

Considerations for Head and Neck Oncology Practices During the Coronavirus Disease 2019 (COVID-19) Pandemic: The Wuhan and Toronto Experience

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April 28, 2020

Abstract

The practices of head and neck surgical oncologists must evolve to meet the unprecedented needs placed on our healthcare system by the Coronavirus Disease 2019 (COVID-19) pandemic. Guidelines are emerging to help guide the provision of head and neck cancer care, though in practice, it can be challenging to operationalize such recommendations. Head and neck surgeons at Wuhan University faced significant challenges in providing care for their patients. Similar challenges were faced by the University of Toronto during the severe acute respiratory syndrome (SARS) pandemic in 2003. Herein, we outline our combined experience and key practical considerations for maintaining an oncology service in the midst of a pandemic.

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Conflict of Interest and Funding: None

Disclosures: None

Word Count: 2787

Introduction

Coronavirus Disease 2019 (COVID-19), caused by the SARS-CoV-2 virus, emerged in December 2019 with an initial epicentre focused in Wuhan, China. As of April 9, 2020, the COVID-19 pandemic has infected over 1,500,000 people worldwide and resulted in nearly 90,000 deaths¹. The COVID-19 pandemic carried profound implications on the head and neck oncology practice in Wuhan and is a rapidly emerging concern in Canada. Projections vary, though the Canadian federal government estimates that between 30 and 70 percent of Canadians could become infected with coronavirus². Toronto's experience with severe acute respiratory syndrome (SARS) in 2003 highlighted the dangers of inadequate preparation and protocols when faced with a novel and dangerous coronavirus^{3,4}. Rapid nosocomial spread of SARS led Toronto to become one of the most impacted regions in the world^{3,4}. Fortunately, from this experience, significant institutional memory exists within the University of Toronto partner hospitals⁵. Our healthcare systems are better prepared for, and are uniquely positioned to comment on, the challenges faced with COVID-19.

In order to meet the unprecedented needs facing healthcare systems across the world, head and neck surgeons must evolve and modify the care provided to patients in the midst of this pandemic. The Canadian Association of Head & Neck Surgical Oncology (CAHNSO) has recently published thoughtful guidelines for the management of patients with head and neck cancer during COVID-19⁶. In combination with other guidelines and expert opinions, suggestions on how to proceed with our patients are accumulating for COVID-19⁷⁻⁹. Ontario Health (Cancer Care Ontario) developed pandemic clinical practice guidelines in 2009 which have been recently updated to reflect the province's strategy for COVID-19^{10,11}. A priority classification system is currently used to triage resources to oncology patients with the greatest needs. Most head and neck cancer care remains at the highest level of priority, and the need to provide ongoing head and neck oncology care remains clear. However, application and operationalization of these various guidelines can differ across institutions and real-world experience is needed. This paper describes the regional institutional practices in Toronto, Canada and Wuhan, China, and how we have operationalized such guidelines. We outline key practice considerations for personal protective equipment (PPE), triaging and decision-making for new referrals, ongoing surgical care, and follow-up practices from the perspective of two large cancer institutions with experiences in pandemic management.

Prevention of Transmission

Early reports from Wuhan, China noted that Otolaryngologist – Head and Neck Surgeons were at a disproportionately increased risk of infection. In the early stages, transmission during a single skull base case at a partner hospital in Wuhan resulted in widespread transmission amongst surgeons and healthcare workers, resulting in several deaths including some senior colleagues (personal communication). Recently, hospitals in British Columbia, Canada have also reported several Otolaryngologists being infected with COVID-19 after performing endoscopic sinus surgery before appropriate PPE guidelines were established (personal communication).

The SARS-CoV-2 viral particles have been reported to be highly concentrated within the nasal cavity, nasopharynx, and oropharynx¹². Given the scope of Otolaryngology – Head and Neck Surgery, there is the concern for aerosolization of viral particles during procedures that include flexible nasopharyngolaryngoscopy, transoral examination, sinonasal surgery, airway surgery, and major head and neck surgery¹³.

The use of PPE is paramount given that head and neck procedures and examinations are performed on the upper aerodigestive tract, where high viral loads are encountered¹². Stemming from the Wuhan experience in combating COVID-19, specific recommendations were made with regards to workflow and PPE for Otolaryngology – Head and Neck Surgery¹⁴. National and international societies are drawing attention to this issue with groups like the Australian Society for Otolaryngology – Head and Neck Surgery, and the British Association of Otorhinolaryngology recently releasing guideline statements^{15,16}. Recently, guidelines on proper PPE usages were also released by the Canadian Society of Otolaryngology – Head and Neck Surgery¹⁷.

While we will not repeat all guideline recommendations here, clearly a high degree of caution should be

exercised when performing procedures that enter the nasal cavity, oral cavity, larynx, or pharynx. Indications for endoscopy must be made clear, as to avoid any unnecessary procedures, and to minimize exposure to head and neck surgeons. In many clinical scenarios, endoscopy can be delayed or avoided in the pandemic setting with increased reliance on history, other physical examination maneuvers, and imaging. In Wuhan, airborne precautions were taken during all head and neck examinations. To protect healthcare providers, the Canadian Society of Otolaryngology – Head and Neck Surgery has stated that airborne precautions should be taken for all aerosolizing procedures including, but not limited to, the use of N95 respirators, face shields or goggles, gloves, gowns, disposable medical caps, and shoe covers¹⁷. In cases of limited PPE, avoidance or deferral of full physical examination may be warranted.

In the setting of increasing PPE demands and dwindling medical supplies, measures have been instituted to ensure provision of essential equipment to medical personnel. In Toronto, this has included repurposing research labs and equipment such as 3D printers in order to print and manufacture PPE, such as face-shields, along with nasopharyngeal swabs for viral testing.

In a further effort to conserve PPE and minimize exposure, the number of individuals inside operating rooms have been reduced to the bare minimum required for completion of cases and additional monitoring methods have been implemented. We have restricted access to the operating room to a single entry and exit point. A nurse observes all donning and doffing of PPE while providing support and instructions to ensure high quality and compliance. Moreover, there are no trainees in the room for portions of the procedure that may lead to aerosolized exposure. For instance, if a patient is undergoing an oral cavity resection and neck dissection, the neck dissection is performed first with involvement of trainees, while the oral cavity resection is performed separately with only staff physicians in the room. As an additional measure, within the University of Toronto hospitals, we are currently saving N95 masks. Efforts have been put towards developing a process for N95 mask re-sterilization utilizing equipment similar to other centres in the US, though this is not yet needed nor standardized across Ontario^{18,19}.

Triaging New Referrals

Ontario has one of the most mature and regionalized head and neck cancer programs in the world, with all care being provided at one of seven designated cancer centres²⁰⁻²³. To meet the needs of this pandemic, both Wuhan and Toronto initiated a centralized system within their regionalized cancer centres for the intake of new referrals. For example, all new referrals to Sunnybrook Health Sciences Odette Cancer Centre in Toronto are now first virtually reviewed by a team consisting of medical, radiation, and surgical oncologists. Together, the determination is made in regard to any additional testing required prior to patient consultation. If at all possible, patients are seen virtually via the Ontario Telehealth Network (OTN), which allows for two or three-way audio with video support, allowing family members to be present, even if not physically with the patient. This is particularly important within our elderly population, minimizing social contacts, while maintaining physical distancing. The virtual interaction through OTN is particularly useful if the physical examination will not change the next steps in management (i.e. pathology review, discussion of treatment options, or where the need for additional imaging and testing remains). This step allows for the collection of information from patients, while reducing the risk of exposure with face-to-face consultations, and has been shown to be an effective avenue for patient care²⁴. In circumstances that necessitates in person consultation, such as the need for biopsy, patients are seen in person.

Multidisciplinary care is a staple in the effective management of head and neck cancer patients. All patients continue to be discussed weekly through case conferences where staff discuss remotely. Where alterations to the standard of care are necessary based on healthcare constraints, there is increased discussions within the multidisciplinary care team to determine best treatment course, and full disclosures with the patients are provided. In Toronto, multidisciplinary clinics remain active with all essential multidisciplinary allied healthcare professionals present, including speech-language pathology, social work, physiotherapy, dietetics and nutrition services, and all-relevant oncology specialties. We have successfully incorporated our multidisciplinary team in OTN consultations and in-person follow-up are offered under necessary circumstances as outlined above.

As surgical waitlists grow in the face of reduced operating room resources, formalized systems for reviewing patients are necessary to create a dynamic list that is able to accommodate changing disease progression and patient needs. For example, a centralized list is being used at Sunnybrook Health Sciences Centre to contact and monitor patients on a regular basis, while providing them with ongoing reassurance.

Ongoing Care and Post-Treatment Surveillance

With regards to ongoing care for head and neck oncology patients, follow-ups are arranged virtually over OTN or via telephone whenever possible. In-person follow ups are reserved for specific indications, including patients who develop new or concerning symptoms, those that require a biopsy or procedure (i.e. new oral lesion that needs biopsy, new voice symptoms, or needs endoscopic examination), and rarely patient preference/desire. Currently, a rotating schedule has been implemented for head and neck surgeons at several hospitals in Toronto, for evaluation of follow-up patients. For instance, at the Sunnybrook Health Sciences Odette Cancer Centre, a three-week rotation has been put into practice for the three head and neck surgeons. With such a schedule, surgeons are all personally socially distanced from one another, protecting the capacity for ongoing patient care in cases of illness or need for formal quarantine.

Pre-Operative Screening

Patients scheduled to undergo head and neck oncological surgery in Wuhan, China were asked to self-isolate for a period of 14 days prior to the operation date. Screening was performed for symptoms of COVID-19 and patients were required to have two negative viral swabs on polymerase chain reaction (PCR) prior to the surgery. At the University of Toronto, varied practices are being used across hospitals, but all are extensively focused on screening for symptoms of COVID-19. Several hospitals are ensuring patients undergoing surgery have at least one negative viral swab (PCR testing) prior to the operation. It must be noted, however, that a risk of transmission remains despite negative testing, as the sensitivity of PCR by viral swab (~70%) is imperfect²⁵⁻²⁷. Head and neck surgeons must therefore consider the continued use of appropriate PPE despite negative testing. With all operative cases, it is imperative to balance the benefits of surgery against the risks during this pandemic for each individual patient.

Close consideration of baseline functional status and the presence of comorbidities remains important in surgical decision making. Head and neck cancer patients are often male, elderly, and frail²⁸. These considerations increase susceptibility to post-operative complications and are additionally associated with both increased risk of COVID-19 diagnosis and adverse²⁸⁻³¹. At the Renmin Hospital of Wuhan University, mortality rates for patients who were unintentionally scheduled for elective surgery during the COVID-19 incubation period exceeded 20%, with 44% requiring intensive care unit admission²⁹. Risks are further amplified as patients with cancer are disproportionately affected by COVID-19, having over two times higher odds of being diagnosed with the infection³², and over five times higher odds of experiencing severe adverse events³³.

Surgical Management

The timeline and duration of COVID-19 is uncertain, and consequently, triaging surgical cases poses an enormous challenge. Both the CAHNSO as well as Wuhan University have held the view that surgical management should be offered when a worse outcome is expected should surgery be delayed more than 2-6 weeks. In practice this means operating largely on patients with advanced mucosal disease, high grade salivary malignancy with rapid progression, advanced melanoma, and other pathologies where surgery could be potentially curative. Salvage surgery is being approached with great caution given the poor oncologic results and necessity to limit institutional resource use where possible^{34,35}. The Stanford University group have recently outlined their stratification of urgency according to disease process and show general agreement with these suggestions³⁶.

Within the operating room, significant thought has been put towards minimizing exposure and conserving PPE. Resident trainees are either not involved in cases or are brought in only for portions of the procedure appropriate for their level of training. In head and neck oncology, clinical equipoise often exists between

various treatment modalities. In an effort to limit operating room use and build intensive care unit capacity, for patients who could expect equivalent results for radiation or surgery, the former is preferred. An example is early stage glottic cancer, where transoral laser microsurgery has traditionally been discussed as a treatment option. As this is a high-risk aerosol generating procedure, with similar oncologic outcomes to primary radiotherapy, the latter is being preferentially used. Head and neck cancer sites must also consider the potential future need for primary radiation in the treatment of oral cancer. However, each patient must be managed on a case-by-case basis, while considering other possible side effects, such as chemotherapy and radiation induced immunosuppression.

Where surgery is required, we use a pre-huddle outside the operating room prior to patient arrival that includes all team members. All necessary surgical and anesthetic equipment is confirmed so that circulating nurses do not have to enter and leave the room. Surgical teams remain outside of the operating room during intubation and extubation. At our institution in Toronto, in keeping with two cycles of operating room air clearance, this equates to a 20-minute wait for each intubation and extubation event. Given the nature of many oncological procedures, the surgical team must remain vigilant, and accurate communication between the anesthetic, nursing, and surgical teams is paramount.

Reconstructive options should be further considered in the pandemic setting, both as a function of the need for prophylactic tracheostomies and as a consideration for reducing the total intraoperative time. Where feasible, in Toronto, we currently consider transitioning to regional flap reconstruction or delaying reconstruction altogether. Free flaps are still required but are used judiciously. Patients should be counselled about these management decisions, their risks, and future steps to correct any unsatisfactory outcomes, such as tethering.

The use of secondary intention may, in select circumstances, additionally negate the need for up-front tracheostomy and assists in reducing the overall length of the procedure. We recognize in certain cases this is not possible, and individual patient safety must be weighed, as well as the risk of increased aerosolization should an uncontrolled airway intervention be required. Our institutions have also elected to reduce manipulation of tracheostomies as much as possible. The use of non-fenestrated cannulas, delay of tracheostomy tube changes, and corking of deflated, cuffed tubes have been employed to facilitate this goal^{37,38}.

From an adjuvant therapy perspective, both the radiation oncology and medical oncology services across Toronto hospitals are adapting their practices to help mitigate risk to head and neck cancer patients in the wake of COVID-19. For instance, there has been increased consideration placed towards hypofractionated or accelerated radiation schema, as well as weekly outpatient cisplatin regimens for select cases; both with the goal of reducing hospital visits. In cases where a regionalized cancer centre in Ontario is no longer able to safely offer cancer services, protocols are in place to transition care to another provincial care centre.

Summary

In 2003, SARS was immediately devastating to cancer care in both Canada and China. In Ontario, SARS resulted in many hospitals being closed for 6 weeks, leading to treatment delays and even longer wait times in an already strained system. With this crisis, however, came the opportunity to better cancer care delivery. The SARS pandemic highlighted the shortcomings of Ontario's public health system and helped catalyze initiatives to improve health care accessibility including regionalization of head and neck cancer care and the establishment of quality metrics³⁹. Periods of immense stress on the health care system can ultimately drive system improvement. They are also periods of reflection on the capacity of a sometimes already stretched system. In Ontario, operating room use, and hospital occupancy, is generally high and reliant on efficient through-put. However, pre-COVID-19 there was very little allowance for large aberrations in volumes. With a large decrease in hospital capacity and operating room resources, surgical delays and rationing have been required.

In the interim, the abovementioned modifications enable head and neck oncology services to continue in the wake of COVID-19, albeit in a subset of patients such as those at greatest risk of progression due to high grade disease. Meeting the system capacity needs of COVID-19 must be balanced with the oncology risk

to our patients – both present and future. Despite providing continued care for select, high risk patients, there is an ongoing accumulation of cases that will strain the healthcare system after resources again become available. Learning from past experiences and colleagues at the epicentre of the current pandemic, we present here institutional considerations that reflect the multitude of developing guidelines.

Table 1: Challenges faced by head and neck oncologic practices in the wake of COVID-19 and associated recommendations

Prevention of Transmission

Triaging New Patient Referrals

Ongoing Care/Post Treatment Surveillance

Pre-Operative Screening

Surgical Management

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