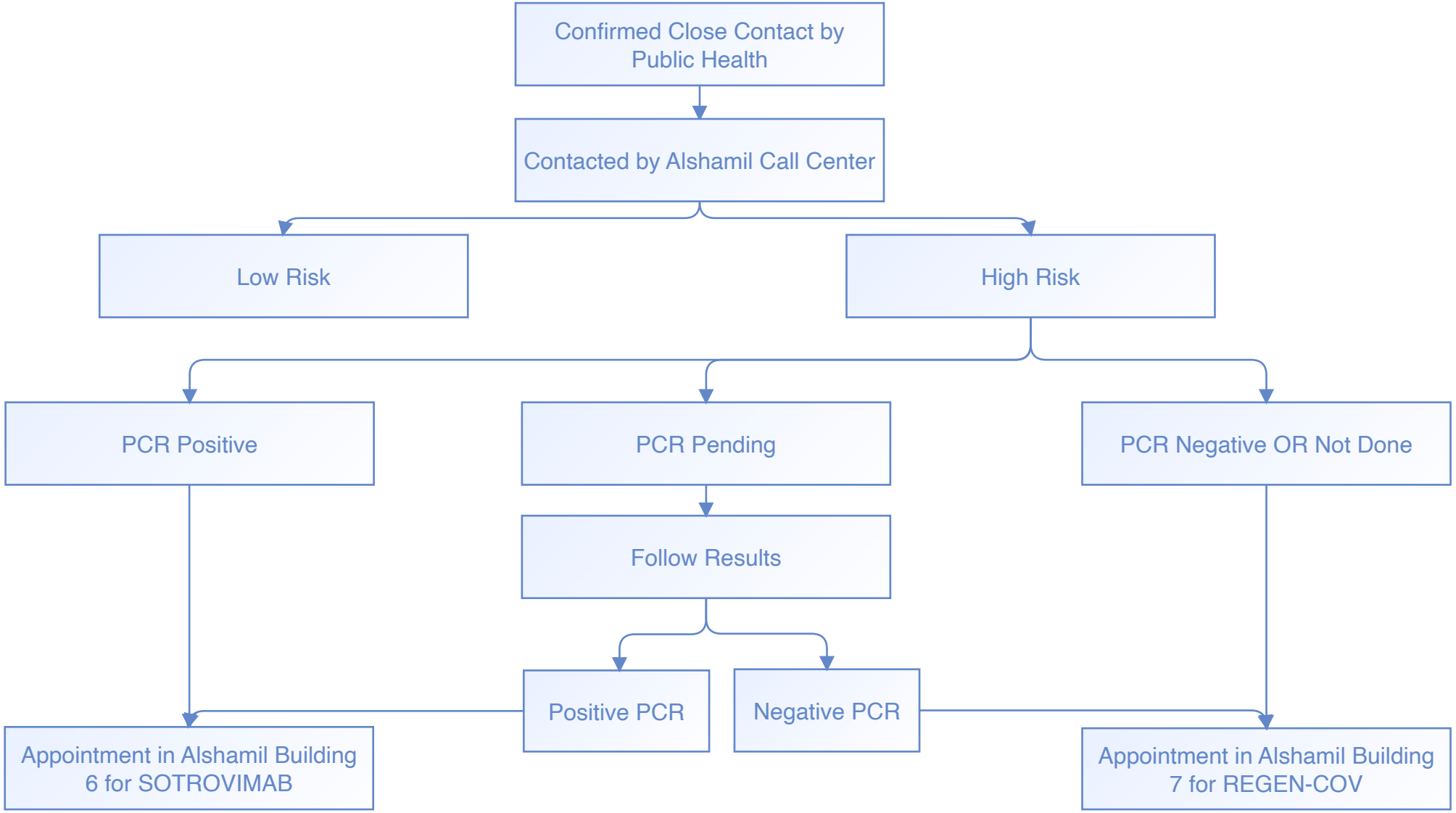
الحملة الوطنية
لمكافحة
فيروس كورونا
(COVID-19)

Treatment Guidelines and Pathways *(V12.0)* Jan 2022

Monoclonal Antibodies Treatment Pathway



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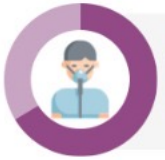
Monoclonal Selection Criteria Outpatient Setting

Sotrovimab Inclusion Criteria

Within 10 Days of Positive PCR

Weight ≥40 Kg



Do Not Require Oxygen

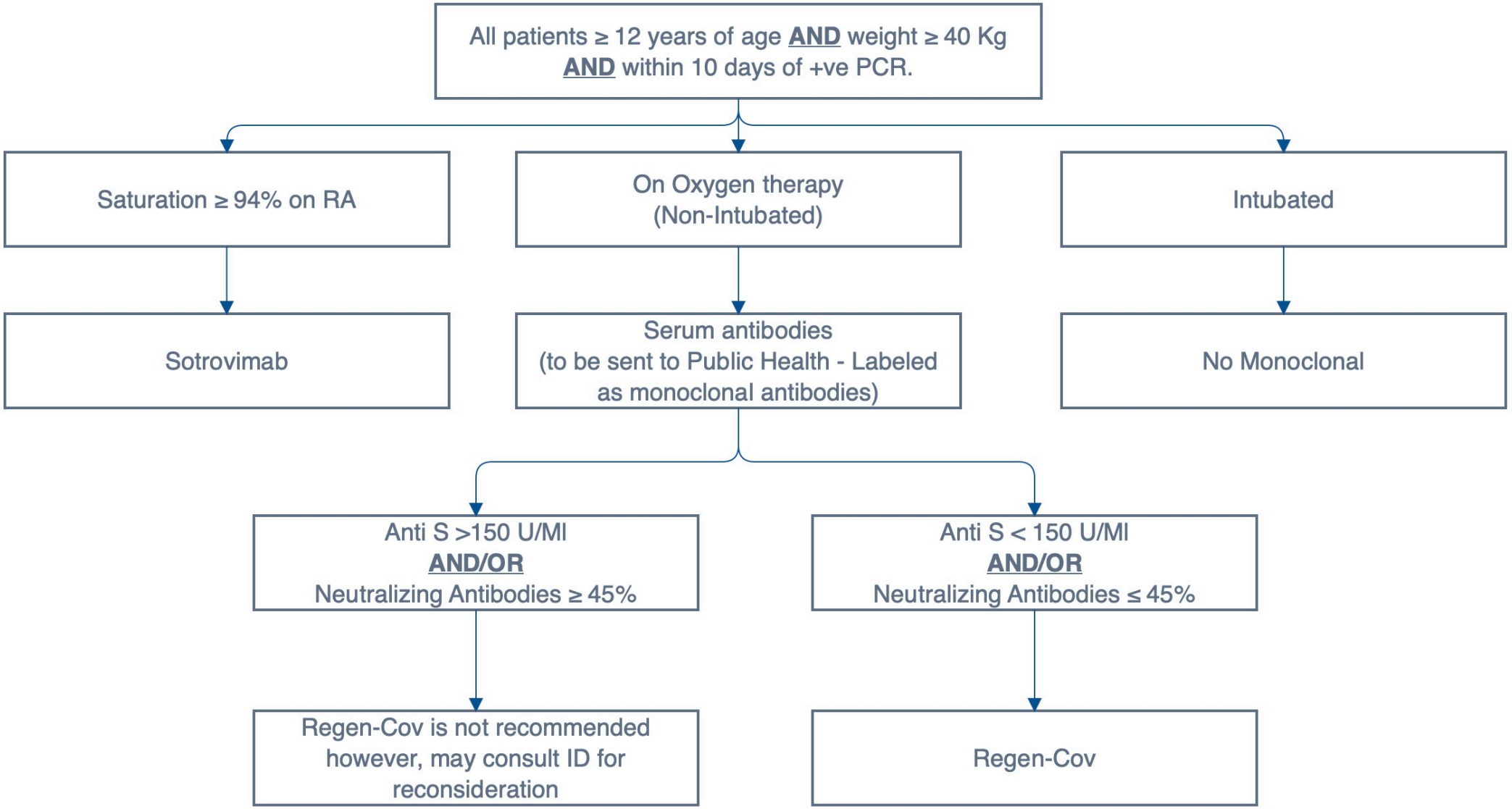
Criteria:

≥50 Years of Age	Unvaccinated	OR	One or More Risk Factors
≥18 Years of Age	Unvaccinated	AND	One or More Risk Factors
≥12 Years of Age	One or More Risk Factors		

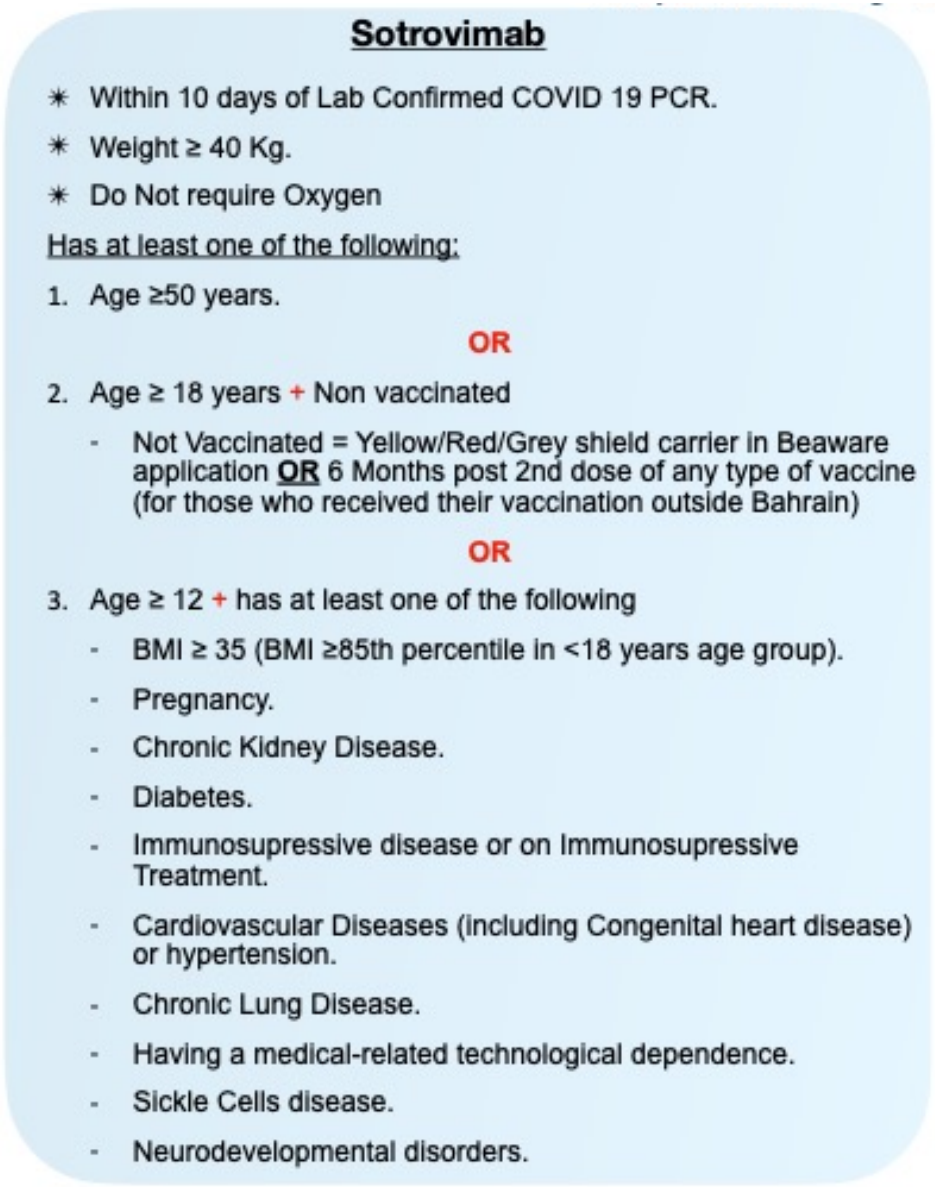
Risk Factors:

1. Obesity
2. Cardiovascular Diseases
3. Chronic Lung Diseases
4. Immunocompromised
5. Chronic Kidney Disease
6. Pregnancy
7. Neurodevelopmental Disorders
8. Sickle Cell Disease
9. Diabetes

Monoclonal Selection Criteria Inpatient Setting



Sortovimab



Sotrovimab

- ✶ Within 10 days of Lab Confirmed COVID 19 PCR.
- ✶ Weight ≥ 40 Kg.
- ✶ Do Not require Oxygen

Has at least one of the following:

1. Age ≥50 years.

OR

2. Age ≥ 18 years + Non vaccinated
   - Not Vaccinated = Yellow/Red/Grey shield carrier in Beaware application **OR** 6 Months post 2nd dose of any type of vaccine (for those who received their vaccination outside Bahrain)

OR

3. Age ≥ 12 + has at least one of the following
   - BMI ≥ 35 (BMI ≥85th percentile in <18 years age group).
   - Pregnancy.
   - Chronic Kidney Disease.
   - Diabetes.
   - Immunosupressive disease or on Immunosupressive Treatment.
   - Cardiovascular Diseases (including Congenital heart disease) or hypertension.
   - Chronic Lung Disease.
   - Having a medical-related technological dependence.
   - Sickle Cells disease.
   - Neurodevelopmental disorders.

Sortovimab is a monoclonal antibody that is specifically directed against the spike protein of SARS-CoV-2, designed to block the virus' attachment and entry into human cells. It is FDA Emergency use authorization (EUA) approved for Treatment of mild to moderate COVID-19 in adult and pediatric patients who are ≥12 years of age and weighing at least 40 Kg with positive result of direct SARS-CoV-2 viral testing.

- Sotrovimab use should be considered for persons with mild to moderate COVID-19 who are hospitalized for a reason other than COVID-19 and who otherwise meet the EUA criteria.

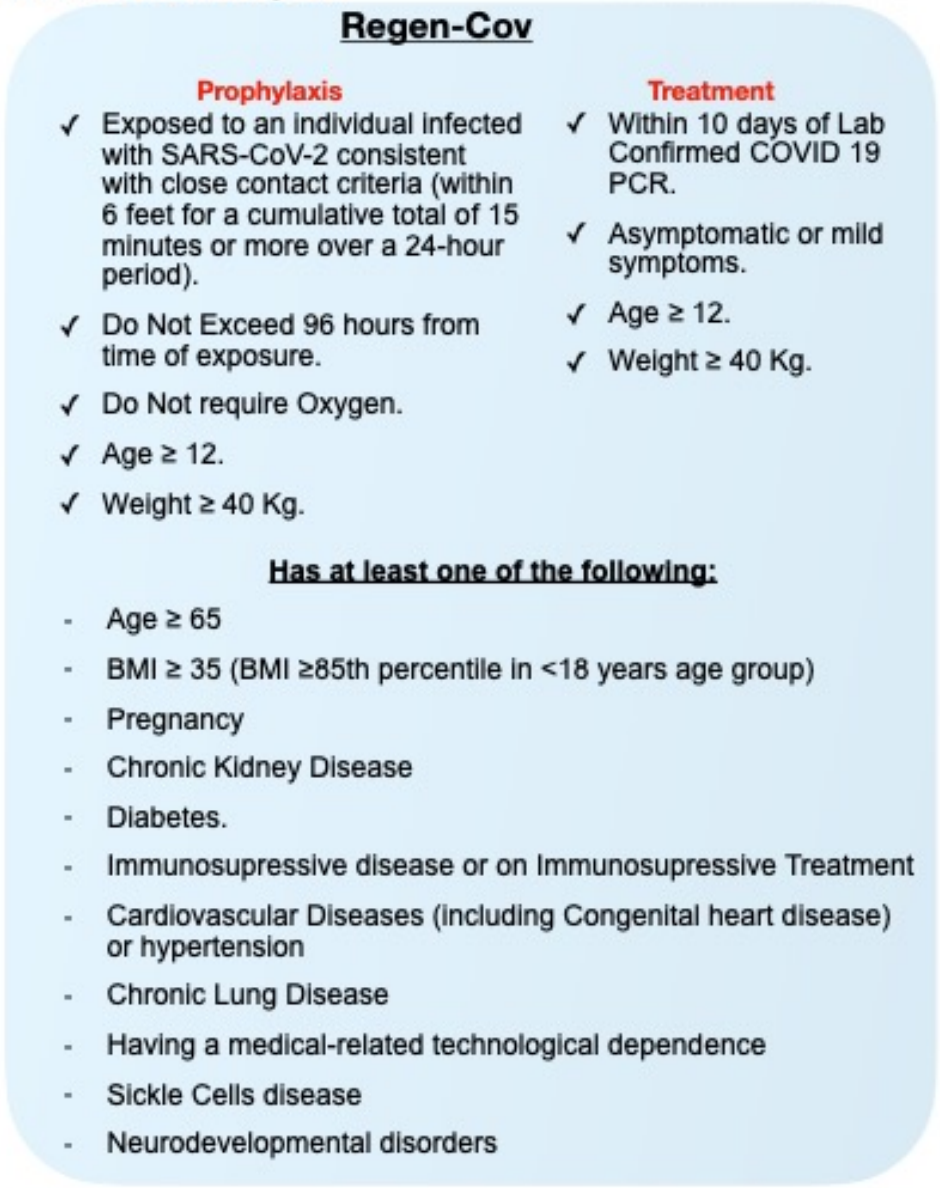
Sotrovimab Treatment Protocol

Category	Details
Dose	• The dosage of sotrovimab is 500 mg of Sotrovimab. (One vial of sotrovimab (500 mg/8mL) - single dose. • Sotrovimab should be given as soon as possible aier positive results of direct SARS- CoV-2 viral testing and within 10 days of symptom onset. Sotrovimab must be diluted in 50 OR 100ml Normal Saline and administered as a single intravenous infusion of 500 mg over 30 minutes. • Dosage Adjustment in Specific Populations: • No dosage adjustment is recommended based on renal impairment, during pregnancy or while lactating. • No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are 12 years of age and older.

Monitoring	• Full sets of vital signs should be measured as follows:
	  • Pre-infusion.
	  • 15 minutes after start of infusion.
	  • End of infusion.
	• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Adverse effects	• Hypersensitivity reactions • Infusion related reactions
Contraindication	• Severe Covid • Passing of more than ten days since onset of symptom

Regen-Cov



FDA Emergency use authorization (EUA) of the approved product Regen-Cov (casirivimab and imdevimab) for Treatment of mild to moderate COVID-19 or as a post-exposure prophylaxis in adult and pediatric patients who are ≥12 years of age and weighting at least 40 Kg with positive result of direct SARS-CoV-2 viral testing. Target patient who are at high risk of progression to severe COVID-19. With the Aim to Reduce COVID-19 Related Hospitalization and death.

For Positive Cases: Within 10 days of Lab Confirmed COVID-19 PCR.

For Post Exposure Prophylaxis:

- Exposed to an individual infected with SARS-CoV-2 consistent with close contact criteria (within 6 feet of someone for a cumulative total of 15 minutes or more over a 24-hour period)
- Do Not Exceed 96 hours from time of exposure.

Regen-Cov Treatment Protocol

Category	Details
Dose	• 600 mg of casirivimab and 600 mg of imdevimab administered together as a single intravenous infusion over a minimum of 20 minutes. • For COVID-19 Positive PCR: Regen-Cov should be given as soon as possible after positive results of direct SARS-CoV-2 viral testing and within 10 days of symptom onset. • For Post Exposure Prophylaxis: Regen-Cov should be given as soon as possible after exposure to an individual infected with SARS-CoV-2 and within 96 hours from time of exposure. • No dosage adjustment is recommended in pregnant or lactating women • No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are older than 12 years of age. • No dosage adjustment is recommended in patients with renal impairment

Monitoring	• Full sets of vital signs should be measured as follows:
	  • Pre-infusion.
	  • 15 minutes after start of infusion.
	  • End of infusion.
	• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Adverse effects	• Hypersensitivity Reaction, including anaphylaxis. • Infusion Related Reaction, occurring during the infusion and up to 24 hours after the infusion.
Contraindication	• Severe Covid • individuals with previous severe hypersensitivity reactions, including anaphylaxis, to REGEN-COV

Treatment Guidelines : General approach

- Daily clinical assessment of patients is required
- It have been reported that deterioration is more common within the 8 to 10 days from symptoms onset
- Strict Isolation and adherence to infection control measures
- Baseline investigations for all patients:
  - ECG, Chest Xray/ Ultrasound chest
  - Echocardiography
  - CBC, Urea/Electrolytes, Creatinine, LFT
  - CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Risk stratification and prognostic markers
  - D-dimer, Fibrinogen, PT/PTT, Mg
  - Ferritin, CRP, ESR, PCT
  - LDH, Troponin, BNP
  - VWF, IL6
- All Patients should have the baseline investigations done, with the addition of Blood Grouping and Vitamin D level
- Medication Order Sheet
- **Figure 2:** Pharmacological management of patients with COVID-19 based on disease severity.
- Disclaimer
  - At present, no drug has been proven to be safe and effective for treating COVID-19. There are insufficient data to recommend either for or against the use of any antiviral or immunomodulatory therapy in patients with COVID-19 who have mild, moderate, severe, or critical illness
  - Guidelines are created based on best available evidence. Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care
  - Physician should use this as a guide and depend on clinical and scientific judgment and individualizing of care
  - This guideline is subject to change based on more evidence and will be updated regularly whenever needed

BACK

Uncomplicated Infection (Upper Respiratory Tract Infection)

Definition:
- non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain.
- These patients do not have any signs of dehydration, sepsis or shortness of breath.
- Absence of signs of pneumonia

***Risk Factors**: any ONE of :
- Age ≥65 years
- Residence in a nursing home or long-term care facility
- Immunocompromising condition
- Chronic lung disease or moderate to severe asthma
- Cardiovascular disease (including hypertension)
- Severe obesity (body mass index [BMI] ≥40 kg/m2)
- Diabetes mellitus
- Chronic kidney disease (undergoing dialysis)
- Cerebrovascular disease
- Chronic liver disease
- Tobacco use disorder

Immediately implement strict infection control measures

Supportive care:
- IVF
- Antipyretics (Avoid NSAID)
- Symptomatic care

Consider the use of Zinc, Vitamin C and Vitamin D
Consider Thromboprophylaxis with **low molecular weight heparin (LMWH)** if not contraindicated (page 81)
Consider using **Ritonavir-boosted nirmatrelvir (Paxlovid)** (page 110)
Regular laboratory investigations for individuals with risk factors*

Baseline investigations :
- ECG, Chest Xray/ Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- Blood Group and Vitamin D
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT (and Respiratory panel PCR if available)

Investigations:

Risk stratification and prognostic markers (Daily for individuals with risk factors)
- D-dimer, Fibrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR, PCT
- LDH, Troponin, BNP
- VWF, IL6

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Pneumonia

Definition

Pneumonia:

Patient with pneumonia and no signs of severe pneumonia.
Child with non-severe pneumonia has cough or difficulty breathing + tachypnea

Severe Pneumonia:

Adolescent or adult:
fever or suspected respiratory infection, **plus** one of

- Respiratory rate >30 breaths/min
- Severe respiratory distress
- SpO2 <93% on room air
- Lung infiltrates >50% of the lung field within 24- 48 hours
- Ferritin >500 ug/L; Ddimer >1mg/L ; CRP>100mg/L ; LDH>245 U/L ; Elevated Troponin

Child with cough or difficulty in breathing, **plus** at least one of the following:

- Central cyanosis
- SpO2 <93%;
- Severe respiratory distress (e.g. grunting, very severe chest indrawing);
- Signs of pneumonia with a general danger sign:
- Inability to breastfeed or drink,
- lethargy or unconsciousness, or convulsions.
- Other signs of pneumonia may be present: chest indrawing and tachypnea.

Immediately implement strict infection control measures (refer to Figure 2)

Pneumonia

- ICU Consultation and ICU care if necessary
- **Supportive care:**
  - IVF
  - Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
- Consider the use of Zinc, Vitamin C and Vitamin D
- **Remdesivir** (refer to page 86)
- **Ritonavir-boosted nirmatrelvir (Paxlovid)** (page 110)
- **Tocilizimab** (refer to page 86)
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes of pneumonia and PE

Severe Pneumonia

- ICU Consultation and ICU care
- **Supportive care:**
  - IVF, Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
  - Ventilatory support if needed
- **Remdesivir** (refer to page 86)
- **Tocilizimab** (refer to page 86)
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Tocilizumab** (if fitting criteria)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes for pneumonia and PE

Baseline investigations :

- ECG, Chest Xray/Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Blood group and Vitamin D
- and Respiratory panel PCR (if available)

Investigations:

Risk stratification and prognostic markers (q12hr)

- D-dimer, Fbrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR,PCT
- LDH, Troponin, BNP
- VWF, IL6

Daily: CBC, Biochemistry, ECG

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Acute Respiratory Distress Syndrome (ARDS)

Definition

Onset: new or worsening respiratory symptoms within one week of known clinical insult.

Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules.

Origin of edema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of edema if no risk factor present.

Oxygenation (adults):

- Mild ARDS: 200 mmHg < PaO2/FiO2 ≤ 300 mmHg (with PEEP or CPAP ≥5 cmH2O,
- Moderate ARDS: 100 mmHg < PaO2/FiO2 ≤200 mmHg with PEEP ≥5 cmH2O
- Severe ARDS: PaO2/FiO2 ≤ 100 mmHg with PEEP ≥5 cmH2O,
- When PaO2 is not available, SpO2/FiO2 ≤315 suggests ARDS (including in non-ventilated patients)

Oxygenation (children):

- Bilevel NIV or CPAP ≥5 cmH2O via full face mask: PaO2/FiO2 ≤ 300 mmHg or SpO2/FiO2 ≤264
- Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5
- Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3
- Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3

OI= Oxygenation Index and OSI = Oxygenation Index using SpO2

Immediately implement strict infection control measures

- ICU Consultation and ICU care
- **Supportive care:**
  - IVF, Antipyretics (Avoid NSAIDS) and Symptomatic care
  - Oxygen (keep saturation >94%, start with 5L)
  - Ventilatory support if needed
- **Remdesivir**
- **Dexamethasone or Methylprednisolone** (if evidence of hypoxia)
- Consider the use of **Tocilizumab** (if fitting criteria)
- **LMWH/UFH** if not contraindicated (refer to page 81)
- Rule out other causes for pneumonia and treat accordingly
- Rule out the possibility of PE incase of worsening hypoxia

Baseline investigations :

- ECG, Chest Xray/ Ultrasound chest
- CBC, Urea/Electrolytes, Creatinine, LFT
- CRP, LDH, ESR, D-Dimer, Ferritin, PCT
- Blood Group and Vitamin D
- and Respiratory panel PCR (if available)

Investigations

Risk stratification and prognostic markers (q12hr)

- D-dimer, Fbrinogen, PT/PTT, Mg
- Ferritin, CRP, ESR,PCT
- LDH, Troponin, BNP
- VWF, IL6

Daily: CBC, Biochemistry, ECG

Consider ruling out PE (by echo or CTPA)

Guidelines are created based on best available evidence.
Physicians should use this as a guide and depend on clinical and scientific judgment and individualizing of care

Thromboprophylaxis dosing schedule

D-Dimer level (mcg/ml)	Weight (kg)	LMWH dose
<1	<100kg	Enoxaparin 40mg SC once daily
	100 – 150kg	Enoxaparin 40mg SC twice daily
	>150kg	Enoxaparin 60mg SC twice daily
>1	<100kg	Enoxaparin 40mg SC twice daily
	100 – 150kg	Enoxaparin 80mg SC twice daily
	>150kg	Enoxaparin 120mg SC twice daily

Empiric therapeutic anticoagulation in critical ill patient may be linked with increase complications. However, it is likely to be beneficial for moderate to severe cases. The choice and dose of Heparin should be adjusted based on creatine clearance, refer to your hospital protocol.

Clinician should weigh the potential benefit and harms based on the most up to date available evidence REFERENCE

Oxygenation and Ventilation

- For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, high-flow nasal cannula (HFNC) oxygen is recommended over noninvasive positive pressure ventilation (NIPPV)
- Consider awake prone positioning to improve ventilation, if possible
- Incentive Spirometry if patient can perform
- Indirect evidence from other critical illnesses suggests the optimal oxygen target is an SpO2 between 92% and 96%
- Close monitoring for worsening respiratory status and intubation if necessary, in a controlled setting and by an experienced practitioner

Oxygenation and Ventilation

- For mechanically ventilated adults with COVID-19 and ARDS:
  - Use low tidal volume (Vt) ventilation (Vt 4–8 mL/kg of predicted body weight)
  - Target plateau pressures of <30 cm H2O
  - Use conservative fluid strategy over a liberal fluid strategy

- For mechanically ventilated adults with COVID-19 and moderate-to-severe ARDS:
  - Use a higher positive end-expiratory pressure (PEEP) strategy over a lower PEEP strategy

- For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimizing ventilation, use prone ventilation for 12 to 16 hours per day

Antithrombotics in patients with COVID19

Hospitalized Patients	Patients for Home isolation
Laboratory Testing	
Measure coagulation markers (e.g.,CBC, D-dimers, prothrombin time, platelet count, fibrinogen) in Hospitalized patients.	There are currently no data to support the measurement of coagulation markers in non-hospitalized COVID-19 confirmed cases.
Venous Thromboembolism Prophylaxis and Screening:	
Hospitalized patient should be screened and VTE prophylaxis be initiated. Reference doses in page 81	Anticoagulants and antiplatelet therapy should not be initiated for prevention of venous thromboembolism (VTE) or arterial thrombosis unless there are other indications
Chronic Anticoagulant and Antiplatelet Therapy:	
Anticoagulant or antiplatelet therapies for underlying conditions should be continued unless there is need for switching to heparin	Patients who are receiving anticoagulant or antiplatelet therapies for underlying conditions should continue these medications if they receive a diagnosis of COVID-19
Special Considerations During Pregnancy	
Management of anticoagulation therapy in pregnant patients with COVID-19 is same as other conditions that require anticoagulation in pregnancy (40mg once daily) (Lexicomp, 2021).	If antithrombotic therapy is prescribed during pregnancy for another indication, this therapy should be continued if the patient receives a diagnosis of COVID-19 and is not admitted in hospital.
The D-dimer level may not be a reliable predictor of VTE in pregnancy, because there is a physiologic increase of D-dimer levels throughout gestation.	
Venous Thromboembolism Prophylaxis in children with COVID-19	
Pediatric patients admitted for COVID-19 who are moderately or severely ill be given VTE risk prophylaxis in accordance with existing institutional guidelines.	

Thromboprophylaxis post COVID 19 infection

- Extended thromboprophylaxis on discharge can be considered if the patient is at high risk of VTE and if risk of thrombosis outweight risk of bleeding

- The nature and duration of thromboprophylaxis in patients recovering from COVID-19 pneumonia is not clear but a standard prophylactic dose of LMWH or DOAC for **4 weeks** may be a reasonable approach.
  - Duration also depend on disease severity, bleeding risk, possibility of VTE and patient condition

- **Possible medications to be considered:**
  - Apixaban 2.5 mg BD
  - Rivaroxaban 15 mg OD
  - Clexane 40 mg SC OD

- **Risk factors for high risk of VTE**
  - Past history VTE
  - Known case of malignancy
  - Significantly reduced mobility
  - Critical care admission
  - Disease severity (e.g. need for MV, NIV, or high oxygen requirements (e.g. PaO2/FiO2 ≤40 kPA (300 mmHg)) during admission
  - D-dimer >1 mcg/ml

- **Important Considerations**
  - Bleeding risk to be evaluated, the risk of VTE should be outweigh the risk of bleeding.
  - Renal function should be checked before starting patient on DOAC.
  - Drug interaction needs to be reviewed.
  - Coagulation profile and platelet count need to be reviewed before starting patient on thromboprophylaxis

Reference: BTS Guidance on Venous Thromboembolic Disease in patients with COVID-19 Updated 4 May 2020

COVID19 Medications and Dosage

Drugs	Dose
Zinc	50mg Oral Once daily
Vitamin C	1g Oral once daily
Vitamin D (dependig of patients Vitamin D levels)	2000 to 4000 iU daily or 50,000 iU weekly (With Ca+2 monitoring twice a week) or Can also consider dosing related to Vitamin D Level • Serum 25(OH)D 20 to 30 ng/mL: 2000- 4000 iU once daily • Serum 25(OH)D<20 ng/ml: 50,000 iU per day for 7 days with Rechecking level at Day 7. Adjust the dose based on Vit D level **Reference**
Remdisivir	Adult dose: • Day 1: 200mg IV Once Daily • Days 2 to 5: 100mg IV Once Daily *may extend for up to 5 additional days in patients who do not demonstrate clinical improvement.*
Dexamethasone	6mg IV OD for 5-10 days For pregnant: consider prednisolone 40mg OD or 20mg BID Reference Equivalent to Dexamethasone: Prednisolone 40mg or Methylprednisolone 32mg or Hydrocortisone 160mg
Tocilizumab (refer to page 89)	The initial dose is 4-8mg/kg (recommended dose of 400mg diluted with 0.9% normal saline to 100ml). If the initial medication is not effective, one extra administration can be given after 12 hours (same dose as before). No more than two administrations should be given, with the maximum single dose no more than 800mg. The infusion time should be more than 1 hour. Contraindicated for people with active infections such as tuberculosis. Avoid using with interferon
Ritonavir-boosted nirmatrelvir (Paxlovid)	≥12 years and weighing ≥40 kg: nirmatrelvir 300 mg plus ritonavir 100 mg (oral) twice daily for 5 days. • Significant hypersensitivity • Coadministration with drugs that are highly dependent on CYP3A s per clinical pharmacist
Baricitinib	Consider Remdesivir and Baricitinib (once available) Adult Dosing: Remdesivir 200 mg loading dose (IV, within 30 min), followed by 100 mg once Plus Baricitinib 4 mg (oral) once daily for 5 days. Pediatric dosing for Remdesivir <40 kg: 5 mg/kg IV load, then 2.5 mg/kg q24h ≥40 kg: 200 mg IV load, then 100 mg IV q24h Plus Pediatric dosing for Baricitinib ≥ 9 years: 4 mg (oral) once daily for 5 days. 2 - 9 years: 2 mg (oral) once daily for 5 days.

Remdesivir Treatment Protocol

Category	Details
Dose	Adult dose: • Day 1: 200mg IV Once Daily • Days 2 to 5: 100mg IV Once Daily Pediatric dose: *weight-based dosing 3.5 ≥40* • Day 1: 5 mg/kg IV Once Daily • Days 2 to 5: 2.5 mg/kg IV Once Daily General comments: For patients **not requiring** invasive mechanical ventilation and/or ECMO, recommended total treatment duration is **5 days**; if patients do not demonstrate clinical improvement, treatment may be extended for up to **5 additional days** (i.e., up to a total treatment duration of 10 days). For those **requiring** invasive mechanical ventilation and/or ECMO, recommended total treatment duration is **10 days**.
Contraindications	• Hypersensitivity to Remdesivir or any component of the formulation. • Patients with ALT ≥5 times the ULN (upper limit of normal) at baseline. • Renal impairment. (eGFR <30)
Monitoring	• Serum Creatinine, • Biochemical profile • Liver Function tests: ALT, AST, ALP, Bilirubin
Adverse Reactions	• Increased serum glucose • Fever • Infusion reactions

Dexamethasone Treatment Protocol

Category	Details
Dose	Adult dose: 6-12mg IV OD for 5 -10 days or until discharge
Monitoring	• Serum K, Glucose, sugars • Blood pressure, hemoglobin • Occult blood loss • WBC and Neutrophil count
Adverse effects	• Hypertension • Hyperglycemia • Gastric perforation
Precautions:	**Cardiovascular disease:** Use with caution in patients with heart failure and/or hypertension/ following acute myocardial infarction **Diabetes:** More frequent monitoring and dose titration of Anti-diabetic medications **Gastrointestinal disease:** Use with caution in patients with GI diseases (diverticulitis, fresh intestinal anastomoses, active or latent peptic ulcer, ulcerative colitis, abscess or other pyogenic infection) due to perforation risk. **Myasthenia gravis:** exacerbation of symptoms has occurred especially during initial treatment with corticosteroids. **Seizure disorders:** Seizures have been reported with adrenal crisis.
Contraindication	Hypersensitivity to dexamethasone or any component of the product Systemic fungal infection Concomitant use of more than a single dose of dexamethason with rilpivirine

Tocilizumab

- Tocilizumab can be given in COVID19 in the presence of severe cytokine storm
- Criteria of Severe Cytokine Syndrome:
  1. **It should be used with Dexamethasone 6-12mg (NHS, ASHP)**
  2. A Maximum of two **Tocilizumab** doses(each of 800mg) can be given at least 8 hours apart.
  3. AND Laboratory parameters supportive of cytokine storm including:
     - Serum IL-6 at least 3 X ULN; OR
     - Ferritin >300 ug/L (or surrogate) with doubling within 24 hours; OR
     - Ferritin > 600 ug/L at presentation with LDH >250 U/L; OR
     - Elevated D-dimer (> 1 mg/L).
     - CRP ≥75 mg/L or >50 but doubled in past 48 hours
  4. AND Rapidly worsening gas exchange within 24hrs requiring >6 L/min or HFNC, or O2 sats <93% (NHS, NIH ASHP)

Avoid use

- Avoid use in patients with platelets <50,000 and those with ANC <1,000
- Known hypersensitivity to tocilizumab or any component of the formulation
- Active infections, interrupt the treatment in case of developing severe infection.
- Patient with decompensated cirrhosis
- A baseline alanine aminotransferase (ALT) or aspartate aminotransferase (AST) more than 5 times the upper limit of normal.
- A pre-existing condition or treatment resulting in ongoing immunosuppression. (NHS, NIH)

(Recovery and REMAP –CAP)

References and Further Reading

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فيروس كورونا
(COVID-19)

COVID-19 Multisystem Inflammatory Disease in Children

Background

- Children compromise a small percentage of symptomatic SARS-COV-2 cases, even with symptoms children are usually reported to have mild to moderate symptoms.
- Recent reports have shown rare cases of systemic inflammation associated temporarily with SARS-COV-2.
- Children with this condition present with fever and hyper-inflammation, and may also have features of Kawasaki disease (KD), features of Toxic Shock Syndrome (TSS), or with acute gastrointestinal symptoms mimicking appendicitis.
- This can further develop into life threatening shock with single or multi-system dysfunction and require admission into critical care.
- A temporal association is clear, and the onset of PIMS/MIS-C typically follows 3 to 6 weeks after the peak of a COVID-19 outbreak in the local population.
- Studies have shown that most children test negative for SARS-COV-2 by PCR from nasopharyngeal swabs, however 80-100% tested positive to SARS-COV-2 antibodies.

Case Definition

- Case definition varies between institutes and its important to be aware of all

Category	RCPCH	CDC	WHO	CPSP
Age	Child	<21years	0 to 19 years	<18 years
Length of fever	Not specified	≥ 24hr	≥3days	≥3days
Evidence of inflammation	Yes	Yes	Yes	Yes
Multisystem	Single organ or multisystem	≥ 2 systems involved	≥ 2 systems involved	Implied, but not specified
Exclude other causes	Yes	Yes	Yes	Yes
SARS-CoV2 PCR or Antibody or exposure	Not necessary	Necessary	Necessary	Necessary

RCPCH: Royal College of Pediatrics and Child Health
CPSP: Canadian Pediatric Surveillance Program

Presentation

	Classic pre-pandemic KD	PIMS/MIS-C
Average age at presentation (years)	<5	7 to 9
Ethnicity	East Asian +	African, Afro-Caribbean +
Gastrointestinal symptoms	+	+++
Cardiac dysfunction	+	+++
Coagulopathy	+	++
Shock	+	++
Macrophage activation syndrome	+	++
Markedly elevated CRP	++	++++
Elevated ferritin	+	++
Elevated D-dimers	+	++
Elevated cardiac biomarkers (NT-proBNP, troponin)	+	++
Thrombocytopenia	rare	++
Coronary artery abnormalities	++	+

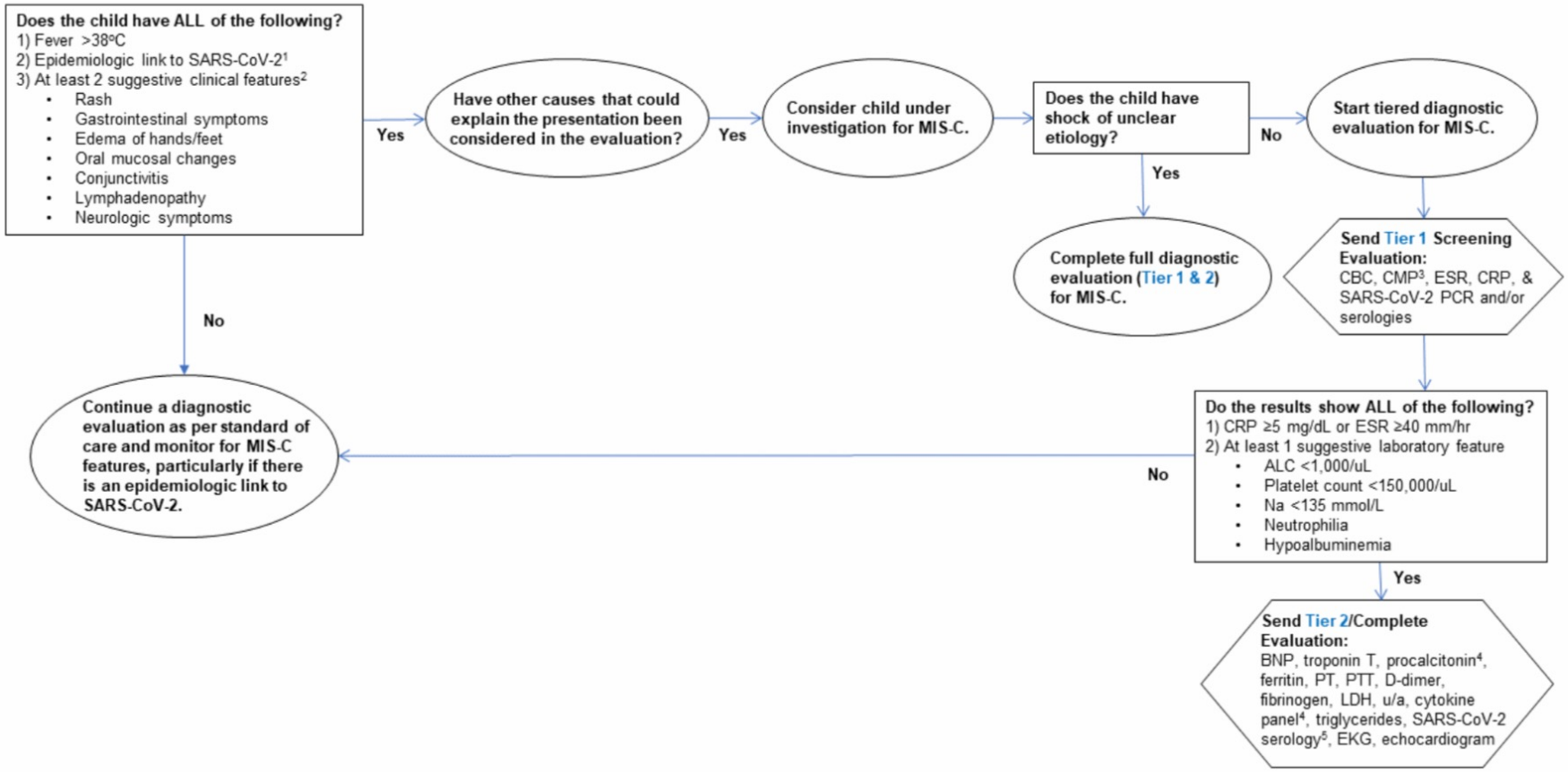
Presentation

- The hallmark of PIMS/MIS-C is fever >3 days that is unexplained by other causes, evidence of systemic inflammation, and a temporal association with COVID-19.
- The clinical presentation is fever with hyper-inflammation with features of Kawasaki Disease or features of Toxic Shock Syndrome with signs of shock or shock-like state with hypotension or poor perfusion and myocardial dysfunction, or GI distress, or neurological symptoms (like neck stiffness, lethargy, and altered mental status)
  - see appendix Table A and Table B for features of KD and TSS

- PIMS/MIS-C shares many symptoms with KD. A few major differentiating features are
  - PIMS/MIS-C has GI symptoms (rare in classic KD) and more severe myocarditis and cardiac dysfunction.
  - GI symptoms at presentation have been prominent in all case series reported to date and included features of an acute abdomen, with vomiting, diarrhea, and severe pain, but have rarely prompted surgical intervention.
  - While the major cardiac morbidity associated with KD is the development of coronary artery aneurysms, children with PIMS/MIS-C have presented with severe myocarditis and cardiogenic shock.

Evaluation

- Early diagnosis is essential to provide the required care



1An epidemiologic link to SARS-CoV-2 infection is defined as a child with ANY of the following criteria: positive SARS-CoV-2 polymerase chain reaction (PCR), positive SARS-CoV-2 serologies, preceding illness resembling COVD-19, or close contact with confirmed or suspected COVID-19 cases in the past 4 weeks.
2Rash, (polymorphic, maculopapular, or petechial, but not vesicular); GI symptoms, (diarrhea, abdominal pain, or vomiting); oral mucosal changes, (red and/or cracked lips, strawberry tongue, or erythema of the oropharyngeal mucosa); conjunctivitis, (bilateral conjunctival injection without exudate); neurologic symptoms, (altered metal status, encephalopathy, focal neurologic deficits, meningismus, or papilledema).
3Complete metabolic panel: Na, K, CO2, Cl, BUN, Cr, glucose, Ca, albumin, total protein, AST, ALT, ALP, Bilirubin. 4Send procalcitonin and cytokine panel, if available.
5If not sent in tier 1 evaluation. If possible, send SARS-CoV-2 IgG, IgM, IgA.

Management of MIS-C involves:

- Immunomodulatory treatment in MIS-C
- Antiplatelet and anticoagulation therapy in MIS-C
- Cardiac management of MIS-C
- Immunomodulatory treatment in children with acute symptoms of COVID-19 (respiratory symptoms of SARS-CoV2)

- Details on management provided in appendix

- **Further management:** https://www.rheumatology.org/Portals/0/Files/ACR-COVID-19-Clinical-Guidance-Summary-MIS-C-Hyperinflammation.pdf

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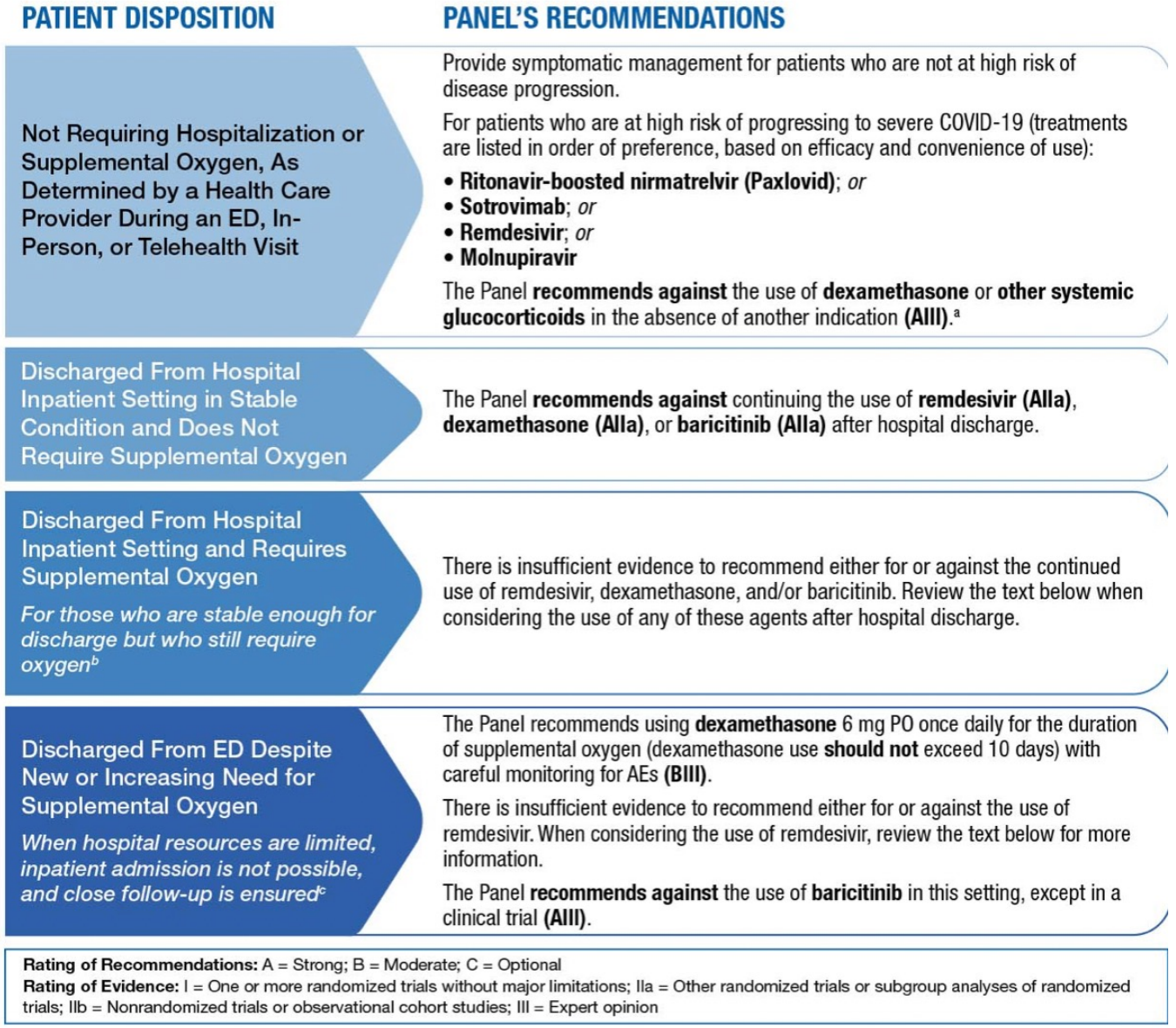
Appendix

Pharmacological Management of Outpatients With COVID-19 Based on Disease Severity

Figure (1)



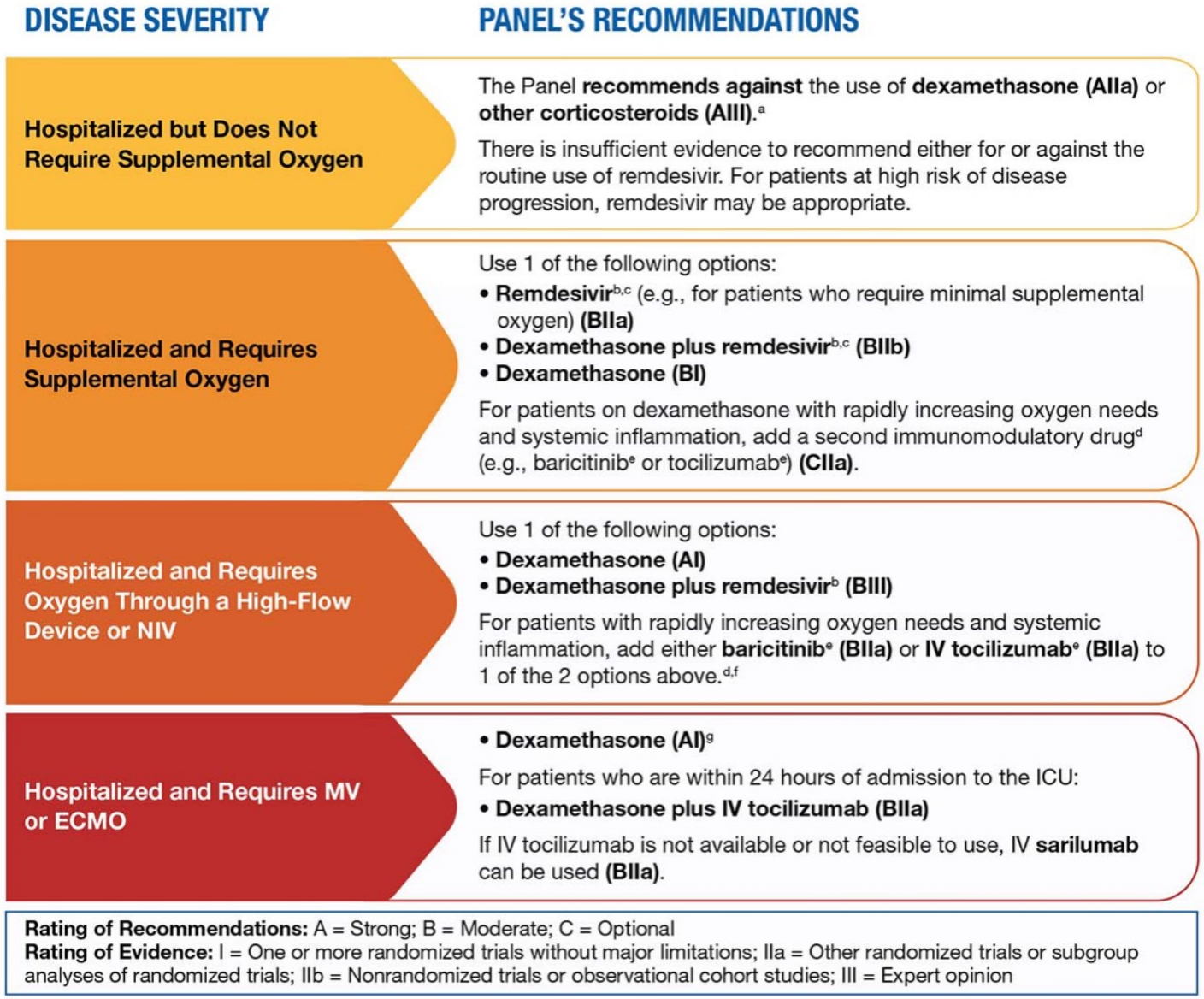
PATIENT DISPOSITION	PANEL'S RECOMMENDATIONS
Not Requiring Hospitalization or Supplemental Oxygen, As Determined by a Health Care Provider During an ED, In-Person, or Telehealth Visit	Provide symptomatic management for patients who are not at high risk of disease progression. For patients who are at high risk of progressing to severe COVID-19 (treatments are listed in order of preference, based on efficacy and convenience of use): • **Ritonavir-boosted nirmatrelvir (Paxlovid)**; *or* • **Sotrovimab**; *or* • **Remdesivir**; *or* • **Molnupiravir** The Panel **recommends against** the use of **dexamethasone** or **other systemic glucocorticoids** in the absence of another indication **(AIII)**.[a]
Discharged From Hospital Inpatient Setting in Stable Condition and Does Not Require Supplemental Oxygen	The Panel **recommends against** continuing the use of **remdesivir (AIIa)**, **dexamethasone (AIIa)**, or **baricitinib (AIIa)** after hospital discharge.
Discharged From Hospital Inpatient Setting and Requires Supplemental Oxygen *For those who are stable enough for discharge but who still require oxygen*[b]	There is insufficient evidence to recommend either for or against the continued use of remdesivir, dexamethasone, and/or baricitinib. Review the text below when considering the use of any of these agents after hospital discharge.
Discharged From ED Despite New or Increasing Need for Supplemental Oxygen *When hospital resources are limited, inpatient admission is not possible, and close follow-up is ensured*[c]	The Panel recommends using **dexamethasone** 6 mg PO once daily for the duration of supplemental oxygen (dexamethasone use **should not** exceed 10 days) with careful monitoring for AEs **(BIII)**. There is insufficient evidence to recommend either for or against the use of remdesivir. When considering the use of remdesivir, review the text below for more information. The Panel **recommends against** the use of **baricitinib** in this setting, except in a clinical trial **(AIII)**.

Rating of Recommendations: A = Strong; B = Moderate; C = Optional
Rating of Evidence: I = One or more randomized trials without major limitations; IIa = Other randomized trials or subgroup analyses of randomized trials; IIb = Nonrandomized trials or observational cohort studies; III = Expert opinion

https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/nonhospitalized-adults--therapeutic-management/

Pharmacological Management of Inpatients With COVID-19 Based on Disease Severity

Figure (2)



https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/hospitalized-adults--therapeutic-management/

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Management of MIS-C

Immunomodulatory treatment in MIS-C

- A stepwise progression of immunomodulatory therapies should be used to treat MIS-C with IVIG and/or glucocorticoids considered as first tier treatments (M/H).
- High dose IVIG (typically 1-2 gm/kg) may be considered for treatment of MIS-C. Cardiac function and fluid status should be assessed in MIS-C patients with shock before IVIG treatment is provided, and IVIG should be administered when cardiac function is restored. (M/H).
- Low-moderate dose glucocorticoids may be considered for treatment of MIS-C. High dose, IV pulse glucocorticoids may be considered to treat patients with life-threatening complications, such as shock, and specifically, if a patient requires high dose or multiple inotropes and/or vasopressors (M/H).
- Anakinra (IV or SQ) may be considered for treatment of MIS-C refractory to IVIG and glucocorticoids or in patients with contraindications to these treatments (M/H).
- Serial laboratory testing and cardiac assessment should guide immunomodulatory treatment response and tapering. Patients will often require a 2-3-week taper of immunomodulatory medications (H).

Antiplatelet and anticoagulation therapy in MIS-C

- Low dose aspirin (3-5 mg/kg/day; max 81 mg/day) should be used in patients with MIS-C and KD-like features and/or thrombocytosis (platelet count ≥450,000/μL) and continued until normalization of platelet count and confirmed normal coronary arteries at ≥4 weeks after diagnosis. Treatment with aspirin should be avoided in patients with a platelet count ≤80,000/μL (M).
- MIS-C patients with CAAs and a maximal z-score of 2.5-10.0 should be treated with low dose aspirin. Patients with a z-score ≥10.0 should be treated with low dose aspirin and therapeutic anticoagulation with enoxaparin (factor Xa level 0.5-1.0) or warfarin (M/H).
- Patients with MIS-C and documented thrombosis or an ejection fraction (EF) <35% should receive therapeutic anticoagulation with enoxaparin until at least 2 weeks after discharge from the hospital (H).
- Indications for longer outpatient therapeutic enoxaparin dosing include: CAA with z-score >10.0 (indefinite treatment), documented thrombosis (treatment for ≥3 months pending thrombus resolution), or ongoing moderate to severe LV dysfunction (H).
- For MIS-C patients who do not meet the above criteria, the approach to antiplatelet and anticoagulation management should be tailored to the patient's risk for thrombosis (H).

Cardiac management of MIS-C:

- Patients with MIS-C and abnormal BNP and/or troponin T at diagnosis should have these laboratory parameters trended over time until they normalize (H).
- EKGs should be performed at a minimum of every 48 hours in MIS-C patients who are hospitalized and during follow-up visits. If conduction abnormalities are present, patients should be placed on continuous telemetry while in the hospital, and Holter monitors should be considered during follow-up (M/H).
- Echocardiograms conducted at diagnosis and during clinical follow-up should include evaluation of ventricular/valvar function, pericardial effusion, and coronary artery dimensions with measurements indexed to body surface area using z-scores (H).
- Echocardiograms should be repeated at a minimum of 7-14 days and 4-6 weeks after presentation. For those patients with cardiac abnormalities occurring in the acute phase of their illness, an echocardiogram 1 year after MIS-C diagnosis could be considered. Patients with left ventricular (LV) dysfunction and/or CAA will require more frequent echocardiograms (M/H).
- Cardiac MRI may be indicated 2-6 months after MIS-C diagnosis in patients who presented with significant transient LV dysfunction in the acute phase of illness (LV ejection fraction <50%) or persistent LV dysfunction. Cardiac MRI should focus on myocardial characterization including functional assessment, T1/T2 weighted imaging, T1 mapping and extracellular volume (ECV) quantification, and late gadolinium enhancement (H).
- Cardiac CT should be performed in patients with suspicion of distal CAAs that are not well seen on echocardiogram (M).

Immunomodulatory treatment in children with COVID-19 (Current acute symptoms of SARS-COV2):

- Children with severe respiratory symptoms due to COVID-19 with any of the following should be considered for immunomodulatory therapy: acute respiratory distress syndrome (ARDS), shock/cardiac dysfunction, substantially elevated lactate dehydrogenase (LDH), D-dimer, IL-6, IL-2R, CRP, and/or ferritin, and depressed lymphocyte count, albumin, and/or platelet count (M/H).
- Glucocorticoids may be considered for use as immunomodulatory therapy in patients with COVID-19 and hyperinflammation (as outlined in point above) (M).
- Anakinra appears safe in severe infections and in children with hyperinflammatory syndromes. In children with COVID-19 and hyperinflammation, anakinra (>4mg/kg/day IV or SQ) should be considered for immunomodulatory therapy. Initiation of anakinra before invasive mechanical ventilation may be beneficial (H).
- Children with COVID-19 treated with anakinra should be monitored for liver function test (LFT) abnormalities (M).
- Compared to standard care, tocilizumab may be effective in reducing mortality and ICU admission in patients with severe COVID-19 pneumonia and signs of hyperinflammation; however, patients treated with tocilizumab may be at higher risk for bacterial and fungal infections (M).
- When tocilizumab is used to treat children with COVID-19, weight-based dosing should be employed (<30kg: 12mg/kg IV; ≥30kg: 8mg/kg IV, max 800mg). Children treated with tocilizumab should be monitored for LFT abnormalities and elevated triglycerides (M/H).
- In the absence of randomized controlled trails or comparative effectiveness studies, if immunomodulation is to be used at all, the balance of risks and benefits suggests anakinra as first-line immunomodulatory treatment of children with COVID-19 and hyperinflammation. There is insufficient evidence to support the use of other immunomodulatory agents unless glucocorticoids

Multisystem Inflammatory Syndrome in Children (MIS-C)

Criteria for Management:

•- Patient aged < 21 years presenting with fever (>38.0°C for ≥24 hours, or report of subjective fever lasting ≥24 hours), laboratory evidence of inflammation (Including, but not limited to, one or more of the following: an

•elevated CRP, ESR, fibrinogen, procalcitonin, D-dimer, ferritin, LDH, or IL-6; elevated neutrophils; reduced lymphocytes; and low albumin), and evidence of clinically severe illness requiring hospitalization, with multisystem

•(≥2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological)

•- No alternative plausible diagnoses

•- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

Immunomodulatory treatment in children with COVID-19 (Current acute symptoms of SARS-COV2):

COVID-19 Testing*	Category	Supportive Care	Pharmacotherapy	Precautions

Management:

There are no established therapies for COVID-19-associated CSS or MIS-C. These medications are to be used only with guidance from Rheumatology, Cardiology and Infectious Diseases. Patients who are being evaluated for immunomodulatory therapy should also be considered for antiviral therapy if they are not already receiving it.

- Supportive Care: Children with moderate to severe signs and symptoms should be admitted to the hospital. Admission to a pediatric intensive care unit is appropriate for children with hemodynamic instability (shock, arrhythmia), significant respiratory compromise, or other potentially life-threatening complications
- Thromboprophylaxis (see above section)
- Antiviral therapy (see above based of patient category)
- Immunomodulator Dosing and Monitoring

Immunomodulator	Dosing	Safety monitoring
IVIG with methylprednisolone see below table *"Medication Related Information"* MIS-C with or without features of Kawasaki disease or signs of myocardial dysfunction OR Severe or critical COVID-19 with evidence of CSS	- IVIG 2 g/kg + methylprednisolone at 0.8 to 1 mg/kg every 12 hours (maximum of 30 mg for 12 hours) for 5 days - IVIG 2 g/kg + methylprednisolone bolus of 15 to 30 mg/kg/d for 3 days	- Assess cardiac function and fluid status prior to giving to avoid fluid overload - Baseline renal function tests, urine output, IgG level, CBC - Monitor clinically for signs of hemolysis after first dose - Potential adverse reactions: anaphylaxis, - Infusion reaction, hemolysis, transaminitis, aseptic meningitis - Pulmonary adverse reactions; blood pressure (prior to, during, and following infusion); clinical response. - For patients at high risk of hemolysis (dose ≥2 g/kg, given as a single dose or divided over several days, and non-O blood type): Hemoglobin or hematocrit prior to and 36 to 96 hours post-infusion and again at 7 to 10 days post-infusion
Glucocorticoids MIS-C with features of shock or coronary artery dilation/aneurysm OR Severe or critical COVID-19 with evidence of CSS	- 1-2 mg/kg/day divided BID (prednisone, prednisolone, methylprednisolone) - 5 mg/m2 daily (dexamethasone)	*(see precautions above)*

Abbreviations:

ANC: Absolute neutrophil count, ARDS: Acute respiratory distress syndrome, COVID-19: Coronavirus Disease 2019, CBC: Complete Blood Count, CRP: C-Reactive Protein, ECMO: Extracorporeal Membrane Oxygenation, IL6: Interleukin 6, LFT: Liver Function Test, PCR: Polymerase Chain Reaction, ECG: Electrocardiogram, G6PD: Glucose-6-Phosphate Dehydrogenase, ACEI: Angiotensin-converting enzyme inhibitors, ARBs: Angiotensin II receptor blockers, MI: Myocardial infarction, MIS-C: Multisystem Inflammatory Syndrome in Children, CSS: Cytokine Storm Syndrome, mechanical ventilation (MV), noninvasive mechanical ventilation (NIV), high-flow nasal canula (HFNC), VTE : venous thromboembolism

Footnotes:

*Testing for SARS-COV2 virus shall be performed in accordance with published case definition by Saudi CDC guidelines.

$High risk patients have one or more: 1. Elderly (age > 65 years), 2. With underlying end organ dysfunction, 3. Diabetes, 4. History of cardiovascular disease, 5. History of pulmonary disease, 6. Immunocompromised, and/or 7. Pregnancy

References

- Canadian Pediatric Society
- Royal College of Pediatrics and Child Health
- American College of Rheumatology
- Saudi MoH Protocol

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COVID-19 Medication Order Sheet

Medication Order sheet for Adult COVID-19

Indicate choice by checking the box:

□ **Pregnancy test** for Hydroxychloroquine, Lopinavir/ritonavir, Ribavirin, or Favipiravir

□ **ECG monitoring 12-lead or telemetry**: (check all that apply per guideline): □ Baseline. □ 2 hours after Hydroxychloroquine dose. □ Daily. □ Every 48 hours

□ **Baseline tests**: CBC with differential, Blood Group and Vitamin D level, urea, creatinine, electrolytes serum glucose level, LFT, CRP, PCT, ESR, D-dimer, PT&PTT, Fibrinogen (repeat 24 - 48 hrs as indicated)

□ **Tests to assess complicated infection**: serum ferritin, LDH, triglycerides, serum lactate, Troponin-I, BNP, CK-MP, VWF and IL-6 *(repeat 24 - 48 hours as indicated)*

Medication	Dose	Contraindication	Monitoring
Vitamins			
□ **Zinc**	□ 50 mg daily	Hypersensitivity	• Serum copper • serum zinc • Alkaline phosphatase • Mental depression • taste acuity
□ **Vitamin C**	□ 1g daily	Non specific	• Renal function • Hb and CBC (in patients with G6PD)
□ **Vitamin D**	□ 50,000 unit's PO/NGT weekly or 2000/4000 PO/NGT Daily	No specific contraindications	Vitamin D level
Antipyretics			
□ **Paracetamol**	□ 325 - 650 mg q4-6 hr Or 1 g q 6hr Not Exceed 4 g/day	Hypersensitivity Severe hepatic impairment	Relief of fever

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Antivirals			
□ **Remdesivir**	□200 mg iv day 1 then 100 mg daily for 9 days	• Hypersensitivity	• Baseline and daily (ALT, AST, Bilirubin, ALP) • serum creatinine and CrCl
□ **Ritonavir-boosted nirmatrelvir (Paxlovid)**	≥12 years and weighing ≥40 kg: nirmatrelvir 300 mg plus ritonavir 100 mg (oral) twice daily for 5 days.	• Significant hypersensitivity • Coadministration with drugs that are highly dependent on CYP3A	• As per clinical pharmacist
Anticoagulants			
□ **Enoxaparin**	□ 40 mg once daily Consider higher dose if D Dimer >1000 ng/ml	• Hypersensitivity • Active major bleeding	▪ Bleeding parameter ▪ Serum creatinine
□ **Heparin**	□ 5000 IUq 8-12 hr	• Hypersensitivity • Active major bleeding • HIT in the past 100 days	▪ Bleeding parameter
□ **Fondaparinux**	□ 2.5mg SC Daily	• Hypersensitivity • Active major bleeding	▪ Bleeding parameter

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Steroids			
□ **Dexamethasone (For patients who require non- invasive or invasive ventilation):**	Adult dosing: **6 mg once daily** oral (liquid or tablet or IV for 5-10 days	■ **In pregnant or breastfeeding women**, prednisolone or IV Hydrocortisone 80 mg twice daily **should be us instead of Dexamethasone** ■ **Take precautions** when used with: Cardiovascular, diabetes, Gastrointestinal, Myasthenia graves and seizure patients	
□ **Methylprednisolone**	1 mg/kg/day (based on actual body weight divided in 2 doses) mg □ IV or □ PO/NGT BID for 3 days	■ (If severe hypoxia persists with continued supplemental oxygen requirement on day 3, extend to a total duration of 5 - 7 days)	
Statin			
□ **Atorvastatin**	□ 40 mg PO daily	If patient receiving Lopinavir/Ritonavir, then Atorvastatin 20 mg PO daily	
□ **Rosuvastatin**	□ 20 mg PO daily	If patient receiving Lopinavir/Ritonavir, then Rosuvastatin 10 mg PO daily	
Immunomodulators			
□ **Tocilizumab**	□ 4-8 mg/kg/dose. Maximum 2 doses □ 50-59 kg: 400 mg IV X 1 dose □ 60-85 kg: 600 mg IV X 1 dose □ >85 kg: 800 mg IV X 1 dose	Laboratory criteria for patient at high risk of developing cytokine storm: • Ferritin >500 mcg/l • Elevated D-Dimer > 1 mg • CRP>75-100 mg/dl • LDH >250 U/L • Lymphocyte count <0.8	
□ **Baricitinib**	Consider Remdesivir and Baricitinib (once available) • Adult Dosing: Remdesivir 200 mg loading dose (IV, within 30 min), followed by 100 mg once Plus Baricitinib 4 mg (oral) once daily for 5 days. • Pediatric dosing for Remdesivir • <40 kg: 5 mg/kg IV load, then 2.5 mg/kg q24h ≥40 kg: 200 mg IV load, then 100 mg IV q24h • Plus Pediatric dosing for Baricitinib • ≥ 9 years: 4 mg (oral) once daily for 5 days. 2 - 9 years: 2 mg (oral) once daily for 5 days.	• Hypersensitivity to Baricitinib or any component of formulation	• As per clinical pharmacist

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Antibiotics ONLY for Community or Hospital Acquired Pneumonia :			
□ **Vancomycin**	15 mg/kg .....mg IV every.....hours	Vancomycin trough 30-minute pre 4th dose or 24 hours if renal impaired (target trough 15 - 20 mg/dl)	
□ **Azithromycin**	500 mg IV or PO Daily		
□ **Ceftriaxone**	1 or 2g IV Daily		
□ **Cefepime**	2 g IV q 8 hours:		
□ **Piperacillin/tazobactam**	___g IV q___hours		
□ **Meropenem**	___mg IV q___hours		

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Monoclonal antibodies			

Sortovimab	• The dosage of sotrovimab is 500 mg of Sotrovimab. (One vial of sotrovimab (500 mg/8mL) - single dose.
	• Sotrovimab should be given as soon as possible aier positive results of direct SARS- CoV-2 viral testing and within 10 days of symptom onset. Sotrovimab must be diluted in 50 OR 100ml Normal Saline and administered as a single intravenous infusion of 500 mg over 30 minutes.
	• Dosage Adjustment in Specific Populations:
	• No dosage adjustment is recommended based on renal impairment, during pregnancy or while lactating.
	• No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are 12 years of age and older.
		• Severe Covid
		• Passing of more than ten days since onset of symptom
			• Full sets of vital signs should be measured as follows:
			  • Pre-infusion.
			  • 15 minutes after start of infusion.
			  • End of infusion.
			• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.

Medication Order sheet for Adult COVID-19

Medication	Dose	Contraindication	Monitoring
Monoclonal antibodies			

Regen-Cov	• 600 mg of casirivimab and 600 mg of imdevimab administered together as a single intravenous infusion over a minimum of 20 minutes.
	• For COVID-19 Positive PCR: Regen-Cov should be given as soon as possible after positive results of direct SARS-CoV-2 viral testing and within 10 days of symptom onset.
	• For Post Exposure Prophylaxis: Regen-Cov should be given as soon as possible after exposure to an individual infected with SARS-CoV-2 and within 96 hours from time of exposure.
	• No dosage adjustment is recommended in pregnant or lactating women
	• No dosage adjustment is recommended in pediatric patients who weigh at least 40 kg and are older than 12 years of age.
	• No dosage adjustment is recommended in patients with renal impairment
		• Severe Covid
		• individuals with previous severe hypersensitivity reactions, including anaphylaxis, to Regen-COV
			• Full sets of vital signs should be measured as follows:
			  • Pre-infusion.
			  • 15 minutes after start of infusion.
			  • End of infusion.
			• Patient should stay 60 minutes post completion of dose for observation and final sets of vitals will be taken before discharge.