

EMERGENCY CENTRE MANAGEMENT OF COVID-19

Patient presenting with possible COVID-19 to the Emergency Centre

Access Control: Case definition screening and Triage

ROUTINE EC TRIAGE (SATS)

- Respiratory Rate
- O2 Saturations
- Heart Rate
- Temperature
- Mental State/ AVPU

ASSESS FOR SYMPTOMS AND RISKS?

- Dry, non-productive cough (60-80% of patients)
- Fever >38 degrees (50-75%)
- Dyspnoea/ SOB (20 – 40%)
- Sore throat, Rhinorrhoea, Headache (<15%)
- Chest Pain
- Haemoptysis
- Contact with positive person or patient if HCW
- Travel History (less pertinent now with local spread)

KEY PAST MEDICAL & SOCIAL HISTORY

- Diabetes
- Asthma/ COPD
- TB
- HPT
- Current Smoker
- Immunocompromise (HIV, Chronic steroids use, immunosuppressive medication)
- Cancer with ongoing treatment

PPE USAGE SUMMARY

1) LOW RISK PROCEDURES OR NON-AEROSOL / DROPLET GENERATING PROCEDURES

For routine care of COVID-19 patients e.g. clinical assessment, patient transfer between departments, performing vital signs, handing out medication:

Hand hygiene, Surgical mask, Eye protection, goggles, Apron

2) HIGH RISK PROCEDURES OR AEROSOL GENERATION PROCEDURES

E.g. Nebulizer treatment, Suctioning, CPR, Intubation

Hand hygiene, N95 respirator, Long sleeve disposable gown, eye protection- goggles, face shield, gloves

PPE ADJUNCTS

Hospital based multidisciplinary clinical teams to agree on adjunct preference.

- **Intubation hoods:** can be used repeatedly with post-use disinfection imperative.
- **Intubation sheets** are single use and must be discarded after each intubation. The exception being the single sheet used for the same patient (intubation and extubation) in the theatre/operative environment.

Direct to Appropriate Treatment Area

Requiring Emergency Life saving Intervention?

YES

NO

Continue directly to lifesaving intervention

Completion of the COVID-19 Severity Score (ideally doctor completed- see separate sheet for calculation/ web application) If not completed look at NICD guideline

Green: 1-4 Mild or Moderate
Less Likely Needs Oxygen

NICD MILD DISEASE

- SpO₂ ≥ 95%
- Resp rate < 25 / min
- HR < 120 / min
- Temp 36 - 39°C
- Mental status normal

Yellow: 5-7 Severe
Likely Needs Oxygen

NICD Severe Disease

- SpO₂ < 93%
- Resp rate > 30 / min
- PaO₂/FiO₂ < 300
- Lung infiltrates on imaging

Red: 8+ Critical
Likely needs mechanical ventilation

NICD Critical

- As per severe with:
- Respiratory failure requiring mechanical ventilation or
 - Presence of shock or
 - Other organ failure

Age >65 and/or Comorbidities?

YES

NO

Mild Disease with Risk Factors

!!TAKE NOTE: Geriatric patients are more likely to have atypical symptoms (e.g. functional decline, delirium, exacerbation of underlying chronic resp. conditions & loss of appetite)

Imaging and other Ix:

- CXR (consider mobile)
- Baseline ECG
- POCUS if indicated



LABORATORY SEVERE AND CRITICAL

Bloods: FBC with diff, Ferritin, CMP, D-Dimer, Pro-BNP, Trop, U+E, LFT, CRP, clotting profile, PCT, ABG
COVID-19 Swab for PCR
Consider other **respiratory swab (e.g. Influenza and RSV)**
+Specimen for culture to confirm other infection sources or organism

Monitoring in the EC

- Review frequently (at least every hour)
- RR, work of breathing, Sats,HR
- If high PaCO₂ at presentation repeat ABG

In borderline scenarios use clinical discretion to determine need for CXR or bloods (CRP, FBC with Diff, U+E)

TREATMENT PLAN MILD DISEASE

- Use clinical discretion- likely safe for discharge home, self-isolation and monitoring.
- Send COVID-19 PCR and complete paperwork
- Advise to return if symptoms worsen/ call the call centre
- Symptomatic Treatment

TREATMENT OF PATIENTS REQUIRING ONGOING CARE

- **Symptomatic Treatment:** Paracetamol 1g PO or IV if not tolerated orally. In children Panado syrup 15mg/kg.
- **Bronchodilator** via Metered Dose Inhaler or Spacer device. Nebulising is an aerosolising procedure and should be avoided.
- **Fluids:** Be restrictive with fluids. Avoid 'maintenance' IV fluid, high volume enteral nutrition and fluid bolus for hypotension.
- **Supplemental O₂:** O₂ should be provided in severe acute respiratory infection and respiratory distress, hypoxaemia or shock with a target SpO₂ > 95%. NIV is discouraged. In mild case consider NC or Face mask O₂ (with reservoir bag only if necessary). Be aware that HFNO₂ requires full PPE as this is an aerosolising intervention and should only be used as bridging ventilation in a care environment that caters for it. Please place a surgical mask on the patient if they are given HFNO₂.
- **CPR:** This is an aerosol generating procedure so ensure PPE in place. Be careful if BVM used – ensure good seal to minimise risks of leak.

* **Remember** - Look for other treatable pathology (e.g. a tension pneumo) that may cause COVID-19 patients to decompensate.

* **Remember** – Don't assume that all deteriorating patients are COVID-19 related. We will still see & treat all other cases that present to the EC.

INTUBATION SUMMARY

- **Don and Dof PPE-** this is a high risk!
- Most experienced doctor to tube
- Use video laryngoscopy
- **Pre-O₂:** 3-5Min @15L/min NRM & nasal O₂ or a tightly applied BVM, attached to high flow O₂ for the spontaneously breathing patient.

RSI AND OTHER MEDICATIONS

Ketamine 1–2 mg/kg IV

Rocuronium 1.2 mg/kg IV

- Consider **Propofol** Induction 1-1.5 mg/kg only in haemodynamically stable patients
- **Fentanyl** 50-100 mcg, **Sufentanil** 10-20mcg, or **Remifentanyl** 2.5 mcg/kg may be used to suppress laryngeal reflexes and optimize the intubation condition. Caution: watch for cardiovascular side effects.
- Ensure full neuromuscular blockade before intubation
- Have stat dose of vasopressor ready in case of hypotension for example:

Epinephrine 5-20 mcg

or

Phenylephrine 50-200 mcg

or

Norepinephrine 8-16mcg= 0.5-1ml of 16mcg/ml infusion- mix in 3cc syringe

- Use a supraglottic device (LMA/iGel) to re-oxygenate (during RSI) rather than bagging
- Once intubated, inflate the cuff before positive pressure ventilation
- Once intubated, minimize circuit disconnects
- Use in-line suction
- If needing to disconnect the circuit and there is a risk of the patient coughing-clamp tube while disconnected

COVID-19 CLINICAL SEVERITY SCORE

Full name:	DOB:	Sex: M F
------------	------	----------



Comorbidities	>2 comorbidities or Immunocompromised or Cardiovascular disease	Score – circle only those that apply 2
----------------------	---	---

- COMORBIDITIES:**
- Hypertension
 - Diabetes
 - COPD/Asthma
 - TB
 - Current smoker
- IMMUNOCOMPROMISE:**
- HIV/AIDS
 - Severe malnutrition
 - Chronic steroid use
 - Immunosuppressive medication
 - Ongoing cancer treatment



		Score – circle only those that apply
Mobility	With help Stretcher	1 2
Assessment	Difficulty breathing or Unresponsive	3
Temperature	≤ 35 ≥ 38.5	2 3
Pulse	≤ 45 ≥ 110	2 3
Respiratory rate	≤ 9 20 - 27 ≥ 28	2 2 4
Systolic BP	≤ 90 ≥ 160	4 2



Total (add all those circled): |



1-4: GREEN MILD / MODERATE	5-7: YELLOW SEVERE	8+: RED CRITICAL
Less likely to need oxygen.	Less likely to need mechanical ventilation. Likely needs oxygen.	Probably needs mechanical ventilation.



MANAGEMENT OF COVID-19 IN-HOSPITAL (WARD)

CONSIDER FOR ADMISSION IF

- Room Air Oxygen Saturation \leq 95% at rest
- Respiratory rate \geq 26 breaths/ minute
- Pulse rate \geq 121 beats/ minute
- Temp \geq 38.1°C
- Abnormal Mental State

INVESTIGATIONS

IMAGING AND OTHER INVESTIGATIONS

- CT chest not a diagnostic requirement
- (Findings: Viral pneumonia picture, +GGO, Septal thickening, +- consolidation)
- CXR not required daily only if change in condition or plan
- Baseline ECG- If chloroquine please repeat on Day 2 of treatment to review QT interval

LABORATORY INVESTIGATION

- **Bloods Admission:** FBC, Ferritin, Pro-BNP, Trop, U+E, CRP, ABG
- **Consider Blood repeat** of K+ & ABG if high O2 req.
- COVID-19 SWAB PCR
- +- Specimen to confirm other source or type of infection
- **If worsening:** LFT, trop, CRP, PCT, LDH, ferritin, d-dimer, clotting profile, ABG

BASIC WARD CARE

- Routine ward observations
- Pressure Care, including prone positioning
- VTE risk assessment and prevention (consider therapeutic and mechanical preventative mechanisms)
- ***Be vigilant with the recognising and rescuing of deteriorating patients as hypoxaemia and ARDS may happen quickly**
- Monitor **HGT and Potassium** levels as these can be impacted by the medication and disease process
- Baseline ECG and repeat every second day if on Chloroquine treatment or immediately if deteriorating/ change in clinical conditions.
- **IV Fluids:** Be cautious of giving 'maintenance fluid'. Balso, or if unavailable, ringers lactate should be used. Be conservative with IV fluid, as fluid overload will worsen the patient's condition.

OXYGEN THERAPY IN THE WARD

- This will depend on masks available in the ward in your hospital
- Administer oxygen initially via Nasal Cannula (1-4l/min) and thereafter Face Mask (40 – 60%); titrate according to requirement.
- Place a surgical mask on the patient with nasal cannula O2 when there is risk of exposing others to COVID.
- **Saturation Aims of O2 therapy (NICD):**
 - Non pregnant adults: \geq 90%
 - Pregnant patients: \geq 92 – 95%
 - Children: \geq 90%
 - Children with emergency signs: \geq 94%
- **Look for clinical signs of respiratory distress:** deterioration in mental state, respiratory rate $>$ 30 breaths/minute, using accessory muscles despite maximum non-invasive oxygen therapy. If present do a blood gas to look at the PaO2, Ph and PaO2/FiO2 ratio.
- If the patient is not tolerating on 40% Oxygen **Seek ventilation advice early as these patients deteriorate quickly.**
- High Flow Nasal Oxygen can be considered as bridging ventilation however please remember this is a high risk aerosolising procedure and exposure risks of staff and other patients must be considered

NUTRITION

Ensure the renal function is normal before prescribing high protein supplements. Consult your local dietician for guidance.

Protein supplement options (for patients with normal renal function):

- Fortisip compact protein tds PO
- Supportan bd PO
- Fresubin 2kcal bd

Diabetic patients:

- Diasip tds PO
- Diben sips tds PO

Clear fluids consideration:

Peptamen prebio, Fortijuice, Fresubin Jucy

NG Feeding protocol:

Start feeds at 20 ml/h with Nutrison standard or Fresubin Original

TREATMENT

PHARMACEUTICAL RX

- Paracetamol 1g 6-8hourly (Only consider IV route if oral not tolerated)
- Thromboprophylaxis if no contraindication
- Bronchodilator via **Metered dose inhalers** (e.g. Asthavent)
- **Avoid nebulising** patients as this is an aerosolising procedure!
- Chloroquine can be given in isolation or in combination with Azithromycin.

Hydroxychloroquine* (Section 21 200mg = 155mg base)
- 400 mg 12h for 1 day then 200 mg 12h for 4 days

OR

Chloroquine Sulphate* (200mg = 150mg base)
- 10 mg/kg base daily for 2 days then 5 mg/kg base daily for 1 day

PLUS

Azithromycin 500 mg on day 1, 250 mg daily day 2 -5.

* Please note the stock of chloroquine is markedly limited nationally and should be reserved for hospitalised cases.

Other symptomatic/ supportive treatment (limited evidence of benefit)

- Elemental Zinc 30-45 mg Po daily for 5 days
- Ascorbic Acid 1000 mg PO daily
- Calciferol 50 000 iu 1 tablet daily for 3 days
- N-Acetylcysteine (ACC200) 200 mg PO tds
- Consider PPI in patients with a coagulopathy

Do Not routinely give corticosteroids for viral pneumonia.

TREATMENT OF POTENTIAL CO-INFECTION:

Consideration should be given to empiric antimicrobials if evidence of Co-infection:

- **Conventional Community-Acquired Pneumonia (of Hospital acquired pathogens** if appropriate)
 - Amoxicillin-Clavulanate 1g 12 hourly or 2g/125mg 12hourly
- **IF risk of Atypical pneumonia pathogens add:**
 - Azithromycin 500mg dly x 3days
- **Influenza (if influenza epidemiology fits and the patient has severe illness)**
 - Oseltamivir 75mg PO bd x 5day
 - Discontinue Tamiflu if PCR negative.**
- **PJP** (if appropriate risk factors present, e.g. HIV with low CD4 count)

***Empiric therapy should be de-escalated on the basis of microbiology results and clinical judgment.**

Patient Deteriorates?

Call treating Doctors for possible HC/ ICU admission as per Critical Care Society South Africa Guidelines (CCSSA)

DISCHARGE

DISCHARGE CONSIDERATIONS

- Consider the patient risk factors
- Discharge destination
- Clinical condition
- Current course of illness
- Current Capacity and availability of step down care?

DISCHARGE CRITERIA

- Room Air Oxygen Saturation \geq 95% at rest
- Respiratory rate \leq 25 breaths/ minute
- Pulse rate \leq 120 beats/ minute
- Temp $<$ 38°C
- Normal Mental State

MANAGEMENT OF COVID-19 IN-HOSPITAL (ICU)

ICU ADMISSION CRITERIA MET (CCSSA ALGORITHM SOFA AND FRAILTY ASSESSMENT)

IN-PATIENT OXYGENATION

Ensure adequate oxygenation and hemodynamic support during acute phase of illness is crucial. Oxygen therapy is likely to be the single most effective supportive measure in COVID-19 patients overall:

Aim for a SpO₂ of:

- Non pregnant adults: $\geq 90\%$
- Pregnant patients: $\geq 92 - 95\%$
- Children: $\geq 90\%$
- Children with emergency signs: $\geq 94\%$

PPE USAGE SUMMARY

1) LOW RISK PROCEDURES OR NON-AEROSOL / DROPLET GENERATING PROCEDURES

For routine care of COVID-19 patients e.g. clinical assessment, patient transfer between departments, performing vital signs, handing out medication:

Hand hygiene, Surgical mask, Eye protection, goggles, Apron

2) HIGH RISK PROCEDURES OR AEROSOL GENERATION PROCEDURES

E.g. Nebulizer treatment, Suctioning, CPR, Intubation

Hand hygiene, N95 respirator, Long sleeve disposable gown, eye protection- goggles, face shield, gloves

PPE ADJUNCTS

Hospital based multidisciplinary clinical teams to agree on adjunct preference.

- **Intubation hoods:** can be used repeatedly with post-use disinfection imperative.
- **Intubation sheets** are single use and must be discarded after each intubation. The exception being the single sheet used for the same patient (intubation and extubation) in the theatre/operative environment.

ROUTINE ICU CARE ACTIVITIES

1. Haemodynamic monitoring, assessment and intervention

* NOTE THAT COVID-19 PATIENTS DETERIORATE QUICKLY

* Watch for Rhythm abnormalities particularly those as result of a medication side effect or as a result of hypokalaemia.

2. Aspiration prevention

3. Prevent HAI by implementing the **bundles**

4. Pressure Care

5. **VTE assessment and prevention** (consider mechanical and pharmacological depending on clinical condition)

6. Optimise **Nutrition**

7. **Blood Glucose Monitoring** as some medications used in COVID-19 treatment can cause hypoglycemia.

8. Monitor **Potassium levels** as there is a increased risk of hypokalemia in COVID-19 patients

9. Strict monitoring of **Fluid Balance** (including IV infusions amounts)

DAILY SOFA SCORES

INVESTIGATIONS

LABORATORY

- **Bloods Admission:** FBC with diff, Ferritin, CMP, D-Dimer, Pro-BNP, Trop, U+E, CRP, clotting profile, PCT, ABG
- **Bloods Daily:** FBC, Magnesium, U+E
- **Blood every other day:** LFT, LDH, CRP, Ferritin
- **If deteriorating:** LFT, U+E, Trop, CRP, ProBNP, PCT, LDH, Ferritin, Clotting profile
- COVID-19 Nasal Swab PCR
- +- Specimen to confirm other source or type of infection

IMAGING AND OTHER

- Chest X-ray with repeat Chest X-ray only necessary if the patient deteriorates. Consider bedside rather than moving patient to radiology
- CT chest: not a diagnostic requirement and also cannot be done bedside.
- Point of Care USS (POCUS) if indicated
- Baseline ECG
- Consider Echocardiography

TREATMENT

RESPIRATORY CARE

Oxygen Therapy

- Nasal Cannula (with surgical mask) or Face Mask Oxygen
- Avoid High Flow Nasal Cannula and Non-Invasive ventilation
- Call for help if PAO₂ <72kpa or 9.5mmHg or requiring 40% O₂.

Commencing Mechanical Ventilation (see separate ventilation sheet)

LUNG PROTECTIVE VENTILATION

- Tidal Volume ideally 4ml-6ml/kg ideal body weight
- Initiate with PEEP 14 and titrate down
- Titrate FiO₂ to maintain sat Of 88- 90%
- Aim to get the FiO₂ below 0.6 (60%)

If Refractory Hypoxaemia or still requiring an FiO₂ > 0.6 consider the following sequentially:

- 1) **Titrate PEEP:** Increase the PEEP up to 14-16
- 2) **Review sedation** and consider increasing
- 3) **Prone** patient and increase mean airway pressure: Maintain Peak pressure 30 or if obese 34
- 4) **ECMO** – only if in registered centre. This will not be indicated or possible for most and should commence prior to signs of MODS.

If Airway Pressure Release Ventilation (APRV) (Only if treating team are comfortable with APRV ventilation)

- Pressure high 30
- Pressure low 0
- Time high 4 secs
- Time low set on the flow tracing- inspiration occurs at 40% of Peak expiratory flow
- No Pressure support
- Trigger lowest setting

FLUIDS

- **Be conservative** with fluids in patients- Limit intake and avoid oedema.
- Consider the use of **IV Balsol** or if unavailable Ringers Lactate when administering fluid.
- Target **CVP of 4-8mmHG.**

SEDATION CONSIDERATION:

- Remifentanyl
- Propofol (only during first 72hours)
- Midazolam (be aware that this can worsen delirium)

NUTRITION IN CRITICAL CARE

ENTERAL NUTRITION

- **Enteral nutrition is preferable.** Aim to commence within 12 hours of being placed on vent. This can be done through 10-12Fr NGT. Post-pyloric only if NG route fails.
- **Hypocaloric enteral nutrition should be initiated,** advanced slowly over 7 days of critical illness to an energy goal of 15-20 kcal/kg actual body weight per day (which should be 70-80% of caloric requirements), with a protein goal of 1.2-2.0 gm/kg Actual body weight per day.
- **Withhold feeds in patients with hemodynamic instability requiring vasopressor support (high or escalating doses),** multiple vasopressor agents, or rising lactate levels. It may be initiated/restarted after the patient is adequately resuscitated and/or has been on a stable vasopressor dose with sustained MAP of >65 mmHg.
- **A standard high protein (> 20% protein) polymeric isosmotic enteral formula should be used in the early acute phase of critical illness.** As the patient's status improves and vasopressor requirements abate, addition of fiber should be considered.

REFEEDING SYNDROME

- Older patients with co-morbidities are at higher risk of re-feeding syndrome and should be commenced at 25% of caloric goal. Monitor the serum CMP as calories are increased. The first 72hours being the highest risk.

TPN

- If requiring **parenteral nutrition this should commence early (in only the high risk- Those with enteral feed intolerance and escalating vasopressors).**

PHARMACEUTICAL RX

- Paracetamol 1g 6-8hourly (Only consider IV route if oral not tolerated)
- Thromboprophylaxis if no contraindication
- Bronchodilator via **Metered Dose Inhaler** (e.g. Asthavent) **avoid nebulising** as this is an aerosolising procedure!
- Chloroquine can be given in isolation or in combination with Azithromycin.

Hydroxychloroquine* (Section21 200mg = 155mg base)
- 400 mg 12h for 1 day then 200 mg 12h for 4 days

OR

Chloroquine Sulphate* (200mg = 150mg base)
- 10 mg/kg base daily for 2 days then 5 mg/kg base daily for 1 day

PLUS

Azithromycin 500 mg on day 1, 250 mg daily day 2 - 5.

* Please note the stock of chloroquine is markedly limited nationally and should be reserved for hospitalised cases.

Other symptomatic/ supportive treatment (limited evidence of benefit)

- Elemental Zinc 30-45 mg Po daily for 5 days
- Ascorbic Acid 1000 mg PO daily
- Calciferol 50 000 iu 1 tablet daily for 3 days
- N-Acetylcysteine (ACC200) 200 mg PO tds
- Consider PPI in patients with a coagulopathy

Do Not routinely give corticosteroids for viral pneumonia.

TREATMENT OF POTENTIAL CO-INFECTION:

Consideration should be given to empiric antimicrobials if evidence of Co-infection:

- **Conventional Community-Acquired Pneumonia (of Hospital acquired pathogens** if appropriate)
- Amoxicillin-Clavulanate 1g 12 hourly or 2g/125mg 12hourly
- **IF risk of Atypical pneumonia pathogens add:**
- Azithromycin 500mg dly x 3days
- **Influenza (if influenza epidemiology fits and the patient has severe illness)**
- Oseltamivir 75mg PO bd x 5day
Discontinue Tamiflu if PCR negative.
- **PJP** (if appropriate risk factors present, e.g. HIV with low CD4 count)

*Empiric therapy should be de-escalated on the basis of microbiology results & clinical judgment.

COMMON RESULT FINDINGS TO WATCH FOR:

- Myocarditis and elevated troponins (fatal cases)
- Lymphopaenia (common).
- Elevated liver enzymes, LDH and CPK
- Elevated prothrombin time (PT)
- Acute kidney injury
- CRP & D-Dimer tend to correlate with severity and can assess response to therapy
- PCT usually normal- if high consider bacteria infection
- Findings on CXR/CT Chest: Viral pneumonia picture, +-GGO, Septal thickening, +- consolidation
- X-ray changes may lag improvements in symptoms
- Septic shock is not common
- ARDS denotes severity of disease

NUTRITIONAL SUPPLEMENTS

Ensure the renal function is normal before prescribing high protein supplements and consult with the dietician in your team.

Protein supplement options (for patients with normal renal function) include:

- Fortisip compact protein tds PO

- Supportan bd PO

- Fresubin 2kcal bd

Diabetic patients: Diasip tds PO or Diben sips tds PO

Clear fluids for consideration: Peptamen prebio, Fortijuce, Fresubin Jucy

NG Feeding protocol:

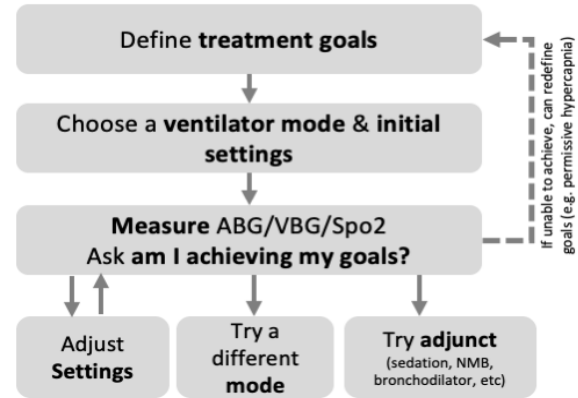
Consider Nutrison standard or Fresubin Original

OVERVIEW OF VENTILATOR MODES by Nick Mark MD



onepagericu.com
@nickmark

Link to the most current version →



Goals for mechanical ventilation:

- Oxygenation** – support PaO₂/SpO₂
- Ventilation** – maintain pH
- Patient comfort** – vent synchrony, ↓ sedation
- Facilitate weaning** – minimize muscle loss, promote readiness to wean from support

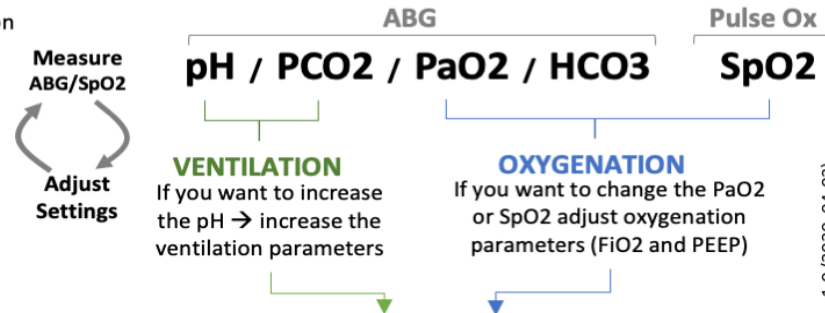
Ventilator Modes:

Fall into two broad categories: **pressure** and **volume** modes. Each mode has three features:

- Trigger (T) – what initiates a breath?
- Cycle (C) – what ends a breath?
- Limit (L) – what stops a breath early?

Each mode has **Pros** and **Cons** to consider.

Measurement and optimization:



Mode	Description	Pros	Cons	Major settings / example	Monitor
VC Volume Control (a.k.a. assist control volume)	Every breath delivered (mandatory and patient triggered) is the same set volume (TV) T – time/pressure/flow, C – volume, L – volume	Good general-purpose mode; Ensures a minimum MV is achieved. Good mode for lung protective ventilation (LPV)	Requires you to monitor pressures to avoid barotrauma. (See my OnePager on ARDS for details.)	RR, TV, PEEP, FIO2 12 bpm, 450cc, +8, 60% <i>(RR – respiratory rate, TV – tidal volume)</i>	Pressures (Ppeak, Pplat)
PC Pressure Control (a.k.a. assist control pressure)	Every breath delivered (mandatory & patient triggered) is a set pressure (IP) for a set time (T_i) T - time/pressure/flow, C – time, L - pressure	Good for limiting pressure; may be more comfortable for select patients. Also can be used for LPV (no difference in mortality)	Requires you to monitor volumes to avoid volutrauma or hypoventilation	RR, IP, T_i, Risettime, PEEP, FIO2 12 bpm, 25 cmH₂O, 0.9 sec, 0.15 sec, +8, 60% <i>(IP – inspiratory pressure, T_i – inspiratory time)</i>	Volumes (TV, MV)
PRVC Pressure Regulated Volume Control (a.k.a. VC+, APV, Autoflow)	Hybrid PC mode that dynamically changes inspiratory pressure to deliver a desired volume T - time/pressure/flow, C – volume, L - volume	Guarantees TV but delivers pressure-controlled breaths; (e.g. low risk of causing VILI), which potentially may be more comfortable for patients	In patients who are struggling (e.g. high WOB) this mode will provide less support	RR, TV, T_i, Risettime, P_{max}, PEEP, FIO2 12 bpm, 450cc, 0.9 sec, 0.15 sec, 30 cmH₂O, +8,60% <i>(P_{max} – maximum pressure)</i>	Pressures & volumes
SIMV Synchronous Intermittent Mandatory Ventilation	Delivers mandatory breaths with a fixed volume but patient can't trigger (patient breaths are not the same as mandatory breaths); can use PS T – time , C – volume, L - volume	May be useful for patients with hiccups to avoid alkalemia	Seldom used; not effective for weaning; often found to be uncomfortable	RR, TV, PEEP, FIO2 12 bpm, 450 cc, +8, 60%	Pressure (Ppeak Pplat)
PS Pressure Support	All breaths are patient initiated; ventilation determined solely by patient (no backup rate). T – pressure/flow, C – flow, L - pressure	Ideal weaning mode (used in SBTs and for prolonged periods); most comfortable because it allows patient to control ventilation	Does not guarantee a rate; need to monitor to ensure adequate ventilation	PS, PEEP, FIO2 +10, +5, 40% <i>Note that PS is above PEEP so "Ten over Five" PIP = 15cmH2O</i>	Volumes (TV, MV)
APRV Airway Pressure Release Ventilation (a.k.a. Bi-Vent)	Inverse ratio ventilation (e.g. I time > E time) that allows patient to breath spontaneously; can combine w/ PS T – time, C – time, L - pressure	Great for ARDS patients who are spontaneously breathing (e.g. not on NMB); may improve comfort & oxygenation (but no mortality benefit)	Complex mode/settings; Risk of VILI if settings are done improperly; doesn't make sense if on NMB	T_{High}, T_{Low}, P_{High}, P_{Low}, FIO2 5.5 sec, 0.5 sec, 25 cmH₂O, 0 cmH₂O, 60% <i>(T_{High/Low} – time high/low, P_{High/Low} – pressure high/low, also note that P_{Low} is analogous to PEEP)</i>	Volumes & gas exchange PCO ₂ / EtCO ₂

v1.0 (2020-04-03)

MANAGEMENT OF COVID-19 IN-HOSPITAL (PALLIATIVE CARE)

COVID-19 PALLIATIVE CARE: Patients with severe symptoms who are not candidates for critical care admission & ventilation if they deteriorate

AIMS OF CARE:

- Limit suffering of patients and families
- Align treatment decisions with patient and family values
- Protect healthcare workers and community from infection

Need to withdraw ventilatory support?

NO

YES

BASIC NURSING CARE

Be warned of possible sudden deterioration of COVID-19 patients

Stop all non-essential, non-beneficial procedures, e.g. vital signs monitoring & fluid balance monitoring

1. Nutrition and hydration

- Comfort feeding as required
- Sips of water
- Prevent fluid overload

2. Hygiene and comfort

- Mouth care
- Pressure care
- Catheter care

3. Emotional and spiritual care

- Communicate sensitively to support emotional and spiritual needs
- Connect the patient electronically to talk/listen to emotional/spiritual support as specified and possible

4. Communication

- Honest, direct, compassionate and culturally sensitive information about the prognosis
- Follow 'important communication skills'

SYMPTOM MANAGEMENT

Administer medication per os, IV or subcutaneously.

Stop all non-essential, non-beneficial medication

1. Fever

- Paracetamol 1g 6-hourly PO PRN

2. Dyspnoea

MILD

- Nasal cannula: 1 – 4 l/min (patient must wear surgical mask TBC)
- Face mask: 40 – 60% Oxygen
- If Bronchodilator required (e.g. asthma) administer through a Metered Dose Inhaler or Spacer Device.

MODERATE AND SEVERE

- Morphine (Opioids assist with respiratory Distress):
Morphine Syrup PO 2.5 – 5 mg 4-hrly
(! Check the strength at which it is mixed as this will affect the dose prescribed)

or

Morphine Sulphate IV 1-2 mg stat; then 15mg in 50 ml syringe over 24 hrs

or

Morphine Subcutaneous 1.5-2.5 mg 4hrly

* Note that the elderly may require lower doses.

* Anti-emetics should be prescribed with morphine

- Positioning: Upright position. Prone nursing can also be considered if
- Assist with breathing techniques- relax shoulders, hand on stomach and focus on supporting the outbreath.

3. Anxiety

- Lorazepam 1-2mg sublingual 2hrly until patient settled then 6-12 hrly or
- Alprazolam 0.5-1mg 8hrly prn or
- Haloperidol 2-5mg SC; add 5mg over 24 hours CSCI or
- Midazolam 5mg SC 1hrly until symptoms resolved

4. Restlessness

- Stop non-essential drugs
- Address factors that can agitate patients (full bladder, constipation, pain, thirst)
- Good hygiene and basic nursing care

5. Nausea and vomiting

- Metoclopramide 10mg 8hrly prn

6. Pain

- Morphine (review dose and route above)

7. Clear Secretions

- Hyocine Butylbromide (buscopan) 20mg 6-12 hourly subcut or IV

WITHDRAWAL OF VENTILATORY (+- INOTROPIC) SUPPORT

- Ensure the correct team are involved in the decision making process (critical care doctor/ anaesthetist)
- Document the decision in the clinical record.
- Discuss with the Family and document in notes.
- Assess timeline of Death (1) RAPID (2) DELAYED

1. RAPID TIMELINE

Predictors High PEEP and FiO2 required. Severe acidosis, Obtunded.

- Ensure neuromuscular blockers have worn off
- Stop Inotropes
- Gradually scale down vent over 30 mins to allow for the titration of medication to control dyspnoea and anxiety.

- Decrease pressure support, PEEP, FiO2 every 5 mins until 0cmH2O and 21% O2 (Room air)

- Only Extubate after death.
- Administer bolus of a benzodiazepine if anxious or
- IV morphine if breathlessness occurs

2. DELAYED TIMELINE

- Ensure Neuromuscular blockers have worn off.
- Gradually scale down vent support over 30mins to allow time for the titration of medication to control dyspnoea and anxiety.

- Symptom based monitoring and intervention- not vital sign related.

- Stop inotrope infusions
- Administer Buscopan 20mg I.VI stat
- Decrease pressure support, PEEP, FiO2 every 5 minutes until 3cm H2O and 21% FiO2.

- Treat with Morphine (breathlessness) or an IV benzodiazepine if anxious.

- Palliative Extubation: PPE is required as this is a high risk procedure and requires the same precautions used when intubating.

IMPORTANT COMMUNICATION SKILLS

- Start by **checking the patient/family's understanding** of the situation. Use these clues to take the conversations forward
- **Give information in small chunks, avoiding medical jargon**
- **Use silence**- this allow emotion and absorbing what was said
- Acknowledge emotion: NURSE acronym
 - Name emotion: 'You seem to be upset/worried?'
 - Understanding: 'Given what is going on, I can understand that you are concerned.'
 - Respecting: 'You have been really patient under difficult circumstances.'
 - Supporting: 'I understand that this will be very hard. We will be here to help.'
 - Exploring: 'Tell me more; I would like to hear what you are thinking.'
- **Never say: 'There is nothing more we can do for you.'** Commit to excellent symptom management, compassionate communication an your presence.
- Consider linking family per phone/WhatsApp/online to say a final goodbye.

WELLBEING OF HEALTHCARE WORKERS

- Ensure the demands of your work dont exceed your physical, emotional, psychological and spiritual resources and **get help sooner rather than later**

- **Consciously care for yourself;** physically, emotionally, mentally, socially and spiritually

- **Be conscious of burnout** and its symptoms: Exhaustion (physically, emotionally and spiritually); Feelings of cynicism and indifference towards others; A loss of purpose and a sense of failure as a healthcare worker and as a person; Depression, substance abuse, suicidal ideation