LITERATURE REVIEW SARS-CoV 2 Clinical Presentation

By: Anisha Guda, Kavina Patel, Aleena Vargas, Tracey Vuong, Caroline Zhu, Taylor McCracken, Salma Yazji, Anusha Sherwani, Cynthia Jiang, Noah Hodson, Keerthana Nimmagadda, Keerthi Thallapureddy, Ashley Andrew, Sijil Patel
Peer reviewed by: Dr. Philip Ponce, Dr. Kelly Echevarria

updated 10/26/2021

UT Health San Antonio Long School of Medicine

TYPICAL PRESENTATION

COMMON SYMPTOMS

Fever (70%) Cough (70%) Dyspnea (70%) Muscle Aches (36%) Headaches (34%)

Others: fatigue, anorexia, anosmia, dysgeusia, diarrhea, nausea / vomiting, abdominal pain, sputum production, hemoptysis, cutaneous manifestations

DELTA VARIANT COMMON SYMPTOMS

Headache, Sore Throat , Runny Nose, Fever, Cough, Fatigue, Sneezing

LABS

lymphopenia, hypoalbuminemia, elevated CRP, elevated LDH, elevated ESR, normal procalcitonin

IMAGING

Bilateral multi-focal opacities on CXR, bilateral ground glass opacities on CT
Chest ultrasound useful in detecting peripheral pulmonary pathologies and interstitial syndromes

INCUBATION PERIOD

14 days from time of exposure
4 to 5 days median incubation period

DURATION OF ILLNESS

Mild to moderate disease: 2 weeks
Severe disease: 3-6 weeks

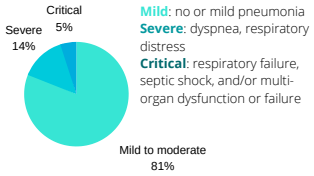
ASYMPTOMATIC PRESENTATION

40-45% of those infected with SARS-CoV-2 will remain asymptomatic for duration of illness. May be associated with CT abnormalities.

DISEASE SEVERITY

New York City, USA
22% of hospitalized patients with COVID-19 needed ICU care.

China



***SEVERE DISEASE AND MORTALITY

IMMUNOCOMPROMISED

- **CANCER PATIENTS**: healthcare exposure is significant risk factor; breast & prostate cancer are more prevalent among US & UK patients, with increased risk of severe outcomes, including intubation & death. Highest fatality rates seen with hematologic and lung malignancies, and in age groups 45-60 years and >75 years.
- **HEMATOLOGIC MALIGNANCY**: higher levels of immunosuppression lead to more severe respiratory viral infections than solid tumors. There is an increased risk of COVID-19-related serious events (ICU admission, MV support, or death).
- **BONE MARROW TRANSPLANT RECIPIENTS**: increased risk of poor outcomes with COVID-19 infection due to immunosuppressive agents
- **ON LONG TERM GLUCOCORTICOIDS**: longer incubation and viral shedding periods shown in single familial cluster report
- **HIV+ PATIENTS**: inconclusive data if higher risk of severe disease
- **ORGAN TRANSPLANTS**: inconclusive data if higher risk of severe disease. It may be that underlying chronic illnesses which lead to transplant may dictate risk, more so than transplant status.

CHILDREN

Visit pediatric infographic

PREGNANT WOMEN

- Most are mild and often asymptomatic.
- Most common symptoms are fever (62.9%) and cough (36.8%)
- Pregnant women with COVID-19 are more likely to be hospitalized and are at increased risk for ICU admission and receipt of mechanical ventilation than nonpregnant women.
- Incidence of preterm birth, low birth weight, C-section, NICU admission are higher than the general population
- Maternal death, pregnancy loss, and laboratory evidence of vertical transmission are infrequently reported

ELDERLY

- Significantly higher rate of severe disease, ICU admission, and mortality than younger patients
- Nonspecific signs & symptoms are falls, general health decline, delirium, and GI symptoms
- Can be asymptomatic

RISK FACTORS FOR SEVERE DISEASE AND MORTALITY

- **Non-Modifiable**
  - Older age (>65 years)
  - Black, Hispanic, or South Asian ethnicity
  - Male sex
  - In patients age >60 years: muscle aches, absence of fever
  - Cancer
  - High SOFA score
  - Down Syndrome
- **Modifiable**
  - Hypertension, cardiovascular disease, cerebrovascular disease
  - Overweight (BMI 25 - <30), obesity (BMI ≥ 30 kg/m^2), diabetes mellitus
  - Smoking history (current>former), COPD
  - High-dose corticosteroid use
  - Acute kidney injury (AKI) during hospitalization

PROGNOSTIC MARKERS OF SEVERE DISEASE

- **Hematologic**
  - Thrombocytopenia, lymphopenia
  - Elevated RDW (>14.5%) at admission and increasing RDW during hospitalization
  - High neutrophil:lymphocyte ratio (especially in males)
  - Significantly elevated WBC count (WMD: 4.15×10^9/L), CD8+ T cells ≤ 75 cell/microliter, decreased CD4+ count
- **Coagulation Parameters**
  - Prolonged PT
  - Increased fibrin degradation products; D-dimer > 1microgram/mL
  - Fibrinolysis shutdown (elevated D-Dimer and complete failure of clot lysis at 30 minutes on TEG) predicts thromboembolic events and need for hemodialysis
- **Liver/Kidney Biomarkers and Enzymes**
  - High LDH levels
  - Significant elevations in ALT, AST, total bilirubin
  - Significant elevations in BUN and creatinine
  - Elevated C-reactive protein (CRP)
  - Elevated procalcitonin associated with a nearly 5-fold higher risk of severe disease
- **Others**
  - Cardiac troponin significantly elevated (WMD: 32.7 ng/L)
  - Acute cardiac injury 13 times more common in ICU-COVID patients than in non-ICU COVID patients
  - Cancer patients - advanced tumor stage, elevated TNF-α and NT-proBNP, and decreased CD4+ T cells and albumin–globulin ratio
  - Chills, body temperature > 37.5 °C, findings of pneumonia on chest X-ray

POTENTIAL COMPLICATIONS

LUNGS	• ARDS: 15-33% of cases (8 days after sx onset); increased risk in older age, neutrophilia, increased LDH, increased D-Dimer, age >65yrs, DM, HTN • Acute respiratory failure: 8% of cases; leading cause of mortality • Pneumonia
CARDIO-VASCULAR	• Reported in 7-20% of cases. Prevalence high among patients who are severely ill • Vascular inflammation cardiac arrhythmias, myocarditis, cardiomyopathy, acute onset heart failure, MI, cardiac arrest • Less common: myocarditis, cardiac tamponade, fulminant myocarditis • 1 case of ITP
LIVER	• Reported in 14-53% of cases • Abnormal aminotransferase levels in patients with severe illness (AST and ALT >40) • Clinically significant liver injury is uncommon
INFECTION	• Sepsis and septic shock reported in 4-8% of cases • Secondary infection reported in 6-10% of cases; staph and strep are common • DIC: cytokine release syndrome with persistent fevers, increased ferritin, D-dimer, and proinflammatory cytokines • Conjunctivitis seen in several cases
MIS-A	• Adult multisystem inflammatory syndrome (MIS-A) • Often has features of Kawasaki Disease: conjunctivitis, cracked lips, edema of hands and feet, palmar erythema, diffuse maculopapular rash, cervical lymphadenopathy. • Lab features: elevated inflammatory markers, abnormal coagulation profiles, markers of organ dysfunction. • Diagnosis of exclusion (sepsis, toxic shock, and autoimmune diseases).

THROMBOTIC	• 31% incidence of thrombotic complications in one study of 184 pts • Predisposes to venous and arterial thromboembolic events due to excessive inflammation, hypoxia, immobilization and DIC • PE is most frequent thrombotic complication • Age and coagulopathy (PT>3s, APTT>5s) are independent predictors
KIDNEY	• Low prevalence, but is a marker of multi organ failure and severe disease • 40% pts with proteinuria and 26% with hematuria on admission • 5% pts developed AKI and increased hospital mortality • Stage 3 AKI in 50% of pts; rhabdomyolysis, metabolic acidosis, and hyperkalemia • Old age, DM, severe illness, and positive fluid balance are associated factors
NEUROLOGIC	• Viral invasion of CNS in patients with severe illness • Observed in 36% of 214 patients in one study • Acute CVA disease, impairment of consciousness, ataxia, seizures, and encephalopathy; prognosis is poor for these patients • Guillain-Barre syndrome seen in 4 cases
CUTANEOUS	• Exanthematous rash in several cases at disease onset or after recovery • "COVID toes" - pernio acral lesions reported across age spectrum • Retiform purpura and necrotic vascular lesions with severe cases • Vesicular varicella-like eruptions in several reports • Multisystem inflammatory syndrome in children (Kawasaki-like)

For details and references please visit **https://oume.uthscsa.edu/longco/**