Clinical update on management of critically ill adults with COVID-19

Faculty of Intensive Care Medicine and Intensive Care Society UK

FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Prepared by MSc in Critical Care

Preamble

This short presentation has been created using the **FICMClinical+guide_FINAL_MG_16-4-2021.pdf**

Much more detailed information and guidance is included in that document. Please use this resource to signpost you to that.

Graham Nimmo
Clinical Lead COVID-19 Critical Care: Understanding and Application course
Edinburgh May 2021

Introduction from FICM/ICS Guideline

This clinical guidance provides contemporary information for practising clinicians caring for critically ill adult patients with COVID-19. Whilst many of these patients will be cared for on intensive care units, some patients receiving high-flow nasal oxygen therapy (HFNO), continuous positive airways pressure (CPAP) and/or non-invasive ventilation (NIV) may be cared for on specialist respiratory wards. Version 5 updates the previous FICM and ICS guideline published on 28th October 2020* incorporating the contents of the Rapid Update published on 13th January 2021* and is supported by the UK Critical Care Nursing Alliance.This document will continue to be updated at regular intervals during the COVID-19 pandemic. Please always refer to the most up-to-date version, which will be available on the four organisations (Association of Anaesthetists, FICM, ICS, Royal College of Anaesthetists) hub. This can be found here:

https:// icmanaesthesiacovid-19.org

Nursing care resources related to COVID-19 management can be found at: Royal College of Nursing, British Association of Critical Care Nurses*”

- These links can be found in accompanying pdf document and on the Week 4 section of the course Resource List.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Introduction from FICM/ICS Guideline 2

“This guide summarises the clinical characteristics of COVID-19 and offers advice on:

- Dealing with ‘surge’ including mutual aid
- COVID-19 clinical characteristics and specific treatments
- Clinical decision-making
- Management of respiratory failure
- Management of non-respiratory organ failure

This revised version contains important additions relating to:

- Steroid therapy
- Interleukin-6 receptor antagonists
- Clinical decision making under surge conditions
- Non-invasive respiratory support
- Long-COVID”

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Treatment of other conditions in the context of COVID-19

• Take care not to neglect treatment of exacerbations of any underlying conditions, e.g. heart failure, COPD, diabetes, hypertension.

• Consider other possibilities in the differential diagnosis for patients with possible COVID-19

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management 1

Anti-viral therapy

• Preliminary data from the WHO Solidarity trial suggest that there is no benefit from Remdesivir administration in critically ill patients (updated guidance available here: Remdesivir NHS guidance)

Steroid therapy

•The RECOVERY trial supports administration of dexamethasone 6 mg once per day (enteral or intravenous) for 10 days. This reduced deaths:

• in ventilated patients from 41.4% to 29.3%

• in patients receiving oxygen only, from 26.2% to 23.3%

No benefit (possible harm) in those patients who did not receive oxygen.

Meta-analysis of data from seven clinical trials recruiting critically ill patients with COVID-19 indicates that both dexamethasone 6mg once daily and hydrocortisone (50 mg intravenously every 6 hours for seven days) reduce all-cause mortality at 28 days.

•Dexamethasone 2mg tablets are readily absorbed. IV dexamethasone should be prescribed as whole ampoules. 6.6 mg dexamethasone base is equivalent to 8 mg dexamethasone phosphate or 8.6 mg dexamethasone sodium phosphate.

•Prednisolone and hydrocortisone are the preferred steroids during pregnancy as per RCOG guidance. Dexamethasone should not be used during pregnancy except when indicated for foetal lung maturity.

•When patients require corticosteroids for other indications (either at replacement doses for known adrenal insufficiency or as a treatment for another underlying condition such as asthma or Chronic Obstructive Pulmonary Disease), they should not be withheld.

•The risk of adrenal insufficiency should be considered in all patients who receive steroids.

•Steroid therapy may harm skin integrity which should be carefully monitored.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management 2

Interleukin-6 receptor antagonists (Tocilizumab and Sarilumab)

•The RECOVERY trial reported improved 28-day survival with Tocilizumab (33% mortality in the usual care group, 29% mortality in Tocilizumab group) with a 14% relative reduction in risk of death in hospitalised COVID-19 patients with hypoxia and CRP > 75.
• The REMAP-CAP trial reported improved survival with Tocilizumab (36% mortality in the standard care group, 27% mortality in Tocilizumab/Sarilumab group) with a 24% relative reduction in the risk of death in intensive care patients with COVID-19.
• A single dose of Tocilizumab 8mg/kg by intravenous administration (peripheral or central) is recommended as adjuvant treatment to dexamethasone for hospitalised patients with COVID-19 pneumonia, consistent with MHRA guidance: where oxygen saturation is <92% on room air on repeated measurement or an ongoing requirement for supplementary oxygen AND CRP of ≥75mg/L; OR within 24 hours of starting respiratory support (HFNO, CPAP or NIV), or invasive mechanical ventilation), if an IL-6 inhibitor has not already been administered
• Sarilumab is recommended, consistent with MHRA guidance, as an alternative treatment to Tocilizumab for critically ill COVID-19 patients within 24 hours of starting respiratory support (HFNO, CPAP or NIV, or invasive mechanical ventilation), if an IL-6 inhibitor has not already been administered. More detail in accompanying pdf document (see below).

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management 3

Thrombolysis for massive pulmonary embolism

• Thrombolysis should be considered in a patient with COVID-19 with a pulmonary embolus who develops acute haemodynamic instability following BTS guidance. This should be guided by echocardiography and/or CT pulmonary angiogram.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management 4

Antibiotics and other antimicrobials

•Antibiotic administration is not recommended for uncomplicated COVID-19 infection.
•Careful attention to antimicrobial stewardship is important.
•There is limited information available on interactions between seasonal influenza and COVID-19: viral co-infection is possible. Seek evidence of this even if SARS-CoV-2 is detected, and vice-versa. COVID-19 and influenza should be co-horted separately.
•Secondary bacterial and/or fungal infection may be seen, typically later in ICU stay.
•Antibiotics should be considered if there is suspected bacterial super-infection.
•Anti-fungals should be considered in patients not responding to antibacterial treatment, who are known or strongly suspected to have fungal infection.• Pro-calcitonin may be useful in guiding decision making around the use of antibiotics although it is not known if it is suppressed by the use of Tocilizumab or Sarilumab.
•CRP is suppressed by Tocilizumab or Sarilumab and is therefore an unreliable marker of new infection or the effective treatment of infection.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management of respiratory failure 1

Oxygen therapy

- Avoid hyperoxaemia in patients receiving supplemental oxygen.
- Document oxygen saturation targets clearly during ward rounds and titrate oxygen flow to meet targets to avoid over-administration of oxygen.
- Generally, aim for SpO_2 92-96%, however, a SpO_2 target of 90-93% is acceptable inpatients with visible continuous pulse oximetry in an appropriately monitored care environment with trained staff to monitor for clinical deterioration.
- The target should be 88-92% in patients with COPD, obesity and patients with neuromuscular disease causing respiratory muscle weakness.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management of respiratory failure 2

Oxygen supply

Oxygen demand substantially increase in hospitals treating large numbers of COVID- 19 patients and this has resulted in critical incidents relating to oxygen supply.

- High demand, particularly in co-horted areas outside theatres or critical care, may lead to pressure drops in the oxygen supply system that may affect oxygen flow to individual patients or areas.
- There are a number of other risks associated with unusually high oxygen usage including icing of vacuum insulated evaporators (VIEs - the liquid oxygen storage tanks outside hospitals). VIE icing can also lead to oxygen supply drops.
- Preparation for treatment of increased numbers of COVID-19 patients, particularly in surge centres, must involve local oxygen engineering teams, with attention paid to planned locations of treatment with high-flow oxygen devices, and potential systems limitations.
- At times of surges in demand for oxygen, initiation of HFNO should be a consultant level decision. Replacement of high flow CPAP/NIV machines with lower flow machines may be possible at times of high demand on oxygen supplies.
- An oxygen analyser should be used with CPAP/NIV machines which entrain room air to ensure a constant FiO_2 is being delivered, especially when patients have high peak inspiratory flow rates

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Management of respiratory failure 3

Oxygen supply

Consider ways of conserving oxygen such as:

•Turning off oxygen flow meters, nasal high flow and CPAP/NIV devices when not in use
•Staggering of interventions that may lead to sudden surges in oxygen demand between patient e.g., nebuliser use, switching from CPAP to HFNO to enable feeding
•Assessing and managing leaks from CPAP/NIV facemasks & hoods
• Awareness that turning oxygen flow meters up to maximum can result in significantly more oxygen being delivered than the highest gradation on the flow meter.

•Detail on Non-Invasive ventilation; intubation; mechanical ventilation; prone positioning; tracheostomy and weaning; extubation; ECMO can all be found in the FICM document (see below).

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Complications 1

Detailed information on management in FICM document

Cardiovascular complications: myocarditis, pericarditis, right heart failure, shock arrhythmias (AF, bradycardia), cardiac arrest

Renal: AKI. Whilst a degree of relative water depletion might be sought or tolerated in order to improve pulmonary gas exchange in some, care should be taken to ensure that renal perfusion is maintained.

Skin involvement is commonplace and manifests most commonly as a chilblains/pernio-like lesions, maculopapular rash or viral exanthem.

Neurological

Neurological complications of COVID-19 are common: seizures, stroke, encephalopathy, myo-neuropathy, delirium, transverse myelitis. Their presence can be masked by the use of paralysing agents and analgosedation, and a high index of suspicion should be maintained. Where these are suspected, investigation can prove difficult and an expert neurological opinion should be sought.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Complications 2

Detailed information on management in FICM document

Thromboprophylaxis and treatment of thromboembolus

A pro-thrombotic phenotype (high fibrinogen and D-dimer) is common with COVID-19. Even with standard thrombo-prophylaxis, pulmonary thrombo-embolism is identified in about one quarter of COVID-19 patients admitted to ICU.

- Pay great attention to thrombo-prophylaxis including non-pharmacological methods (intermittent pneumatic compression, TEDS).
- Low-molecular weight heparin thrombo-prophylaxis can be administered at 1.5 to 2 times the standard prophylactic dose. Where available, monitoring of thrombo-prophylaxis with anti-Xa levels is NOT needed unless in the presence of significant renal impairment (creatinine clearance 100 kg). The same is true for treatment of thrombo-embolism.
- Have a high index of suspicion for the presence of thrombo-embolic 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 thrombo-embolism, 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.
- Surveillance for bleeding, which may be concealed, is important in anti-coagulated patients.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf

Complications 3

Detailed information on management in FICM document

Hyperglycaemia

● Insulin resistance is common in COVID-19. Glucose-lowering strategies may need to be intensified, including the administration of long-acting insulin. In the recovery phase, carefully monitor and respond to changing insulin requirements. Guidelines for managing hyperglycaemia in COVID-19 patients can be found here: https://abcd.care/sites/abcd.care/files/resources/COvID_Hyper_v4.2.pdf

After-care needs

● A framework for assessing the early rehabilitation needs of post-COVID-19 ICU patients is now available.

● 'Long COVID' is distinct from 'post-ICU syndrome', although the two may overlap and may share symptoms. The commonest features include fatigue, headache, upper respiratory tract symptoms and headache, although many others are reported (including, amongst others, cognitive, psychological and neurological problems). Pathogenesis is not understood but is likely multifactorial, with a prolonged proinflammatory state reported in some.

There should be early involvement of the multidisciplinary team to ensure that treatable causes of symptoms of long COVID (e.g. pulmonary [thromboembolic,inflammatory] or cardiac disease) and of those relating to ICU care (such trachealstenosis, PTSD and more) are identified and treated.' NICE long-COVID Guideline https://www.nice.org.uk/guidance/NG188.

From: FICMClinical+guide_FINAL_MG_16-4-2021.pdf