FICM/ICS Clinical guide for the management of critical care for adults with COVID-19 during the Coronavirus pandemic: RAPID UPDATE

This RAPID UPDATE to the FICM/ICS "Clinical guide for the management of critical care for adults with COVID-19 during the Coronavirus pandemic" highlights five clinically urgent issues for practising clinicians caring for critically ill adult patients during the January/February 2021 surge in COVID-19 critical illness. It should be read alongside Version 4 of the full guideline (28th October 2020) and is published pending a full revision of the main guideline within the next few weeks.

1. Thromboprophylaxis and treatment of thromboembolism

Background

A prothrombotic phenotype (high fibrinogen and D-dimer) is common with COVID-19. At least 30% of ICU patients may develop a thromboembolic event (VTE in 25% of all patients, arterial thrombotic events in ≈4%) even when receiving standard thromboprophylaxis.

Thromboprophylaxis should be guided by careful consideration of the competing risks of thrombosis and bleeding. In the absence of trial data, international guidelines relating to thromboprophylaxis vary in their recommendations.

Recommendations

Pay great attention to thromboprophylaxis including non-pharmacological methods (intermittent pneumatic compression, TEDS).

Low-molecular weight heparin thromboprophylaxis should be administered at 1.5 to 2 times the standard prophylactic dose.

Where available, monitoring of thromboprophylaxis with anti-Xa levels is NOT needed unless in the presence of significant renal impairment (creatinine clearance <30 ml/min) or at extremes of weight (<50 or >100 kg). The same is true for treatment of thromboembolism.

Have a high index of suspicion for the presence thromboembolic disease and investigate urgently where clinical suspicion is raised, e.g., if a sudden deterioration in gas exchange occurs, or if D-dimers remain increased or show a stepwise rise.

If full anticoagulation is considered in the absence of proven thromboembolism, carefully consider the risks and benefits: there is likely to be an increased risk of bleeding and no evidence of improved outcome is currently available.

2. Tocilizumab

Background

Two national COVID-19 platform trials are currently evaluating Tocilizumab, an interleukin-6 antagonist. REMAP-CAP is comparing Tocilizumab with other immune modulating therapies (no standard care control). RECOVERY is comparing Tocilizumab with standard care.

Recommendations

For patients who are eligible for recruitment into the anti-inflammatory arm of REMAP-CAP or the Tocilizumab arm of RECOVERY, randomisation into the relevant trial is strongly recommended.

For adult patients with severe COVID-19 pneumonia under the care of the critical care team *who are unable to enter REMAP-CAP or RECOVERY* and are within 24 hours of starting respiratory support (HFNO, CPAP, NIV, IMV) or admission to ICU, whichever commenced sooner, Tocilizumab may be of benefit. Preliminary data from REMAP-CAP suggest improved survival and time to recovery, but a meta-analysis of all available trial results does not support the finding of improved survival.

Non-trial administration of Tocilizumab should be at a dose of 8mg/kg actual body weight (up to a maximum of 800 mg) in 100 ml of 0.9% sodium chloride, administered as an intravenous infusion over 1 hour; this dose could be repeated 12-24 hours later at the discretion of the treating clinician.

The immune-suppressive effects of Tocilizumab may last up to 3 months: patients and medical teams should be made aware of this and the treatment documented clearly in the notes. There is increased likelihood of bacterial infection for up to 3 months. Suppression of CRP occurs. Tocilizumab may be administered with steroids or Remdesivir. Please refer to the CAS alert (8th January 2021) for further information.

3. CPAP/NIV Transfers

Background

Inter-hospital transfer of patients receiving NIV/CPAP therapy may be required for the effective delivery of mutual aid for hospitals at, or close to, exceeding surge capacity.

Patients receiving NIV/CPAP therapy for COVID19 often have limited physiological reserve. To reduce the risks associated with deterioration during transfer, careful patient selection is required. Such transfers can be undertaken safely in selected patients, but require careful choice of transfer team and equipment, as well as measures to ensure proper ventilation of the vehicle during transfer.

Recommendations

Inter-hospital transfer of patients receiving NIV/CPAP therapy requires careful consideration and decision making led by an intensive care consultant. However, during the COVID-19 incident, such transfers may be required for the effective delivery of mutual aid for hospitals at, or close to, exceeding surge capacity.

Patient selection and the decision to undertake a CPAP transfer should be guided by a consultant-led discussion, led by an intensive care consultant, of the patient's overall clinical picture in the context of the duration of the transfer and the likely benefits and risks. The duration of such transfers should be limited to less than 45mins.

Transfers should be limited to patients meeting the following criteria:

- **FiO_2 ≤0.6**

- **Respiratory rate ≤30 breaths per minute**
- **Total oxygen requirement ≤20 l/min.**
- **CPAP ≤10 cmH_20**
- **Non-invasive inspiratory support ≤10 cmH_20 above EPAP**
- **Orientated, alert, compliant and comfortable**
- **Cardiovascular stability**

EQUIPMENT & OXYGEN

Careful choice of portable ventilator is essential. The criteria above should be met on the transport ventilator before transfer whilst the patient is still on the ward.

NIV and CPAP devices can consume oxygen at a high rate.

Recommendation

Transport oxygen requirements should be calculated and >2 times the predicted volume carried as an absolute minimum.

TRANSFER TEAM

Deterioration during transfer is likely to be rapid and may require rapid sequence induction and intubation.

Recommendation

Careful patient selection, experienced clinical decision making and an assessment of the potential for deterioration are important to safe transfer. The transport team should have appropriate experience to manage this deterioration (transport trained ST5 in ICM or anaesthesia or equivalent) and must include a suitably skilled assistant.

TRANSFER VEHICLE AND VENTILATION

NIV/CPAP devices rely upon high oxygen flow rates. Oxygen enrichment and fire hazard are a theoretical risk. With its doors and windows closed, a vehicle moving at an average of 18 mph may achieve 6 complete air exchanges per hour. With the windows open this number increases by a further 6 - 18 times. This rate of ventilation also increases protection against risk of fire due to oxygen enrichment and reduces exposure to patient generated aerosols.

Recommendation

Windows should be opened in the back of the vehicles in order to maintain vehicle ventilation and minimise oxygen enrichment.

4. Clinical Decision Making

Background

As limited resources (particularly workforce) are distributed between greater numbers of critically ill patients, their capacity to provide the usual standard of care is likely to be affected.

Having exhausted all options to improve resource availability, Medical Directors and Chief Executives have overall responsibility for deciding if this has occurred and for taking appropriate action.

Recommendations

In order to reduce the risk of an individual hospital's critical care demand exceeding available resources, *Mutual Aid* (defined as the gift, loan or exchange of resources for mutual current or future benefit) should be requested in line with regional and national surge plans. Mutual aid may include patient transfers (transferring care to reduce the local clinical burden) and/or transfer of staff, equipment, consumable items or drugs to the hospital in need.

All hospitals/trusts/boards should have a framework in place to support clinicians with decision making, particularly under conditions in which clinical demand exceeds local resources. Such a framework may include immediate availability of consultant colleagues to discuss difficult and/or complex decisions, support with decisions from senior local medical leadership (Medical Director or delegated clinician) and local or regional ethics councils.

Guidance to support decisions is available and may help guide conversations about the likelihood of individual patients benefiting from intensive care. Such guidance is not, and should not be used as, a triage tool.

The challenges of decision-making during this COVID surge, and the need for healthcare professionals to be supported, are acknowledged and by the Chief Medical Officers, Chief Nursing Officers, and Chair of the GMC.

5. Oxygen constraints and supply risks

High oxygen demand

Background

There will continue to be pressures on oxygen supply with both increase in local ward level demand and overall hospital demand on vacuum insulated evaporator (VIE) delivery systems. This can result in rapid pressure decreases in oxygen supplies. There may be limitation of local pipework and/or total outflow of the VIE. There are a number of hospital and patient level interventions to minimise these risks.

Recommendations

Engineering, equipment and planning

- **Identify the current maximum flow rate of the VIE**
- **Work with the local medical oxygen team to evaluate any possibilities of improving supply and flow of oxygen.**
- **Ensure surge plans have appropriately and accurately considered oxygen availability in regard to both pipeline and VIE capacity. If there are significant constraints, discuss mutual aid and decompression of your hospital.**
- **Replacement of high flow CPAP/NIV machines with lower flow machines may be possible. Access to lower flow devices may be possible. Requests should be escalated via your Clinical Director to the regional team responsible for securing critical care equipment from the national stock.**

Clinical

- **Review oxygen flow meter rates and titrate to achieve targeted SpO_2 BTS guideline**
- **Generally, aim for SpO_2 92-96%, although the target will be lower in some patient groups, e.g. those with chronic obstructive pulmonary disease (COPD).**

- **An SpO_2 target of 90-93% is acceptable in patients with visible continuous pulse oximetry in an appropriately monitored care environment with trained staff to monitor for clinical deterioration.**
- **Turn off oxygen flow meters, nasal high flow and CPAP/NIV devices when not in use**
- **Plan interventions that may lead to sudden surges in oxygen demand to be staggered between patient, e.g., nebuliser use, switching from CPAP to HFNO to enable feeding, etc.**
- **Carefully evaluate and control CPAP/NIV facemask leaks – these may lead to substantial increases in oxygen flow rates**
- **Check there is an appropriate oxygen cylinder supply in case of emergency**
- **Ensure that there is a bag with valve and mask available for patients dependent on CPAP or HFNO in the event of oxygen failure**
- **When oxygen supplies are challenged, initiation of HFNO and/or CPAP/NIV should be a consultant level decision**

Increased ambient oxygen levels and fire risk

Background
Fire risk increases if high-flow oxygen is used for large numbers of cohorted patients, especially in a confined or poorly ventilated area (such as a surge area). Ambient FiO_2 >0.23 poses a potential fire risk.

Recommendations:
If responsible for a critical care or respiratory support unit, read and follow advice in a recent CAS-alert (19th November 2020) which set out actions for monitoring ambient oxygen.

Ensure that fire evacuation plans have taken into consideration patient oxygen dependency and changes in ward designation which may affect evacuation feasibility and safety, e.g., requirement for PPE, increased number of non-ambulatory patients.