

FROM THE DESK OF DIANE O'TOOLE, GTC EXECUTIVE DIRECTOR



Diane O'Toole
GTC Executive
Director

We have heard often lately that we are in unprecedented times. Here at the GTC it is a more critical time than ever to be promoting best practices for tracheostomy patients around the world. You will read in this newsletter articles from around the globe as to what patients and families are grappling with at this time and the webinars that the GTC has

been producing to address what healthcare providers should be doing regarding best practices for patients as well as best practices to insure the health and safety of the healthcare workers. In addition, the GTC has a free forum for healthcare professionals to utilize to discuss what is happening around the world in promoting best practices for healthcare professionals during this time of COVID-19.

I encourage all GTC member hospitals and healthcare professionals to utilize these free resources.

Tracheostomy care in the COVID-19 era is challenging; many covid-19 patients will require tracheostomy, but they present a unique challenge because of concerns about healthcare worker infection. The GTC is stepping up our outreach efforts to help all trach caregivers deliver care that is best and safest for both the patient and their healthcare providers. Your donations at this time will help us to reach more providers, patients and families. Like all other non-profit organizations right now, we are increasing our fundraising efforts. I encourage all to give to our quality improvement initiatives by going to www.globaltrach.org/donate

Please feel free to contact me at dotoole@globaltrach.org or at 781-929-6182 if I can answer any questions that you may have and/or provide assistance. I look forward to hearing from you! ■

UPDATES

By: Melissa Webb



Mellisa Webb

I have been doing well, staying focused on some performing arts passion projects with my twin sister and learning how to play piano while having family time. In February, my mother, older sister, twin sister and I went out for Sushi at Sapporo Japanese Restaurant in Hudson Wisconsin. It was my twin sister and my first-time trying sushi and it was a great experience. I ordered a rainbow roll.

I am working on learning how to drive, I just need to pass the written test.

I am getting set up for school online this fall. I already have some school supplies ready just waiting to sign up officially.

I am so grateful to be on a wonderful committee in the Global Tracheostomy Collaborative such as the Patient & Family Committee which gives such support to favorite causes.

Pursuing both passions of going to school and performing arts is a dream come true.

Bringing awareness of how happy I am is the most import thing here to share. I would like to help anyone in need of support or if they just want to know about this field in medicine.

I read many amazing stories from others involved with the global tracheostomy collaborative.

It is important that everyone should be educated on the real-life subject of tracheostomy to be aware of ways on how to improve safety.

Thank you for reading the stories that have been previously posted and updates from me in this column. It means a lot to me to be a voice for others.

Melissa can be reached at dancegeekly@gmail.com ■

GLOBAL TRACHEOSTOMY COLLABORATIVE COVID-19 WEBINAR SERIES DISSEMINATES BEST PRACTICES

By: Michael Brenner and Vinciya Pandian

The COVID-19 pandemic has unfolded with remarkable speed, posing unprecedented challenges for healthcare systems and society. The challenges include risks for healthcare workers and lack of awareness on how to protect healthcare workers or care of individuals with tracheostomy in the community with COVID-19. Mortality from the COVID-19 pandemic has spiraled, placing many frontline healthcare workers at risk. Physicians, nurses, and allied health professionals around the world have died in the line of duty trying to save the lives of COVID-19 patients.

Safety is mission-critical because high-quality care of patients requires a healthy, vibrant workforce. Several procedures surrounding tracheostomy care are potentially aerosol-generating, placing the multidisciplinary team caring for tracheostomy patients at risk. While national organizations have put forth guidance on how to care for COVID-19 patients, recommendations can be confusing or conflicting. Maintaining safe care for individuals living in the community with a tracheostomy is challenged by continued access to care, home care personnel issues, availability of durable

medical equipment, and even the potential need for rationing of care is a compounding concern. The rapidly changing face of COVID-19 across Europe and North America requires real-time, up to date information.

In these webinar series, international medical authorities on COVID-19 shared perspectives from Australia, Hong Kong, United Kingdom, Italy, and the United States. This understanding helped organize actions needed to drive the transmission of infection to healthcare workers toward zero. The webinar series revealed how powerful lessons were taken from prior coronavirus infections- particularly SARS in 2003- used to prevent the spread of infection. The webinar series introduced emerging scientific insights, ranging from infectivity and immune response to blocking viral replication and pinpointing weaknesses in viral spike protein. It answered pressing clinical questions, sharing pre-release expert guidance on the management of mechanically ventilated patients, decision-making for tracheostomy patients, and best standards for personal protective equipment (PPE). This webinar series also provided state of

Dates	Topics	Registered	Live Views	Post-Event Views
March 26	Toward zero harm in the time of COVID-19: Strategies for reducing infectious transmission	987	592	318
April 9	Putting Safety First during the COVID-19 Pandemic: Practical Strategies for Frontline Healthcare Workers and Patients with Tracheostomy	1549	909	454
April 21	Overcoming COVID-19 Through Science and Teamwork: Lessons from United Kingdom, Italy, and United States	715	425	121
May 5	Navigating Public Health Crises for Individuals and Families Living with Tracheostomy: COVID-19 and beyond	515	226	TBD

the art guidance on how to safely care for tracheostomy patients through covering best practices with the COVID-19 novel coronavirus infection and focused on safe practices for tracheostomy, airway, and intensive care related to novel coronavirus infection.

Individuals with existing tracheostomies, family members, caregivers, and multidisciplinary providers shared challenges for those living in and serving the tracheostomy community. The panel provided insights to the concerns, offered suggestions for optimizing health during this time, and discussed areas that require further attention and additional problem solving to promote the well-being of all individuals living in the community with a tracheostomy.

The online seminar used a webinar format turning presentations into real-time conversations from anywhere in the world. It attracted thousands of participants spread across hundreds of institutions in dozens of countries. The activity has been offered on a bi-weekly basis to provide up-to-date, expert information in these critical times. These multidisciplinary tracheostomy quality improvement sessions on the COVID-19 pandemic have played a vital role in building a global learning community. ■

CHILDREN'S MERCY HOSPITAL FAMILY SUPPORT

By: Kylie Higley McElroy □

My name is Kylie Higley McElroy and I am a trach mom from Kansas. My son Parker was born at 23 ½ weeks and the medical team tried multiple times to extubate him. He was unable to be successfully extubated and the best option for Parker was tracheostomy.

I knew we had made the best medical decision for Parker. What I did not know was how difficult and exhausting trach life would be on our daily lives. Having a child with a tracheostomy was hard. We felt isolated at times and wanted more support from other families going through the same trials but did not know how to find it or ask for it.

In September of 2017 I was asked to join the new Tracheostomy Patient Family Advisory Council (PFAC) that had started a few months prior at Children's Mercy Kansas City. I met more parents who were like us, living a trach life. I felt "welcomed", "understood" and "included", a sense of "common ground". After two years of working on the volunteer committee; helping to make institutional change, provide feedback for educational courses, and so much more I was presented the opportunity to work on staff. I became the Tracheostomy Parent Support Program Coordinator and work primarily to chair the Tracheostomy PFAC and provide overall family

support to our tracheostomy patients and families. In this new position and with my experience as a trach parent, I get to help parents learn to help their child experience life to the fullest.

During this world-wide pandemic, COVID-19, we are working as a team to provide new and unique family support. Under routine operations, we provide a Q&A session once a month that gives families a chance to meet and talk to other trach families, ask questions or have a change of scenery. We changed our in-person Trach Q & A to a virtual Q & A and we are now offering it twice a month. So far they have been very successful and parents have given us very positive feedback!

Additionally, I am rounding virtually by offering parents 1:1 video chat time and our institution has increased its level of family support by offering a snack cart twice a day, coffee & tea and educational and stress relieving resources in our library.

Being a trach parent is hard even in "normal" times, and support networks are critical, both for problem-solving and for mental well-being. Leveraging online platforms for group and individual video chats has helped us maintain the connection among our trach family community during this challenging time. ■

RECOMMENDATION OF A

PRACTICAL GUIDELINE FOR SAFE TRACHEOSTOMY DURING THE COVID-19 PANDEMIC

By: Arunjit Takhar¹ • Abigail Walker² • Stephen Tricklebank³ • Duncan Wyncoll³ • Nicholas Hart⁴ • Tony Jacob² • Asif Arora¹ • Christopher Skilbeck¹ • Ricard Simo¹ • Pavol Surda¹

ABSTRACT

PURPOSE: The COVID-19 pandemic is placing unprecedented demand upon critical care services for invasive mechanical ventilation. There is current uncertainty regarding the role of tracheostomy for weaning ventilated patients with COVID-19 pneumonia. This is due to a number of factors including prognosis, optimal healthcare resource utilisation, and safety of healthcare workers when performing such a high-risk aerosol-generating procedure. Methods Literature review and proposed practical guideline based on the experience of a tertiary healthcare institution with 195 critical care admissions for COVID-19 up until 4th April 2020.

Results A synthesis of the current international literature and reported experience is presented with respect to prognosis, viral load and staff safety, thus leading to a pragmatic recommendation that tracheostomy is not performed until at least 14 days after endotracheal intubation in COVID-19 patients. Practical steps to minimise aerosol generation in percutaneous tracheostomy are outlined and we describe the process and framework for setting up a dedicated tracheostomy team.

Conclusion: In selected COVID-19 patients, there is a role for tracheostomy to aid in weaning and optimise healthcare resource utilisation. Both percutaneous and open techniques can be performed safely with careful modifications to technique and appropriate enhanced personal protective equipment. ORL-HNS surgeons can play a valuable role in forming tracheostomy teams to support critical care teams during this global pandemic.

KEY RECOMMENDATIONS:

- Performing tracheostomy for prolonged invasive mechanical ventilation on COVID-19 must be very carefully considered.
- The mortality for patients ventilated with COVID-19 is around 50% and tracheostomy should not be performed until the prognosis is deemed favourable.
- The current literature and consensus opinion suggest that tracheostomy should only be considered after 14 days of invasive mechanical ventilation when the patient is still not suitable for extubation.
- All staff performing tracheostomy in COVID-19 patients must be equipped with enhanced PPE including PAPRs.
- There is currently no evidence whether percutaneous or surgical tracheostomy is less aerosol generating.
- Deep sedation, complete neuromuscular blockade and endotracheal tube cuff hyperinflation should be employed for all tracheostomy procedures.
- Strategies to reduce aerosol generation in percutaneous tracheostomies include avoiding the use of bronchoscope (or using catheter mount with sealed port), pausing ventilation at end-expiration and clamping the endotracheal tube before key steps in the procedure (changing catheter mount, withdrawing tube, removing dilators, inserting tracheostomy tube).
- Early planning and staff training is essential and can ensure adequate resources and expertise to support the increase in demand whilst minimising exposure risk for healthcare personnel.
- Prospective analysis and audit of outcomes are essential to rapidly learn and improve outcomes for this cohort of patients.

To view complete article and charts go to: <https://doi.org/10.1007/s00405-020-05993-x> ■

AIRWAY KINGS AND QUEENS

HEALTHCARE AIRWAYS KINGS AND QUEENS (K&Q) ARE RESPIRATORY THERAPIST

By: Ricky L. Williams

Airway: "The path that air follows to get into and out of the lungs. The mouth and nose are the normal entry and exit ports for the airway. Entering air then passes through the back of the throat (pharynx), and continues through the voice box (larynx), down the trachea, to finally pass through the bronchi."

Definition by MedicineNet <https://www.medicinenet.com>

When it comes to managing a patient with an artificial airway who's the first frontline professional that you think of? Is it the physician, a pulmonologist, Intensivist or ENT doctor or may be your initial answer maybe a RN. But when it comes to reigning supreme if your answer wasn't a Respiratory Care Practitioner (RCP), then here we go with an educational lesson of why the RCP are Kings and Queens of Management of an artificial airway.

Under the AARC guidelines it's under our scope of practice to insert and care of artificial airways. The RCP may intubate, extubate, insert trach, and Change tracheostomy tube per policy schedule or in emergency situations. Respiratory Care Practitioners are very diligent in identifying when airways are partially or totally dislodged. Any airway that's not in the correct position will cause multiple changes on the ventilator, i.e. high peak airway pressure, tachycardia, tachypnea, decreased saturation or if an End-tidal carbon dioxide monitor (EtCO₂) is attached it may also be elevated. The best practices include, but aren't limited to during airway replacement is to have two RCP at the bedside, informing the physician, emergency airway cart stocked and prepared. The airway cart is mandatory, staff must sign off daily to ensure all equipment is in the box, and immediately after an event replace all equipment. Delaying replenishing equipment until the end of the shift most likely will not be completed. The RCP is at the bedside everyday managing multiple airways. Being proactive by having all necessary equipment will help elevate an emergency/code situation from being a chaotic, high-adrenaline and shouting situation. The K&Q's evaluates the position, placement of the tube, and when to extubate (removal of ETT), before the patient does it for us. The skill set in changing trach tubes comes with years of experience, for example when removing a trach tube during a routine change there are times when the airway immediately become a difficult and closes to the size of a pin hole, and the replacement tube is unable to be inserted. One great technique that I've learned over my career is to thread the tracheal stoma with a suction catheter, be sure to provide O's (oxygen via nasal cannula) up the nose to maintain oxygen saturation to prevent a hypoxic / hypoxemia event.

Evaluate that pulmonary secretions are suctioned, thread the new trach tube, you must cut the thumb port, while the other RT keeps the catheter intact and withdraw as the trach is inserted. After placement asses the airway by first suctioning and then by gentle manual ventilation, if there's no resistance, saturation and EtCO₂ are at good levels, along with no sub-Q-emphysema, then you may be assured your airway is intact. It's takes a lot of clinical experience to become King or Queen of "Airway Management" this is in addition to all the textbooks, scholarly articles, seminars, and conferences

attended. Confidence is mandatory, because an airway will become constricted very quickly, best practice is to have two experienced clinicians at the bedside prepared to change. At all cost avoid a single clinician from performing a bedside trach change in the event an emergency occurs. Continued education is always recommended to improve knowledge, understanding, new equipment, and techniques in tracheostomy change. I will also recommend that on the initial tracheostomy change that an experienced physician is at the bedside to perform the change. It's good to have your emergency airway box/cart present.

Respiratory Care Practitioners manage artificial airways from endotracheal tubes, tracheostomy tubes, King Airways, used for difficult intubation that is inserted into the esophagus, in addition to simple tools as a nasopharyngeal airway to facilitate suctioning or an oropharyngeal airway to keep the tongue from obstructing the airway during an emergency event to ensure the patient is being oxygenated correctly, and prevent the patient from biting down on the endotracheal tube causing high peak pressures from the ventilator.

Current Practices in the COVID-19 era:

The Respiratory Therapist worldwide has adopted several best practices in the effort to be smart, safe, and secured to continue to provide optimal ventilation and oxygenation in the fight against COVID-19. The ultimate goal is to liberate patients off ventilator support, as well as a plethora of respiratory equipment.

The biggest prevention method is to increase hand washing with soap and water, it's second to none.

When a patient is placed on ventilator support the plan is to keep a closed system with minimum opening such as changing an in-line heat moisture exchanger (HME), in-line suction catheter as necessary, and flush with normal saline to preserve use, or changing an inner cannula to prevent mucus plugging. Other than these changes the ventilator circuit must remain close to prevent any

potential spread/transmission of COVID-19.

My respiratory department have stopped using nebulizers with the ventilator and now using meter dose inhaler (MDI) to prevent the spread of aerosols.

Ventilator are cleaned with an approved germicidal wipe to kill bacteria/viruses.

All of our scheduled tracheostomy changes are also as needed (PRN), to prevent our staff from being in contact with an exposed airway.

During "CODES" the patient is covered with a plastic barrier, and if manual ventilation is required the bag is also under the plastic barrier secured. During an Intubation there's no manual bagging a non-rebreather is placed on the patient face an 100% FiO₂, and then intubated. In conclusion, practices are being upgraded to use the optical method as we continue to fight against COVID-19 to continue to provide excellence in patient centered services.

In conclusion, the respiratory care practitioners are a major part of the healthcare team. The profession and skill set of the RCP is highly valued, and very necessary in saving lives by managing, preventing, and protecting the airway from complications. The respiratory care practitioner must continue to be educated on artificial airway devices to know what the best device will be to use in an emergency situation. ■

HOW HAS IMPLEMENTING THE GTC HELPED YOUR ORGANIZATION?

DO YOU HAVE A POSITIVE STORY TO TELL?

Please send us an article or infographic to info@globaltrach.org and we will showcase you in our next GTC newsletter.

COVID-19 CHALLENGES AND CONSIDERATIONS IN THE TRACH COMMUNITY

By: Erin Ward, Parent, GTC Board of Directors & Patient & Family Committee Chair



The COVID19 pandemic has created an unprecedented time for our world, and particularly for our healthcare systems. The severity of this virus has rightfully required an “all hands-on deck” response from our hospital systems,

centered around building capacity for intensive care needs and utilization of highly technical equipment. For those of us in the existing trach community, it’s been interesting to see things we experience as our “normal” being launched into the mainstream of society, such as the record use of the word “ventilator” or the function of ambu bags being explained on the news.

A topic that has been given much less media attention – but significant for our GTC patient, family members, and caregivers – is the importance of maintaining care and wellness for those in our world with existing tracheotomies. How do we maintain and optimize health during this time?

Having participated in trach community conversations regarding the impact on existing individuals with tracheostomies, I wanted to share some reflections on the primary concerns that rise to the top and offer some suggestions of support to our global community-based members.

WHAT ARE THE CHALLENGES?

MANAGING CARE AT HOME: Many individuals with existing trachs and their families have been catapulted into providing home care without many, or any, of their typical supports. Even before COVID-19, it was widely recognized that

finding and sustaining quality home care for individuals with higher technology-based health needs, was already a challenge. Then throw in the complications of caregivers not being able to work due to COVID-19 issues including: their own family’s health needs, daycare issues with schools closed, quarantines, high risk of exposure serving multiple cases, and escalated awareness of this virus’s ability to be asymptomatic and contagious at the same time. This accumulation of concerns has led families to make difficult decisions trying to balance continued home care supports with patient safety and protection from the virus.

LACK OF PPE AVAILABILITY: The question of whether to continue with outside providers in the home has been compounded by the lack of PPE (Personal Protective Equipment) for home care and community-based settings. While countries have scrambled to acquire PPE for the frontline workers, there has been little attention and efforts on ensuring PPE has been disseminated to home personnel working with some of the most medically vulnerable in our communities. Families that were able to privately secure masks and gloves have likely fared the best with PPE. Even as attention has turned to this issue in recent weeks, the availability just isn’t there and when offered, in many cases, too late after COVID is in a home.

DME (DURABLE MEDICAL EQUIPMENT) SHORTAGES: Reports have already been made within the trach community of individuals receiving letters from DME providers anticipating shortages in monthly supplies. The life-sustaining equipment our loved ones rely on are now the “hottest” items in this world. The list of shortages to date has included: ventilator circuits, vent and bipap/cpap filters, HMEs (Heat Moisture Exchange) filters, sterile water for humidification, and delays in delivery of trachs.

ACCESS TO CARE: As hospitals shut down elective surgeries, outpatient clinics, and encouraged limiting trips to the hospital, the existing trach community had concerns about access to care for an event unrelated to COVID19. Telemedicine has certainly helped to elevate some concerns, and there is hope that this will be one of the great lessons learned, replacing potentially unnecessary in-person visits with telemedicine appointments in the future. Recent public encouragement to not delay care, with reassurance that hospitals have proper safety measures in place to still treat emergent needs, has been helpful and reassuring.

ACCOMPANYING AND PERSONALIZING CARE: The ability to be present with a family member that has a trach, as hospitals may have COVID "visitor" policies in place to reduce potential exposure, has been a concern. Although many children's hospitals are still allowing parents to be with their child, it has been a reoccurring issue for the adult hospitals. Some disability councils have advocated for special considerations for adults with medical, communication, or developmental needs, to allow for an adult attendant to stay with the individual, ensuring personalized care and that preferences are directed by an adult who knows the individual well. The extreme conditions this virus has created also makes us mindful that care considerations and options may be limited due to logistical, staffing, or medical capacity constraints. Increased communication around balancing individualized patient care needs and the need to maintain safety and protocols for staff, and anyone on a unit, will be helpful. Most that have traveled the trach experience will be able to understand this, but transparency and clear communication will be key.

RATIONING OF CARE: This pandemic has opened a pandora's box of difficult conversations around the real, pressing, or potential need for rationing of care options and treatments, depending on each country's state of crisis. As hospitals updated or prepared "Standards of Care" for crisis, many of our loved ones with underlying conditions would be vulnerable under these unparalleled parameters for care. With the progress that has been made in disability and medical diversity communities over the years for inclusion rights

and equality, these difficult conversations certainly struck a chord, stimulated conversations and action. A call for transparency, for representation of medical disparities in the creation of these policies, and to partner with patients with clear and ongoing communication arose. It will most certainly generate continued efforts moving forward to ensure resources are not depleted to have to implement policies such as these again in the future for all of those involved, patients and providers alike.

WHAT CAN WE DO?

During these challenging times, sometimes it's difficult to know what we can do. It's important to remember that individuals with trachs and their families, have had prior experience with facing adversity. More than ever, we can rely on our strengths and what we have already overcome, to support us during this time.

REMEMBER YOU ARE RESOURCEFUL AND PREPARED: As individuals with existing trachs and family members, it's likely that you have survived through significant illness before. It's possible that in this pandemic, you may be the best prepared with a safe airway, equipment, and training that will help you weather this virus. You are resourceful and know how to prepare for the "just in case" scenarios and have your provider team in place if care needs escalate.

INVENTORY YOUR SUPPLIES: You have learned the importance of being prepared with someone reliant on specific medical equipment, medications, and a consistent care plan. Take inventory of your supplies, see if your insurance is covering more than one-month refills, repurpose and conserve what you have, and prepare a "to go" bag just in case you need to leave for the hospital quickly.

COMMUNICATE WITH YOUR CARE TEAM: It's essential to convey what you would like your care plan to be, if you or your loved one presented with COVID-19. If you are someone that would like to be treated at home, or as a family you feel you have the experience and capacity to provide care at home, be in communication with your most trusted provider to discuss your plan. Together, discuss what parameters you would use

as an indication to seek care in an inpatient setting if things progressed.

CREATE CONTINGENCY PLANS: What would be your “tipping point” to alter your pre-plan? Prepare your plans with your family and provider with the best information you have, but also think about alternative and contingency plans. What if your care personnel are unavailable to come to your home? What if you and your provider determine that this might change based on new or evolving information, what would be your next step? If you have multiple family members, how would you assign roles and responsibilities for all involved?

CONNECT WITH OTHERS: Stay connected to help overcome social isolation and to recognize that issues you might be facing are a shared experience by many. Together we can share knowledge and resources. While virtual connection makes it possible to be connected with other trach community members around the world, it might be also helpful to connect with local trach families to share the current status of your “go-to hospital” and work together on regional supports.

ADVOCATE: The important question we can all ask ourselves is “What can we do to continue to advocate for and promote the well-being of all individuals living in the community with a tracheostomy during this challenging time?” We all have a role in moving forward to ensure the

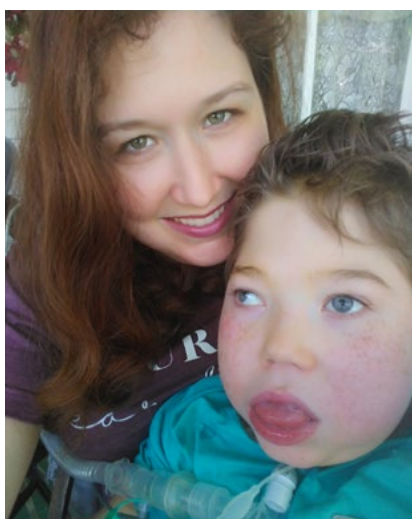
existing trach community has a voice and input into the future direction of healthcare. Be an active participant in advocacy efforts.

WHEN IN DOUBT...LOOK TO EXAMPLES OF RESILIENCE IN THE TRACH COMMUNITY:

Individuals with trachs, families, caregivers, and medical providers who dedicate their lives to helping us thrive in the community, are sources of guidance for us during this time. Individuals have overcome health challenges and adapted to living with the support of a tracheostomy. They have already taught us, but a good reminder now, that we can overcome adversity. We can get creative. We can adapt like no other. We can not only survive, but we can thrive!

Thank you for your hard work on behalf of the global trach community, and for being motivated to think creatively about new and necessary ways to continue to provide the best care possible. By the time this goes to print, the GTC will have hosted a webinar on this topic titled, “Navigating Public Health Crises for Individuals and Families Living with Tracheostomy: COVID-19 and Beyond”. You’ll be able to view this webinar on our website. As you, your families, and teams, come up with innovative ways to respond to COVID19 and the related public health crisis, please share with the GTC what you learn and we’ll continue to move forward together. ■

A MOTHER’S POEM



By: Cheryl Lingenfelter, mom to Nathan

Terrifying - I don’t know if I can do this.

Reality - it will secure his airway

Acceptance - I want what is best for him.

Clearly - I have the best doctors available

Hold on, a new journey begins.

SARS-COV-2 POSITIVE PATIENTS WITH LARYNGECTOMY: A CASE SERIES

By: H Coleman, J Sutherland, S Kang, I Smillie, N Calder
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INTRODUCTION

In December 2019, cases of what appeared to be an acute atypical pneumonia began to cluster in Wuhan, China. Rapid spread to surrounding areas led to the discovery of a novel coronavirus now named the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) due to its similarity to SARS-CoV, the respiratory virus responsible for widespread high mortality in 2002-2003.¹ COVID-19 is the name given to resultant disease of SARS-CoV-2 which the World Health Organisation declared a global pandemic on 11th March 2020. As of 25th of April 2020 there have been 2,800,000 cases and 190,000 deaths worldwide.²

Head and neck cancer patients, including those who have undergone previous surgical treatment are thought to be at an increased risk of SARS-CoV-2 infection. Having undergone major surgery and possible adjuvant treatment such as chemo- and/or radiotherapy these patients are immunocompromised. Due to the pathogenesis of head and neck squamous cell carcinoma (SCC) these patients are also more likely to be elderly and have associated high risk comorbidities such as diabetes and hypertension in addition to a smoking and alcohol history.³ There is no published evidence to date on the post-operative and ward-management of this group of patients with laboratory proven SARS-CoV-2 infection.⁴

Here we present our experience in the diagnosis, investigation and management of SARS-CoV-2 positive patients with laryngectomy attending our institution between 1st of March and 1st of May of 2020 during the COVID-19 pandemic.

SEARCH STRATEGY

A literature search was performed using the database of PubMed. The following search criteria were used: 'Coronavirus', 'COVID-19', 'SARS-CoV-2', 'laryngectomy', 'head and neck carcinoma'. These searches were performed with the following limits applied: Humans and published within the last 20 years.

CASE REPORT

PATIENT 1- 50-YEAR-OLD FEMALE.

At the beginning of March 2020, Patient 1 was an inpatient on the ENT ward and was progressing well 2 weeks following total laryngectomy, bilateral neck dissection and pectoralis major flap reconstruction for a T3N2c moderately differentiated supraglottic SCC. Her past medical history included an out of hospital cardiac arrest and implanted cardiac defibrillator (ICD), COPD, obesity and hypertension. Patient 1 was a lifelong smoker although stopped following the cardiac arrest.

Her post-operative issues included a partial right neck wound dehiscence requiring regular dressing. Otherwise she was making good progress; tolerating nasogastric feeding, able to care for her stoma independently and was fully mobile.

Two-weeks post-operatively nursing staff highlighted her frequent use of nebulisers to the medical team. With clinical suspicion high due to a recently discovered positive contact who had briefly worked on the ward, Patient 1 was swab tested and found to be positive for SARS-CoV-2. She was isolated on the infectious diseases ward, which was operating as the sole COVID-19 ward within our institution at that time. Inflammatory

markers were unremarkable and there were no changes noted on chest x-ray. Subsequent SARS-CoV-2 tests performed were negative and she returned to the ENT ward after 3 days. She remained asymptomatic throughout the remainder of her admission and was discharged home 1 week following her first negative test result.

PATIENT 2- 57-YEAR-OLD MALE

This patient was admitted to the ENT ward on the 7th of April with symptoms of shortness of breath, increased laryngectomy stoma secretions and pyrexia. Patient 2 had undergone total laryngectomy, partial pharyngectomy and tongue base excision with bilateral neck dissection and pectoralis major flap reconstruction in 2018 for a T4a N0 moderate/poorly differentiated supraglottic SCC. His other past medical history included previous stroke, COPD and hypertension. He was also an ex-smoker.

On admission Patient 2 was presumed to have tracheitis given the macroscopic inflammatory features of his trachea, however given his symptoms, he underwent SARS-CoV-2 testing and was admitted to one of two newly formed suspected/confirmed COVID-19 wards. His admission inflammatory markers demonstrated a mildly raised C-Reactive Protein (CRP) of 39mg/L and chest x-ray demonstrated some alveolar shadowing within the left lower lobe. Patient 2 was commenced on supplemental oxygen therapy to target an oxygen saturation of 88-92%, regular nebulized saline, intravenous co-amoxiclav and paracetamol. He required nursing aid with regular stoma suctioning. The following morning his SARS-CoV-2 test returned positive. Patient 2 remained isolated on the ward and he made an uncomplicated clinical recovery; he was weaned from oxygen and discharged home after 4 days as an inpatient to complete a 14-day period of self-isolation.

PATIENT 3 - 66-YEAR-OLD FEMALE

Patient 3 was an inpatient on the ENT ward and was 8 weeks post total laryngectomy, bilateral neck dissection and left hemi-thyroidectomy for a T3N0 moderately differentiated supraglottic SCC.

She remained in hospital as she developed an immediate post-operative pneumonia requiring ITU admission and then suffered from a post-operative left neck wound dehiscence. Her past medical history included hypertension, COPD, cognitive decline and she was an ex-smoker.

On the 6th of April, she developed shortness of breath, nausea and vomiting in addition to diarrhoea. There were no recorded episodes of pyrexia however nursing staff did witness several episodes of rigor. Patient 3 was tested for SARS-CoV-2 infection and found to be positive. She was then transferred to a dedicated COVID-19 ward for ongoing care. Patient 3's CRP peaked at 109mg/L and she developed a lymphocytopenia of $0.3-0.9 \times 10^9$. Chest x-ray demonstrated bilateral peripheral infiltrative appearances. Patient 3 required 4 days of supplemental oxygen therapy before weaning, regular saline nebulisers and nursing aid with stoma care.

She first tested negative for SARS-CoV-2 two weeks later and was transferred back to the ENT ward and was subsequently discharged home

PATIENT 4 - 56-YEAR-OLD FEMALE

Patient 4 was admitted to hospital with suspected SARS-CoV-2 infection on the 20th of April after experiencing 2 days of cough, increased sputum production, fever and headache at home. She had previously undergone a retrograde total laryngectomy, tongue base glossectomy, bilateral neck dissection and pectoralis major flap reconstruction in 2017 for a T4 N0 poorly differentiated vallecula SCC. Her other past medical history included tuberculosis and she was an ex-smoker.

Patient 4 was pyrexial on admission and therefore swab-tested for SARS-CoV-2 and transferred to a dedicated COVID-19 ward. Her test result was positive the following day, CRP was 65mg/L and there were no abnormalities on full blood count. She did not undergo chest x-ray. IS was managed with regular nebulised saline, nursing aid with stoma suctioning and paracetamol. She did not require any supplemental oxygen therapy. Patient 4 made a good clinical recovery; her first negative test result returned on the 23rd of April and she was discharged home from hospital on the same day.

DISCUSSION

The evidence gathered during the pandemic so far agrees that the common clinical presentations of COVID-19 include the primary symptoms of fever and cough, with associated fatigue, sputum production, shortness of breath, sore throat and headache. A small proportion are known to suffer from GI symptoms such as diarrhoea, nausea and vomiting. A combination of all the above symptoms were exhibited in our laryngectomy patients.

The elderly and those with medical comorbidities such as hypertension, diabetes, COPD, cardiovascular disease and obesity are more likely to develop severe illness such as acute respiratory distress syndrome, multi-organ failure and death. Due to the pathogenesis of head and neck SCC, many of these patients who have undergone laryngectomy are highly likely to possess the above risk factors associated with increased risk of severe COVID-19. The age range of our patient cohort is 50-66 years old, the majority of patients suffering severe disease appear to be over the age of 70.ⁱⁱⁱ All patients included within our series have underlying chest disease, all are ex-smokers, 3 of 4 have hypertension and underlying cardiovascular disease and 1 patient is clinically obese.

Studies so far have also shown an association between increased CRP, the presence of lymphocytopenia and severity of disease. A recent study in Wuhan demonstrated that those admitted to the intensive care unit (ICU) in a severe or critical condition demonstrated lymphocytopenia (84%) and an elevated CRP (94%) at time of admission. Also 76% of those admitted to ICU demonstrated bilateral infiltrative changes on chest x-ray.

All of our patients with laryngectomy were managed successfully on dedicated COVID-19 wards and did not require admission to ICU. Our most severely affected patient was the eldest, Patient 3; She demonstrated lymphocytopenia, elevated CRP and bilateral infiltrative changes on chest x-ray. However, she fully recovered following 2 weeks of ward based care including oxygen therapy, saline nebulisers and regular stoma care.

The presence of ENT nurses on each of our dedicated COVID-19 wards must be emphasized; their experience in the management of patients with laryngectomy, including safe suctioning and communication, has proven invaluable in the current climate. It has been well described that otolaryngologists and healthcare workers involved in the care of these patients are at an increased risk of contracting SARS-CoV-2. As per ENT UK guidance, personal protective equipment must always be worn when caring for laryngectomy patients due to the potential for aerosol generation from the open airway. ,

As an emerging acute respiratory disease, the transmission of SARS-CoV-2 infection is primarily thought to spread through the respiratory tract by droplets, respiratory secretions and direct contact. Evidence of the virus has also been found in faecal and blood swabs suggestive of other routes of transmission however ACE2, the primary receptor binding site for the virus, presents in greatest concentrations in lung alveolar epithelial cells and enterocytes of the small intestine. Our experience of COVID-19 and the safe management of these patients without the requirement for higher level care raises the question as to whether there may be a protective effect of laryngectomy. We hypothesise that the lack of direct physical route from the nasopharynx to the lungs may result in a reduction of lung viral load causing only mild illness in an otherwise well recognised high- risk group. Further study of many more infected patients with laryngectomy is required before we can reject this hypothesis.

CONCLUSION

SARS-CoV-2 is the greatest threat to global health in recent history and we are learning new information daily on how to best care for our patients and keep ourselves safe whilst doing so. We hope that by sharing our experience in the management of SARS-CoV-2 positive patients with laryngectomy that practitioners from all specialties feel better equipped to manage this, often intimidating, group of patients safely through the COVID-19 pandemic. ■