

# Anaesthesia and caring for patients during the COVID-19 outbreak

## AIM

To advise on processes and techniques required to protect staff and prevent transmission of infection during airway procedures for patients with known or suspected COVID-19 infection.

To help anaesthesia staff and anaesthesia departments in clinical decision making and in the production of local processes and protocols.

This advice is not intended to replace officially produced local advice (where available) from hospital departments, health services or state or federal health bodies.

## BACKGROUND

COVID-19 is a flu-like illness caused by the SARS-CoV2 virus (though the terms 'COVID-19' or 'coronavirus' are often used for both the disease and the virus itself). This new virus emerged in Wuhan, China in late 2019 and was declared a global health emergency by the World Health Organization on 31st January 2020.

While acknowledging information about SARS-CoV2 is incomplete, it is a droplet and contact spread virus. Current estimates suggest around 10-15% of those affected develop severe disease requiring hospitalisation, with an overall mortality of 2-4%.

Although any health care worker may be required to care for a patient with COVID-19, part of the core business of the anaesthesia team is to perform procedures that risk aerosolisation of respiratory secretions, and transmission of droplet and contact spread viruses. Procedures such as high flow nasal oxygenation, facemask ventilation, intubation, nebulisation, awake fiberoptic intubation, upper GI endoscopy and bronchoscopy place the healthcare workers involved at particular risk unless adequate training, equipment and processes are in place.

## COVID-19 CASE DEFINITION

The definitions for confirmed and suspect cases of COVID-19 are changing frequently. Please refer to the latest Series of National Guidelines (SoNG) definitions, which can be found at:

<https://www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-novel-coronavirus.htm>

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

PPE is required for all staff in the room when an aerosolising procedure is taking place. See the ASA section on [Staff Safety](#) for more details on safe donning and doffing of PPE.

## PREPARATION

### PATIENT

Consider requesting that the patient remove any facial hair that will prevent an adequate seal with a facemask.

### COMMUNICATION

Use of a surgical safety checklist as per local policy is particularly important in the setting of unfamiliar procedures and should be undertaken prior to caring for any COVID-19 case in the operating theatre.

Wearing PPE can mean that normal visual cues may be missed.

### OPERATING THEATRE SETUP

Remove any unnecessary equipment from the theatre to prevent cross contamination. Have a runner outside the room to pass equipment into the theatre. Have a large yellow bin for contaminated waste and separate bin (not yellow) to place soiled reusable equipment temporarily until cleaned.

Operating theatre departments must identify which operating theatre(s) will be used to manage COVID-19 patients and ensure there is a clear protocol for patient flow into the operating theatre. Negative (or at least neutral) pressure rooms are the preferred location for performing aerosolising procedures. Identify any theatres which have negative pressure, or whether hospital engineering/infrastructure is able to create a negative pressure theatre.

On arrival to the theatre suite, ensure a surgical mask is placed on the patient if not already done so and escort them directly to theatre to minimise exposure to staff and other patients enroute.

A plan should be in place to ensure that critical cases requiring immediate care such as Category 1 Caesarean section, severe haemorrhage or airway emergencies can be cared for, including consideration of:

- location of surgery (designated OR with signs posted on the doors to minimise staff entry);
- immediate availability of PPE;
- team formulation.

Some procedures require a specialised location, and planning and simulation for managing COVID-19 patients in these areas is essential, including:

- Interventional radiology;
- Cardiac cath lab;
- MRI.

Some anaesthetic department have created identifying smaller groups of anaesthetists or anaesthetic teams who would preferentially be called to lead the airway management of patients

with COVID-19. This may have some advantages in reducing the number of staff potentially exposed, avoiding staff who may be 'high-risk' (such as those with co-morbidities) and fostering expertise among a smaller group. However, it is resource heavy and the ability to do provide this service will be dependent on departmental size and staffing resource

## EDUCATION

Training including donning and doffing of PPE and simulation testing of the processes for critical and non-critical cases, including airway management, should be undertaken to identify system issues and gaps. Departments and hospitals must ensure that adequate resource (staff time and equipment) is given to training and simulation of operating theatre and airway scenarios in preparation for COVID-19.

## STAFF

The exact staff required will depend on local advice, theatre layout and setup and standard procedures for managing patients with transmissible diseases. Staff in the operating room should be kept to a minimum, but should ideally consist of at least:

- Primary (most experienced) anaesthetist wearing full (airborne) PPE for intubation.
- Second anaesthetist wearing full airborne PPE.
- Anaesthetic assistant wearing full airborne PPE for intubation.
- Anaesthetic 'runner'.
- Consideration should also be given to avoiding exposure of staff members who are over the age of 60, pregnant, immunosuppressed or with cardiovascular or respiratory co-morbidity.

## AVOIDING AEROSOLISATION

The principles of managing the airway are to keep droplet spread to a minimum and avoid aerosolisation as far as possible. Aerosolisation is the production of small particles of water which, rather than falling to the ground (as droplets do), can flow through the air and spread more widely.

Reduction of aerosolisation includes avoidance of aerosolising procedures in the operating theatre such as:

- High flow nasal cannula (above 6 litres per minute).\*
- Nebulisers. Others may regard nebulisers as a non-aerosol generating procedure. We have included it here as nebuliser treatment may induce coughing.
- Awake fiberoptic intubation.
- Entonox/inhalational sedation.
- Non-invasive ventilation.
- Bag masking.
- Use of a t-piece or any other open circuit.
- Open suction.

\* Critically ill patients may appropriately be placed on high flow nasal cannulae (HFNC) for respiratory support, using appropriate precautions (as per the Australia New Zealand Intensive Care Society advice). HFNC is not recommended for use in perioperative airway management of COVID-19 patients.

Note that some patients may already be on continuous aerosolising treatment (e.g nebulisers or NIV) when referred for anaesthetic involvement. Have a plan for how this will be communicated and managed between different treatment teams.

High risk surgical procedures include:

- Airway surgery.
- Bronchoscopy.
- Upper gastrointestinal endoscopy.

As the background risk of COVID-19 increases, decisions on the management of low risk patients, with no symptoms or risk factors having high risk procedures, such as urgent upper airway surgery, will become more challenging. The desire to preserve PPE stocks will compete with the desire to ensure staff are protected. In the face of rapidly changing guidance from professional colleges and societies, anaesthetists must work closely with surgical and nursing colleagues to come up with pragmatic, consistent solutions. These decisions will be based on information from infectious disease specialists and the local picture of COVID-19 spread, and will change rapidly over time.

## AIRWAY MANAGEMENT

It is suggested that individual departments establish and mandate a standardised approach to airway management. Airway management should be performed by the most senior clinician available in the team, with full PPE precautions.

The airway management is aimed at minimising disconnection, aerosolisation and exposure of staff to viral transmission. Intubation is recommended rather than use of supraglottic airways unless required for airway 'rescue'.

The following procedures are designed to minimise aerosol and droplet spread and therefore risk of COVID-19 transmission to healthcare workers. The widespread videos on social media and anaesthesia forums of additional barriers have been noted, including placing the patient under a plastic sheet or under a rigid plastic boxes with arm holes. Such methods require careful consideration of the risks of adding complexity and inadvertent increase in the risk of transmission. None of these methods is specifically endorsed by the ASA at present. A single clear plastic sheet placed close to the face during pre-oxygenation and during the case is likely to be least intrusive for airway management, and may be most effective in reducing droplet dispersal. Significant consideration must be given to the process of removal and disposal or cleaning of any such equipment in order to avoid transmission.

- To avoid crash intubation and to allow time for the application of appropriate PPE and planning, consider early intubation in a rapidly deteriorating patient. If resuscitating a critically ill patient, chest compressions should be withheld during intubation to avoid exposing the anaesthetist to aerosols. Also consider giving muscle relaxation prior to intubation when possible.
- The patient should wear a surgical facemask until pre-oxygenation is started.

- Open all necessary equipment and adjuncts as patients will likely have poor reserve and are highly likely to decompensate rapidly during a rapid sequence intubation.
- Although basic, a very thorough airway assessment is vital to first pass success in the context of a critically unwell patient and minimising the time to intubation and cuff inflation.
- All breathing circuits must be fitted with an appropriate, high efficiency hydrophobic HME filter.
- Place an extra filter on the expiratory limb of the breathing circuit at the machine end. This will protect the anaesthetic machine should the circuit accidentally be attached directly to the airway without an HME filter, either during pre-oxygenation or after intubation.
- Optimise the patient position.
- Create and mandate the use of a pre-induction checklist specific to COVID-19 airway management. Links are given for examples of such checklists created specifically for operating theatres ([Example Operating Theatre Intubation Checklist](#)) and across a hospital ([Example Hospital Intubation Checklist and Action Plan](#)).
- Pre-oxygenate with passive breathing of supplemental oxygen via a well-fitting and well sealed facemask. A two-handed technique to optimise the mask seal on the patient's face is recommended. Minimise positive pressure ventilation and high flow nasal oxygenation (HFNO). If HFNO is to be used, ensure the patient is wearing a surgical face mask over the mouth and nasal canulae. A Mapleson C circuit may be more effective and better tolerated by patients when compared to a self-inflating bag due to the absence of the duckbill valve, however they may require a higher level of skill in their use.<sup>1</sup>
- Preloading of the ETT onto a stylette or bougie may improve the chance of successful intubation first time, though there may be a risk of increasing droplet spread on removal – use a 'gauze-wipe' technique.
- If available, use a videolaryngoscope, irrespective of difficulty of airway assessment with a disposable blade and separate screen to reduce staff exposure to airway secretions.
- Use of a 'rapid sequence induction' procedure is recommended to avoid manual ventilation if possible.
- Use muscle relaxant and allow for full effect before intubation.
- If manual ventilation is required (e.g. rapid desaturation, prolonged airway management) then use a two-handed technique to ensure the best possible facemask seal and apply small tidal volumes if possible.
- On removing the facemask after induction, disconnect the mask and HME filter from the breathing circuit to avoid ongoing flow of oxygen out through the filter into the atmosphere (see Figures 1 and 2 on next page).



Figure 1. Disconnection of the facemask and filter from the breathing circuit when not in use. Disconnecting in this manner risks contamination of the ventilator if the circuit is inadvertently reconnected without the filter in place. A second HME filter placed on the expiratory limb near the machine is recommended.

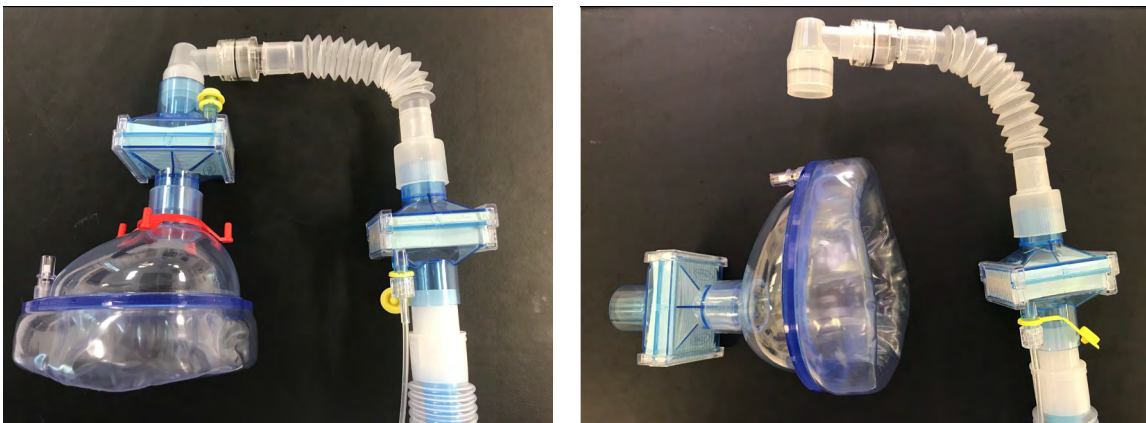


Figure 2. An alternative method of disconnection involving the use of two HME filters. After pre-oxygenation the catheter mount is disconnected from the mask/filter. The circuit is then reconnected as normal with a filter still in place. This method is quicker, requires fewer disconnections/reconnections and avoids entangling of the CO<sub>2</sub> line. However it uses 2 filters per case, creates a larger deadspace and increases resistance.

- Once the ET tube is inserted, wait until the cuff is sufficiently inflated before reconnecting the filter to the ET tube, connecting to the breathing circuit and test ventilating.
- Re-sheath the laryngoscope blade immediately post-intubation and seal all used equipment in a double zip-locked bag. Remove for decontamination and disinfection.
- If the use of PPE has included 'double gloving' the outside gloves should be removed as soon as successful intubation has been confirmed.

## EXTUBATION

Like intubation, extubation should aim to avoid aerosolisation and minimise staff exposure. Techniques to consider include:

- Spontaneously breathing deep extubation to reduce coughing.
- LMA exchange using a close circuit to avoid coughing/straining.



Extubation should take place in the operating theatre, and it is recommended that recovery of the patient also take place in the operating theatre if resources allow – otherwise utilise areas away from other patients, such as a room identified for recovering patients with multi-resistant organisms.

## TRANSFERS

For patients requiring transfer, for example to ICU.

- Minimise the number and duration of breathing circuit disconnections.
- Paralyse before any disconnection of breathing circuit.
- When disconnecting and reconnecting to a ventilator, leave the filter attached to patient end. The endotracheal tube should be clamped and the ventilator disabled to prevent aerosolisation.
- Use a transport ventilator or self-inflating bag with a filter.
- Use inline (closed) suction if available.

## POST PROCEDURE

- Remove and dispose of PPE in a clinical waste bin as per local protocol.
- Remove and discard filters and breathing circuits.
- Ensure the operating theatre is cleaned as per local protocol. Most guidelines suggest the theatre should be left empty for half an hour after use before the final clean, although this does depend on airflow. Any staff entering the theatre within half an hour of the patient leaving must wear full PPE.
- Staff to complete personal log book of clinical exposures.

### Reference:

1. Stafford RA, Bengler JR, Nolan J. Self-inflating bag or Mapleson C breathing system for emergency pre-oxygenation? *Emerg Med J*. 2008 Mar;25(3):153-5. doi: 10.1136/emj.2007.050708. PMID: 18299363.

## ASA COVID 19 GUIDELINES

### DISCLAIMER

The Australian Society of Anaesthetists (ASA) COVID-19 Guidelines (ACGs) presented on this site are developed to assist clinicians about appropriate anaesthesia healthcare focussing on areas of airway management, staff protection and pandemic planning. The materials have been collated by a group of fully qualified specialist anaesthetists who are responsible for providing anaesthesia for operations and procedures.

The authors of the ASA COVID-19 Working Group (ASACWG) made considerable efforts to ensure the information contained within them, especially recommendations, are correct by way of independent sources at the time of drafting. The ASACWG accept no responsibility for any inaccuracies, information perceived as misleading, or the success or failure of any guideline's regimen detailed in the guidelines.

The materials in these guidelines are provided solely for the information and education purposes of qualified anaesthetist in Australia.

The ACGs are targeted at anaesthetists only. Health information for patients and families is available through (<https://www.health.gov.au/health-topics/novel-coronavirus-2019-ncov>). These guidelines are designed and based on evidence available to acquaint the reader rapidly with clinical problems and provide practical advice regarding assessment and management of cases.

The recommendations contained in the ACGs do not indicate an exclusion clause to regular standards of care. They do not replace the need for application of clinical judgment to each individual presentation, nor variations based on locality and facility type.

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