Yale NewHaven Health

Yale New Haven Children's Hospital

PHARMACOLOGIC TREATMENTS OF INPATIENTS (≤18 Y/O) WITH CONFIRMED COVID-19 TESTING FOR THE PICU & GENERAL INPATIENT UNIT (GIU)

(This pathway will be reassessed & updated regularly based on experience & emerging data)

Pediatric Patient (≤ 18 Y/O) With Confirmed + COVID-19 Testing

Provide supportive care w acetaminophen/NSAIDs prn clinician's discretion, prone position & consider COVID-19 pharmacologic treatment criteria for the GIU & PICU

Patients > 18 Y/O should be managed using the adult treatment protocols - The Pediatric Covid/ID Teams will consult and be the point of contact for ID related COVID questions for ALL patients in the Children's Hospital

GIU Criteria

- **Requiring:** ≥ 2 L/min NC O_2 for 24-48 hrs without being able to wean **OR**
- **Worsening clinical trajectory** with increasing oxygen support within 24-48 hrs of starting O_2

PICU Criteria

- **Requiring**:
  - Non-invasive vent support
  - Mechanical ventilation OR
  - ECMO

For Both PICU & GIU:

May also consider treatment for patients with no oxygen requirement (or lesser degree of resp. support) who have fever and respiratory distress AND a history of:

- Congenital cardiac disease, chronic lung disease, immunosuppression and/or other concerning illness

*See Pathway for Multisystem Inflammatory Syndrome in Children (MIS-C)

References

Contact Pediatric COVID-19 Treatment Team (PCTT) if Considering Treatment

(Find PCTT contact in mobile heartbeat - Available from 8am-5pm, ID fellow available for overnight consults & weekends)

If Caregiver & Team Agree to Therapy

Obtain Baseline EKG & Labwork:

CBC w/diff*, CRP*, Procalcitonin*, Ferritin*, CMP*, Mg*, Troponin, BNP, D-Dimer, Fibrinogen, ESR, PT/PTT, cytokine panel

*Priority tests if there is limited blood volume

For PICU, add quantiferon gold, may start tx before get result

Consider

- Blood/ETT Cx's prior to antibiotics - yield highest for PICU pts
- Use of antibiotics as per clinical discretion
- Cardiology consult if abnormal EKG/ cardiac enzymes

Provide Recommended Treatment

1st Line = Remdesivir

(See Recs for Age/Wt Based Dosing, Exclusion Criteria and Considerations on Escalation of Care)

Utilize "COVID-19 Treatment Medications for Pharmacy/ID Provider Entry - Pediatric" Orderset in EPIC

- **For GIU**: Repeat above labs q24hrs for first 2 hospital days (repeat cytokine panel if transfer to PICU) - discuss need for repeating further labs w/ PCTT based on clinical progression
- **For PICU**: Repeat q12 hrs: CRP, D-Dimer, (Troponin x 3) - Repeat q24 hrs: CBC with diff, CMP, Mg, Ferritin, Procalcitonin, BNP, fibrinogen, PT/PTT - Repeat q 48 hrs: Cytokine panel

- Return to Inpatient Pathway when ready for discharge for guidance on home care
- Complete treatment course for outpatients as guided by PCTT

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Review potential medication interactions with clinical pharmacist prior to initiation

INFORMATION ON REMDESIVIR	
Indication	• If ≥ 12 y/o & ≥ 40kg - Eligible for Yale Clinical Trial* • If < 12 y/o or < 40kg - Obtain via compassionate use* • Emergency use Remdesivir may be considered, depending on the formulation(s) available, if patients are inelegible for clinical trial erollment or procurement via compassionate use
Dosing	• <40 kg: loading dose: 5 mg/kg (max 200 mg) once; then maintenance dose (starting 24 hours after loading dose) of 2.5 mg/kg (max 100 mg) every 24 hours • ≥40 kg: loading dose: 200 mg once; then maintenance dose (starting 24 hours after loading dose) of 100 mg every 24 hours • Duration of Therapy: Patients receiving mechanical ventilation and/or ECMO support = 10 days, Patients NOT receiving mechanical venitlation and/or ECMO = 5 days (including loading dose) ◦ Duration may be extended to 10 days if clinical improvement is not evident after 5 days
Exclusion Criteria	• Participation in any other clinical trial of an experimental treatment for COVID-19 • Concurrent treatment with other agents with actual or possible direct acting antiviral activity against SARS-CoV-2 is prohibited < 24 hours prior to study drug dosing • Evidence of multiorgan failure (severe) • Mechanically ventilated (including V-V ECMO) ≥ 5 days, or any duration of V-A ECMO (severe) • Requiring mechanical ventilation at screening (moderate) (CPAP is accepted) • ALT or AST > 5 x ULN • Creatinine clearance < 50 mL/min (Cockcroft-Gault for ≥ 18 yo and Schwartz for < 18 yo) • Positive pregnancy test • Breastfeeding woman • Known hypersensitivity to the study drug, the metabolites, or formulation excipient
Monitoring	• Days 3, 5, 8, 10, and 14 or until discharge (daily while in PICU): • CBC, BUN, creatinine, glucose, total bilirubin, ALT, AST
Side Effects	• Not yet FDA approved • Known potential side effects include: elevated transaminases, reversible kidney injury, and hypotension during infusion.

CONSIDER FOLLOWING MEDICATIONS IN DISCUSSION WITH PCTT/RHEUMATOLOGY FOR PATIENTS WITH CONCERNS FOR SEVERE DISEASE/CLINICAL DETERIORATION	
ANAKINRA	4mg/kg SC every 24 hours x 3 doses
METHYLPREDNISOLONE	1mg/kg/dose (Max 40mg) IV every 8 hours x 72 hours - Review extending course/steroid taper with PCTT
Anticoagulation	Consider anticoagulation based on significant elevations in D-Dimers/evidence of thrombosis (agent at discretion of team)

Discuss further recs on exclusion criteria, monitoring/labwork, and side effects with PCTT prior to starting

*See Pathway for Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with COVID-19

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MORE INFORMATION ON PHARMACOLOGIC AGENTS FOR SUPPORTIVE CARE

- For supportive care, it should be safe to use both acetaminophen and NSAIDs on a prn basis per clinician discretion
  - There is no firm data to show that NSAIDs worsen the course of COVID-19
    - There is a theoretical risk given the fact that COVID-19 virus uses ACE2 to enter cells and NSAIDs (and ACE inhibitors) may increase ACE2 circulation.
    - However, there is some data to show other coronaviruses that also use ACE2, like SARS, have reduced viral replication with NSAIDs (indomethacin).
    - The WHO and FDA do not recommend against the use of NSAIDs for COVID-19 infections, but will be further investigating the issue - we will update our recs accordingly

- For children > 1 y/o, recommend attempting prone position for 2 hours twice daily to help with oxygenation

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