

University of Chicago Medicine (UCM) Covid-19 Emergency Management

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The University of Chicago Medicine

- Preparations
- Emergency approach to airway management
- High Flow O2 and NIV helmets
- High yield points to consider



Began preparations in mid-January

Wuhan Input







Began preparations in mid-January

HICS Activation and Initial meeting in January

- Surge Plan
 - Opened a Drive Through Testing Clinic
 - Old ED Drive/Ambulance Bay
 - Dedicated Covid Testing Clinic
 - Old ED Space
 - Dedicated Covid Treatment Clinic
 - 4th floor of Outpatient Clinic Building
 - Increased TeleHealth Visits
- ED Surge Planning
 - Increase our Treatment Space / Multi-Level Plan / Ambulance Bay
 - Created "Hot" and "Cool" zones / ILI & non-ILI Patients
 - Physician back-up system for non-EM Providers
 - Remote Consults/Family—Telepresence-enabled Emergency Care (TEC)













General Airway Guidelines

- The urgency to secure an airway must be balanced with the need for staff to meticulously don the appropriate PPE, which may take several minutes.
 - Staff safety is a critical priority
- ED intubations of suspected COVID patients should be performed by an experienced provider (Tube Team)
- Early confirmation of goals of care. Document the discussion. Consult Palliative Care. RN Liaison 24x7 (interface with families & care teams, provide phone & video conf support).
- Avoid bag-mask ventilation, BiPAP/CPAP, or nebulizer treatments as these are aerosol generating procedures (AGPs).
- Patients in cardiac arrest should be intubated early, and to minimize aerosolization of virus, <u>CPR should be suspended</u> during the intubation.



General Airway Guidelines

- The BEST intubation is an avoided intubation (Prevent the Vent)
 - Maximize medical therapy
 - Albuterol MDI 4-10 puffs via spacer inhaled every 20 min for 1 hour
 - Symbicort 2 puffs with spacer q20 min x3 then PRN (Max: 12 inhalations daily)
 - Epinephrine 0.3-0.5 mg (1 mg/mL concentration) IM q20 min x2
 - Terbutaline (alternative to Epi): 0.25 mg subcutaneously q20 min x3
 - Mag: 2 g IV over 20 min; may repeat in 30 min if adequate response
 - Ketamine: 0.1-2 mg/kg
 - Steroids
 - Trial HFNC, Proning



Candidate for High Flow Nasal Cannula (HFNC)?

- Able to protect airway AND
- No evidence of ventilatory failure (e.g. hypercarbia, respiratory acidosis, or respiratory fatigue)



All ED Patients by Week

		No HFNC			HFNC started in ED			l	Total		
Week	Week	No	Intubated	Intubated	with no	Intubation	Intubation	No	HFNC	HFNC	
of	Num	Intubation	in ED	post ED	Intubation	in ED	in ICU	Intubation	Post ED Tube	Post ICU Tube	
3/8/20	11	1090	8	5				4		•	1107
3/15/20	12	1585	11	7				1		5	1609
3/22/20	13	1364	23	17				9	4	5	1422
3/29/20	14	1178	20	13				9	5	5	1230
4/5/20	15	1159	27	7	14	1	3	3	3	3	1220
4/12/20	16	1088	17	14	21	1		6	1	4	1152
4/19/20	17	487	6	4	8					•	505
	Total	7951	112	67	43	2	3	32	13	22	8245

Covid-19 Positive by Week

		No HFNC			HFNC started in ED			1	Total		
Week	Week	No	Intubated	Intubated	with no	Intubation	Intubation	No	HFNC	HFNC	
of	Num	Intubation	in ED	post ED	Intubation	in ED	in ICU	Intubation	Post ED Tube	Post ICU Tube	
3/8/20	11	14		1						•	15
3/15/20	12	90	1	1						3	95
3/22/20	13	108	4	5				9	3	4	133
3/29/20	14	134	6	3				9	5	3	160
4/5/20	15	143	7		10		2	3	2	2	169
4/12/20	16	174	4	7	15			3	1	4	208
4/19/20	17	56			5					•	61
	Total	719	22	17	30	0	2	24	11	16	841



Source: ED Operational Data (3/10-4/21/20), not approved for research purposes







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Apparatus: Key Components

1. Oxygen Source

Usually wall oxygen vs tank

2. Air/Oxygen blender

Where you adjust FiO2%

3. Humidifier and Warmer

Warms and humidifies air

4. Nasal Cannula

- Larger bore
- More pliable allowing for better seal



AT THE FOREFRONT UChicago Medicine

Papazian, Laurent, et al. "Use of high-flow nasal cannula oxygenation in ICU adults: a narrative review." *Intensive Care Medicine* 42.9 (2016): 1336-1349.

Management:

Titration (2 Variables)

1. FiO2% (Range: 21-100%)

- % Mixture of O2 and air
- Measured at wall / source

2. Flow Rate (Range: 1-50 or 60 L/Min)





https://rebelem.com/high-flow-nasal-cannula-hfnc-part-1-how-it-works/

Trial of High Flow Nasal Cannula (HFNC)

- Start HFNC at 40 lpm / 100% FiO2
- Titrate flow rate up to max of 60 lpm if needed to decrease work of breathing and maintain RR <30 bpm
- Titrate FiO2 down to maintain oxygen saturation at 92-96%
- Consider intubation if:
 - Unable to achieve O2 saturation of 92%
 - Persistent respiratory distress
 - Unable to wean FiO2 to 60% or less within 4-6 hours



Titrating off HFNC

- Decrease FiO2 as tolerated to maintain saturation 92-96%
- Once FiO2 weaned to 40%, transition to 6L NC and assess for desaturation and/or respiratory distress (i.e. RR >30)
- If any distress, transition back to previous FiO2 of 40% and flow rate on HFNC

Note: There is no need to titrate down flow rate once FiO2 goal of 40% is achieved. Simply go from High Flow to low flow oxygen once FiO2 of 40% is achieved



Indications for Intubation

- FiO2 requirement >40% (5L nasal cannula)
- Failed or not suitable for HFNC
- Respiratory fatigue
- Hypercarbia/respiratory acidosis
- Inability to protect airway



Preparation for Intubation

- Goals of care discussion with the patient and his family, if possible. Re-verify patient's chosen decision maker prior to intubation, while they retain capacity.
- Encourage and assist the patient in calling their family members, even if only for a few minutes. COVID carries high mortality for intubated patients, and this might be a final opportunity.
- Move patient to negative pressure room
 - EMS arrivals with respiratory distress or anticipated need for intubation should be roomed in negative pressure rooms upon arrival
 - ED room 41 should be held open for emergent airway procedures and cardiac arrests
- Don appropriate PPE (check that others involved with intubation are also wearing PPE)
 - N95 & Face Shield or PAPR
 - Gown & Gloves (2 pairs of gloves recommended so you can quickly discard the outer pair after intubation)
- Avoid bag-mask ventilation, BiPAP/CPAP, or HFNC for pre-oxygenation as these are aerosol generating procedures.



Intubation Procedure

- If intubation is urgent, not emergent, pre-oxygenate patient for 5-minutes in reverse Trendelenburg or head up position.
 - Consider awake proning, if the patient can participate
- Consider a NRB for pre-oxygenation with a surgical mask over
- After meds, passive oxygenation with jaw-thrust and holding the BVM, with PEEP valve, over the face to create a seal. Do not bag.
- If BVM is unavoidable, use a high efficiency hydrophobic filter on BVM to minimize contamination of room air and only use small tidal volumes and ensure a tight mask seal to prevent aerosolizing droplets.
- Place barrier (Intubation box or plastic bag) over the patient's face and intubator's forearms
- Video laryngoscopy with the C-MAC or Glidescope with D-blade is preferred over direct laryngoscopy to keep your face as far away from the patient's face. Avoid awake/fiber optic intubation.
- After the tube is placed, inflate the cuff prior to any ventilation. If possible, clamp the tube or place a thumb over the end of the tube
- Close the circuit as soon as possible by connecting the ventilator directly to the ETT, with ETCO2 attached.
- LMA for back-up airway, not direct laryngoscopy if at all possible



NIV Helmets

INDICATION

- Saturation <92% or
- Respiratory rate > 30 breaths/min
- on 6L Nasal cannula and/or transitioning to nonrebreather

EXCLUSION CRITERIA

- Not in Negative Pressure Room
- No gag reflex
- Impending cardiac/respiratory arrest
- Intractable Hemoptysis/vomiting









Patel BK, et al. Effect of Noninvasive Ventilation Delivered by Helmet vs Face Mask on the Rate of Endotracheal Intubation in Patients With Acute Respiratory Distress Syndrome: A Randomized Clinical Trial. JAMA. 2016 Jun 14;315(22):2435-41.

High Yield Points

- Protect your staff
 - Proper PPE/Ante Rooms
 - Get comfortable with any barrier devices
- Maximize medical therapy
- Maximize Airway support
 - HFNC
 - Proning
- Liaison with Families





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UCM: Information Update

HIGH FLOW NASAL CANNULA

BACKGROUND: High Flow Nasal Cannula (HFNC) is a means of

delivering humidified oxygen at a rate of up to 60L/Min. Due to uncertainty about the level of aerosolizaiton, and the risk of COVID transmission, initial UCMC policy was to avoid HFNC use until more data was available.

HOWEVER, recently published literature reviews, as well as international expert consensus have found that transmission risk using HFNC may be less than anticipated. It is now thought that HFNC may represent a relatively safe alternative to intubation in the setting of the COVID Pandemic.

SUPPORT FOR HIGH FLOW NASAL CANNULA USE:

HFT Nasal Cannula Temperiare Senter

Based on extensive literature review, studies coming out of China and Italy, as well as expert consensus, several multi-national organizations are <u>now recommending the use of HFNC in COVID Patients!</u>

SURVIVING SEPSIS GUIDELINES (Alhazzani, 2020)

- Composed by a multi-national panel of experts
- Now recommend HFNC over conventional O2 therapy for patients with hypoxemic respiratory failure in the setting of COVID-19
- Reasoning:
 - Found to decrease need for intubation, which is a higher aerosol generating procedure
 - Retrospective studies DO NOT SHOW increased risk of transmission with HFNC alone

WORLD HEALTH ORGANIZATION (WHO, 2020)

- Agency of United Nations: Specialized in Informational Public Health
- Recommends use of HFNC
- Reasoning:
 - Found to reduce need for intubation
 - Did not find any evidence that HFNC increased aerosol transmission risk

STUDIES EXAMINIG RISK OF AEROSOLIZATION IN HFNC USE:

- While HFNC is generally thought to be an aerosolizing procedure, the level of aerosolization is quite low. A study by Roberts et al (2015) demonstrated that HFNC did not generate any more aerosol than a forceful exhalation or cough.
- A large systematic review by Tran et al (2012) examined the risk of SARS disease transmission during several aerosolizing procedures. HFNC did not increase the rate of SARS (Corona Virus) disease transmission to a statistically significant degree.
- What does Up-to-Date say for Covid-19 pts? "Oxygen via high flow nasal cannula versus noninvasive ventilation — Among the noninvasive modalities, we prefer HFNC." https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-critical-care-issues

TAKE AWAY: High Flow Nasal Cannula is a reasonable option for patients with hypoxic respiratory failure in the setting of COVID Infection, and transmission risk is likely minimal if proper PPE is worn (N95, eye protection, gown, gloves) and patient remains in an isolation room. RESOURCES:

