour turnaround time, and a third test performed on postoperative day 4 which returned negative. Given the two negative tests, and absence of symptoms, it was decided that the second test was likely a false positive. The patient spent only one night on the designated coronavirus floor.

One member of the operative team, a “scrub” technician who entered the procedure briefly, later became mildly symptomatic and tested positive for coronavirus RT-PCR. Other members of the surgical team and nurses and housestaff performing postoperative care all tested negative. The origin of the exposure of our technician is difficult to determine.

The patient was discharged home on postoperative day 9 with a nasogastric feeding tube and a tracheostomy tube with a plan to remove both soon in the office. Final pathology revealed negative margins, perineural invasion at the primary site, and a 9-millimeter lymph node grossly involved by cancer at level 1B with extracapsular extension, leading to a recommendation for chemoradiation postoperatively.

## DISCUSSION

No randomized trials provide data regarding the appropriate systems and policies for the triage of patients with potentially fatal cancers during a global pandemic. The infrastructure and regulations for appropriate triage of the ill and injured that have been developed for crisis triage during war and natural disaster serve as guides, but these situations are not the same, as they may be more intense, but are more limited in time and area of geographic involvement. What is safe, fair and appropriate may not always be clear as the availability of medical resources decreases over time, and while these are threatened in the future, they are still selectively available in the present. Our policies must change and evolve depending on the magnitude of the situation.<sup>9,28</sup>

In the absence of data to guide us, we involved the most experienced surgeons available, and extensive open discussion in multiple forums was followed by formal committee review in order to make decisions. While in theory the committee chairman had the final word, there was always a consensus regarding the appropriate approach. Even primary surgeons who were advocating for a surgical plan on their specific patient accepted the magnitude of the situation and the reasons for decisions that were made.

In the escalating phase of an epidemic when the hospital is trying to keep beds open in anticipation of patient needs, what is appropriate and ethical may be very different from when the pandemic is at its peak.<sup>9,28</sup> Difficult decisions may seem unjustified at a point where we are preparing for expected volume, but still have unoccupied beds, compared to later when the system enters crisis mode. However it would be a fallacy to think that we can “catch up” later, and modeling studies of pandemic crises generally confirm that proper early triage can save lives dramatically over a “first come first served” approach.<sup>9,28</sup> At the same time others have pointed out that triage poorly done, based on improper clinical parameters, can actually lead to worse outcomes.<sup>9,28,29,30</sup> This could occur due to underestimating or overestimating the severity of a patient’s condition, and underutilizing or overutilizing resources, and can actually save fewer lives rather than more.<sup>28,29,30</sup> Thus recommended decisions must be based on appropriate in depth criteria, including understanding and reviewing histology or cytology when possible, and reviewing or repeating imaging when appropriate.

In the absence of exact data, even more problematic is how to factor in the changing level of risk over time of coronavirus infection in these cancer patients, some of whom fall in high risk groups for COVID-19, while also considering the public health goals of conserving intensive care unit beds, ventilators, and PPE. Furthermore, we must then calculate the risk level and relative importance of protecting providers, not only out of fairness to the provider, but also because the provider is a valuable resource in short supply who will be able to treat other patients during the pandemic.<sup>9,28,29,30</sup> At the time of writing this manuscript, our healthcare systems (UHealth and Jackson Memorial Hospital) have so far reported the death of one nurse, one MRI technician, one physician faculty member and one radiology technician as a result of COVID-19.

We emphasize the importance of communicating well with patients and surgeons throughout the process, and reminding them to consider all risks, including risk of COVID-19, emphasizing the Surgeon General recommendations regarding elective surgery, and providing data as needed regarding alternatives for cancer treatment.

Several specialty societies have published guidelines regarding cancer management during the pandemic. These do not specify at what point they should be instituted, and how severe the situation should be. Some of the recommendations, allow potential misinterpretation. For example, the Society of Surgical Oncology has suggested delay of treatment for thin invasive melanomas, and prioritization of surgery only for thicker melanomas.<sup>31</sup> While the reasons for this recommendation are understood, and there are many details to consider, the approach seems debatable in a situation where resources are being protected, but some are still available, as this early group of invasive melanomas are those most likely to be cured by surgery.

The American Head and Neck Society has not published specific guidelines. We have referred here to the publication by Day et al<sup>23</sup> that provides some reasonable guidelines and we add our suggestions here. Our recommendations, in the absence of randomized data, come from practical work triaging surgeries during this process:

- 1) All head and neck cases for which a change in plan is under consideration should be reviewed by a multidisciplinary tumor conference to provide care recommendations specifically in the context of COVID-19 with appropriate documentation of how the pandemic has impacted treatment recommendations.
- 2) A departmental surgical review committee should be established to evaluate all cases proposed for surgical care to provide independent review of appropriate urgency for surgical scheduling. This committee provides a second level of review that is guided by the primary physician's assessment and recommendations, multidisciplinary recommendations from tumor conference, as well as the important independent perspective of non-head and neck surgeons with regard to resource utilization and patient and staff safety concerns. The surgical review committee should have real-time access to hospital ethics committee consultation when necessary.
- 3) We suggest delay for 2 to 3 months of surgery for low-grade malignancies, including well differentiated thyroid cancers and low-grade parotid cancers, and skin cancers not threatening vital functions.
- 4) We recommend that these patients be followed closely with consideration for repeat imaging during this period to allow for correction of the approach if the tumor is progressing.
- 5) When surgery is clearly the superior option for a high-grade mucosal cancer, such as for oral cavity cancer, we would recommend proceeding to surgical treatment. At the height of the pandemic surge this may be interrupted, but when capacity is still available, these patients' survival is at stake and they should have a fair claim to available resources.
- 6) The importance of available rapid accurate testing for active Sars-CoV-2 infection in order to allow surgical care to be offered cannot be overstated. Naturally, given the novelty of this virus, current testing technology is in its early stages. We eagerly await more accurate and reliable testing, including well validated data for false negatives and false positives in the setting of preoperative patients without symptoms of COVID-19.
- 7) During this brief point in time, mucosal cancers for which non-surgical options are considered appropriate should be considered for non-surgical treatment. Specifically, TORS and TLM are often used in clinical scenarios where non-surgical options offer equivalent survival, and both represent high risk procedures.

During endoscopic surgery the surgeon's face is sometimes in close proximity to the rigid laryngoscope during parts of the procedure. Even when behind the microscope, they could, in theory, inhale Sars-CoV-2 particles in smoke plume. Given the significant false negative rate<sup>24</sup> of available tests for COVID-19, even with two negative tests, there is still some risk to the surgeon and staff. We do have information reporting that the rate of acquiring COVID-19 is higher for head and neck surgeons, ophthalmologists, and oral surgeons than it is for radiation oncologists, presumably due to the greater risk of exposure to aerosolized or touched secretions.<sup>33</sup>

It should be acknowledged, in terms of ethics, that the decision to irradiate patients instead of operating endoscopically is one of those situations where we are weighing the public health risk, including the risk to the surgical team, and transferring risk to another setting with limited data to support it. The risk to the patient, in particular, of 6 weeks of radiation with multiple trips to the facility has not been proven to be less than a single endoscopic intervention. Since there are risks associated with an inpatient stay and possible lack of access to medical resources during a surge, in addition to risk of viral exposure, it is very hard to quantify this "moving target" relative to 30 to 35 visits to radiation oncology. Some have pointed out that for immunocompromised patients in particular, multiple trips to the hospital also represent a significant risk,<sup>32</sup> but the answer is just not known.

Currently at our institution, all patients undergoing radiation and chemotherapy are being tested for COVID-19 prior to start of treatment, but not repeatedly. Patients testing positive on that first test get treated separately at the end of the day. There is a risk that a patient could have a true-negative test at the outset, only to develop COVID infection later and then unknowingly expose other patients or radiation oncology staff during any period in which the infection was not clinically evident.

The most significant concern in the definitive radiation setting is the risk, not to the staff, but to the patient. In our institution, there is no routine testing of unexposed faculty or staff for COVID-19 infection. The use of PPE by staff varies by role, with many staff members wearing simple masks only. Radiation therapy technologists wear N95 masks, face shields and gloves while treating head/neck cancer patients, but the nursing staff and some physicians wear only gloves and simple masks. Fundamentally, the difference in testing policy regarding patients (mandatory testing) and staff (no routine testing) has the potential for significant risk to patients over the extended timeframe of radiation treatment.

As we move from a complete ban on elective surgery, towards reincorporating some relatively important cases that have been awaiting institutional clearance for surgery, significant stress will likely occur as we try to determine to which of these patient's medical resources should be allocated first. This will create new conversations and may lead to tension between services as debates develop about the relative value of investing resources in "sicker" patients versus "more salvageable patients".

The head and neck patients triaged to delay in surgical care, primarily the low-grade malignancies, will be the first group for re-consideration by the surgical review committee. These patients will now face perhaps an even more complex path on their journey to finally achieving the surgical care they need in this unprecedented time. They will now be evaluated alongside non-malignant cases with the potential for serious complications with ongoing delay. Such cases might include erosive cholesteatomas with bone loss and risk of cerebrospinal fluid leak, or similar patients with aggressive but benign paranasal sinus disease. In our system these will compete for operative time that has been assigned to the Otolaryngology Department. Such comparisons are likely to be much more nuanced than the decisions the surgical review committee has faced to this point and may present even greater challenges to decision making.

Prachand et al, in a general surgical setting, recently published online regarding this dilemma and their own "Cumulative Medically-Necessary Time-Sensitive (MeNTS) Score", which attempts to introduce objectivity into this process. While we have not attempted to use this tool, such efforts at maintaining objectivity may help introduce greater fairness into this process. <sup>34</sup>

## CONCLUSIONS

The Coronavirus pandemic has forced us to rethink our usual paradigms in head and neck surgery. We describe our department's choice to use a "top down" approach, with supervision and control of the operating rooms at an administrative level. We recommend that triage be conducted with the patient's personal health interests as the guiding principle, and that public health concerns be weighed as a strong secondary consideration.

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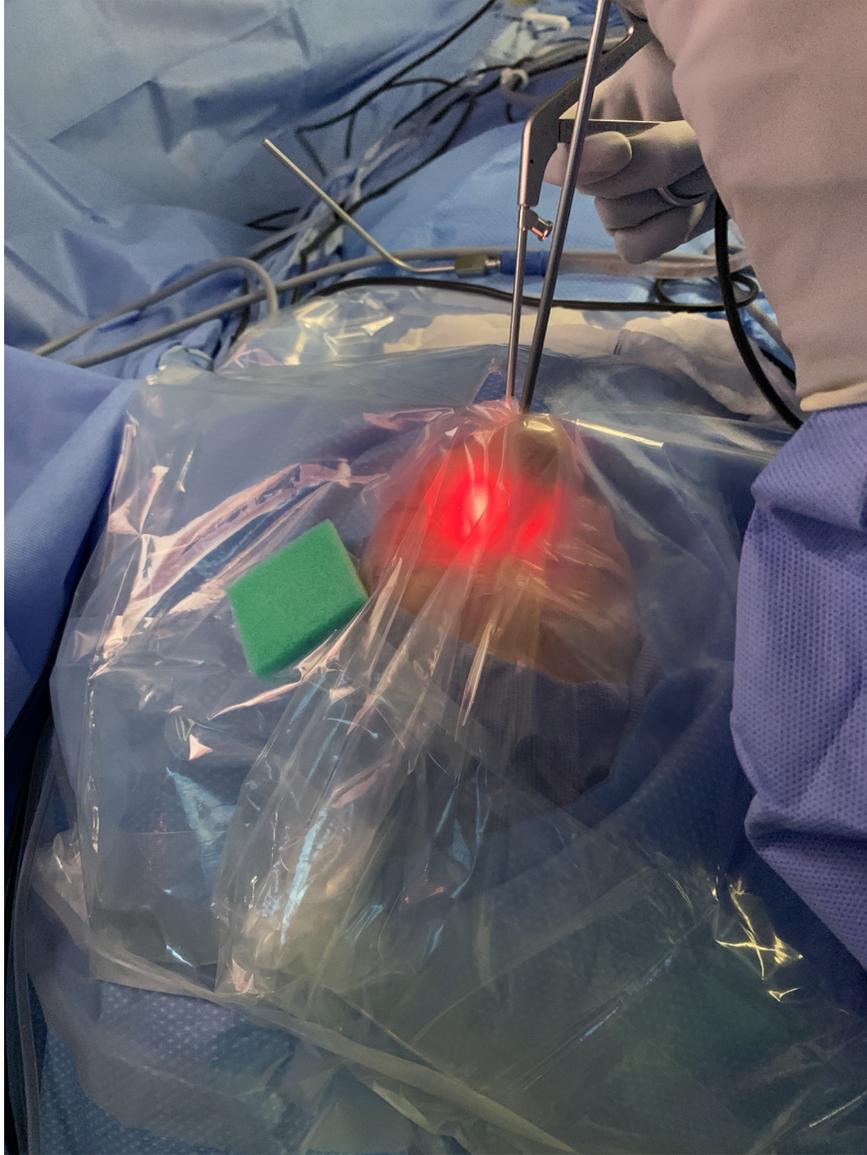


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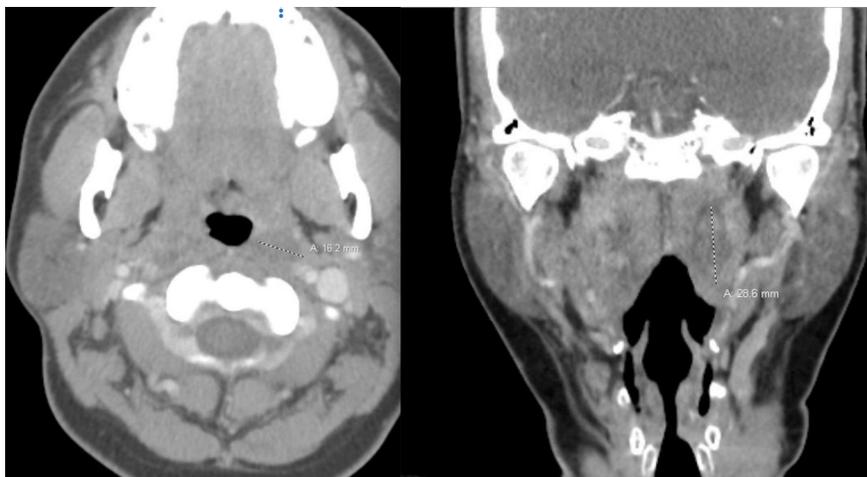


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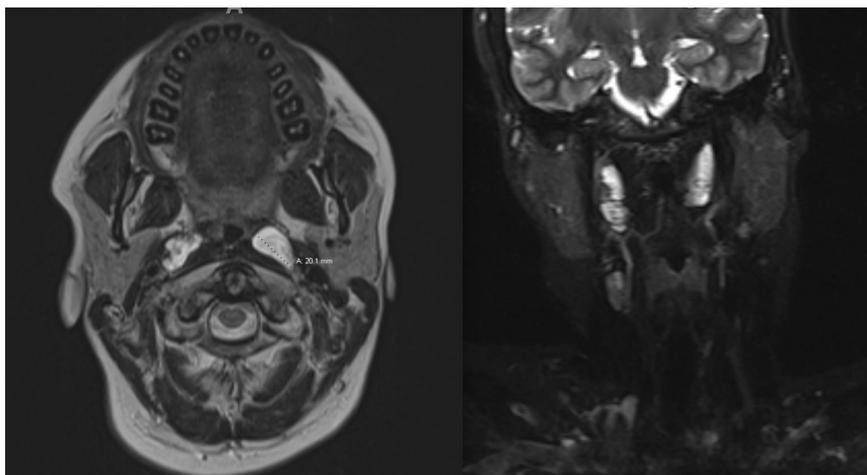


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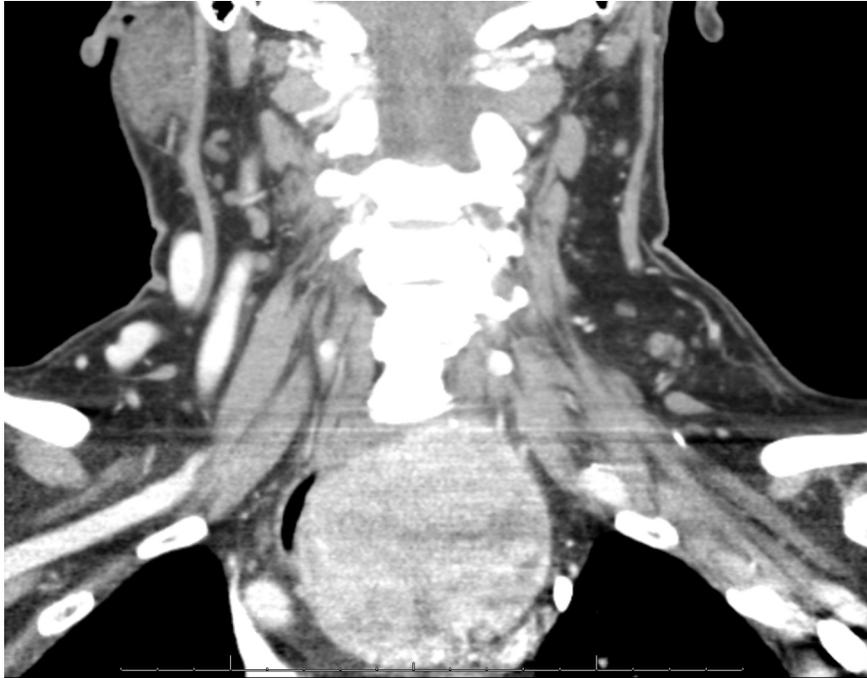


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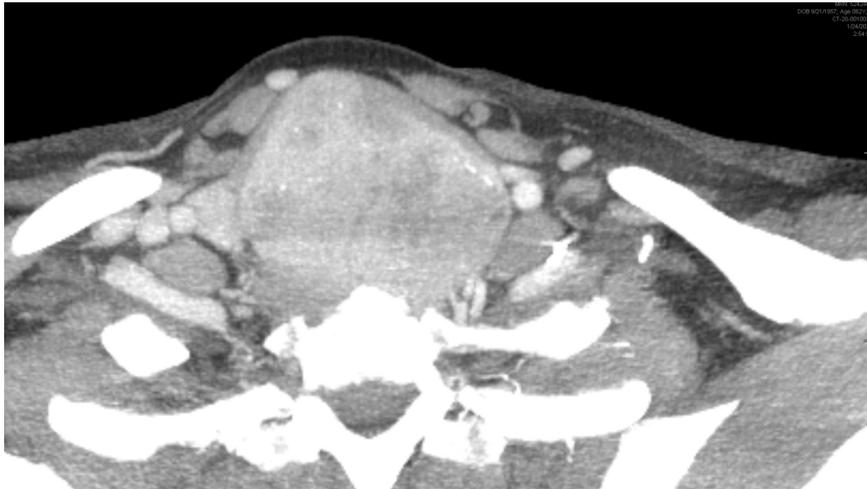


Figure 5: This is a caption

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