Audio COVID quick-release checklist

Last updated 5/4/2020

Checklist

Marketing Assets

@drjaysheree on twitter and instagram
Paul is a Luddite who is not on Twitter, TikTok, Snapchat, nor Instagram.
Key concepts to market this piece:

- What labs should I get on COVID patients and why?
- How do we interpret the recommended labs for COVID inpatients?
- Can labs help me predict prognosis for hospitalized COVID patients?

Site Assets

- *Navigate to the share COVID Google Folder and create a copy of this template to store in that folder*
- *Please submit the following assets to Kat Levine (@klevine) on Slack at the time of submitting your CE'd file; until these assets are received in this format, your piece cannot be published on the site/app*

Title: What's That Lab? COVID-19 Labs Special Edition!

Summary:

In this Hippo Education bonus, Dr. Paul Simmons and Dr. Jay-Sheree Allen sit down to discuss what lab studies are recommended on admission of a COVID patient to the hospital, which labs are followed daily, and how they're best used.

References:

- Wang D., et al. Clinical characteristics of 138 hospitalized patients with 2019 novel Coronavirus-infected pneumonia in Wuhan, China. JAMA. 2020 Mar 17; 323(11):1061-1069. PMID: 32031570
- Huang C., et al. Clinical features of patients infected with 2019 novel Coronavirus in Wuhan, China. Lancet. 2020 Feb 15; 395(10223):497-506. PMID: 31986264
- Chen N., et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel Coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020 Feb 15;395(10223):507-513. PMID: 32007143
- Zhang J-J., et al. Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. Allergy. 2020 Jul; 75(7):1730-1741. PMID: 32077115
- QCOVID risk score: Clift AK, et al. Living risk prediction algorithm (QCOVID) for risk of hospital admission and mortality from coronavirus 19 in adults: national derivation and validation cohort study. BMJ. 2020 Oct 20;371:m3731. PMID: 33082154
- 4C mortality score: Knight SR, et al. Risk stratification of patients admitted to hospital with COVID-19 using the ISARIC WHO Clinical Characterization Protocol: development and validation of the 4C mortality score. BMJ. 2020 Sep 9;370:m3339. PMID: 32907855
- COR+12 score: Laguna-Goya R, et al. IL-6-based mortality risk model for hospitalized patients with COVID-19. J Allergy Clin Immunol. 2020 Oct;146(4):799-807. PMID: 32710975

- Seven-factor nomogram: Gong J, et al. A tool for early prediction of severe Coronavirus disease 2019 (COVID-19): a multicenter study using the risk nomogram in Wuhan and Guangdong, China. Clin Infect Dis. 2020 Jul 28;71(15):833-840. PMID: 32296824
- CALL risk score: Ji D, et al. Prediction for progression risk in patients with COVID-19 pneumonia: the CALL score. Clin Infect Dis. 2020 Sep 12;71(6):1393-1399. PMID: 32271369
- COVID-GRAM calculator: Liang W., et al. Development and validation of a clinical risk score to predict the occurrence of critical illness in hospitalized patients with COVID-19. JAMA Intern Med. 2020 Aug 1;180(8):1081-1089. PMID: 32396163
- Elevated D-dimers and lack of anticoagulation predict PE in severe COVID-19 patients. Basile Mouhat, et al. European Respiratory Journal 2020; DOI: 10.1183/13993003.01811-2020. PMID: 32907890

Tags:
Medicolegal, Infectious disease ID

NOT TO PUBLISH
Objectives: Review the laboratory studies that are often obtained during management of COVID-19 patients

Intro standardization

Paul, official hippo intro Today we are talking about Labs that you'll need to order when caring for COVID-19 patients. I'm Dr. Paul Simmons here with Dr. Jay-Sheree Allen and this is one of our many podcasts that we have available to anyone and everyone working hard on the front lines clinically. We know that taking care of COVID patients has been challenging on many fronts, and our goal is to share practical, clinical tips and pearls that we too are learning along the way. We have lots of incredible resources at your fingertips so check out the rest of our site at COVID.HIPPOED.COM

Jay Intro Response, why I even suggested this, etc

Main Talking Points:

Jay Some labs are recommended on admission and are only followed if there are abnormalities or the clinical condition warrants rechecking. Others are recommended for daily monitoring.

Certain laboratory abnormalities have prognostic value and serve as a risk factors for severe disease such as: Leukopenia, lymphopenia, neutrophilia, thrombocytopenia, elevated LFTs, elevated creatinine, elevated troponin, elevated C-reactive protein, elevated D-dimer, elevated ferritin.

Paul And this is the main takeaway from our discussion about labs in COVID care: they are more about PROGNOSIS than about DIAGNOSIS!

It's important however to understand why we're ordering these labs and how they will help us to provide better care for our patients.

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Admission Labs:

- CBC (Paul)
    - Looking for leukopenia, lymphopenia, neutrophilia, thrombocytopenia
    - Four cohort studies in Feb-Mar 2020 showed lymphopenia <1.1x10^9/L in 60-80% of admitted patients.
    - Study comparing markers for severe vs. non-severe disease: median lymphocyte % was 12.7 (severe) v 20% non-severe ($p<0.001$); WBC count 5.3x10^9/L v 4.5x10^9/L

    - Takeaway - this is a continuous variable, so there's no "cutoff," per se, BUT the more severe the lymphopenia, and the higher the leukocytosis on admission, the worse it is. Probably a marker for acute inflammatory response.
    - Thrombocytopenia seen in 12% of initial case series, but thrombocytosis in only 4%.

- CMP (Jay)
    - Electrolytes
    - In some initial case series, AST elevations were seen in 37%
    - Can get a SARS-CoV-2 viral hepatitis or congestive hepatopathy w HFrEF (below)
    - The AST and ALT are also important because they're one of the factors used to decide whether or not your patient is a candidate for Remdesivir. It's contraindicated if the AST or ALT is greater than 10 times the upper limit of normal. Also note another relative contraindication is CrCl less than 30
    - Dexamethasone is another common treatment that impacts the glucose, which is another lab that's also a part of the metabolic profile.

- CRP (Paul)
    - Elevation seen in 92% of initial case series from Wuhan.
    - Higher in severe disease: 48 mg/L in severe dz v 29 mg/L in non-severe disease ($p<0.001$)
- Ferritin
    - An acute phase reactant analogous to CRP in this context
- Procal
    - Similar to CRP, correlates with disease severity: severe 0.1 ng/mL v non-severe 0.05 ($p<0.001$)
    - Where procal is most useful in hospitalized patients is in supporting a clinical suspicion for bacterial superinfection (e.g., a HAP on top of COVID)

- D-Dimer (Jay)
    - COVID-19 coagulopathy
    - In clinic practice, the anticoagulation dose usually changes based on a d-dimer of 3000. CrCl also plays a role in the dose of the anticoagulant, so we're highlighting this as one you should look into further as many institutions follow slightly different guidelines.
    - Elevated D-dimers (>2590 ng·mL−1) and absence of anticoagulant therapy predict PE in hospitalised COVID-19 patients with clinical signs of severity

- LDH (Paul)
    - Quick review: LDH is super-non-specific - it's in essentially all mammalian cells (pyruvate<—>lactate). So, it's a marker for tissue destruction and turnover.

    - Elevation (>243 U/L) seen in about 40% of initial case series.
    - Factors in multiple prognostic calculators (COVID-GRAM, CALL score, 7-factor prediction nomogram, etc.)

- Trop (Jay)
    - NOT diagnostic for acute MI in this case (assuming no typical MI symptoms), but looking for cardiomyopathy
- BNP
    - Viral cardiomyopathy —> HFrEF possible

Just to recap .... Admit labs are ...

Jay ROUTINE LABS, if you have major abnormalities on admit labs, you may need to follow those.

- But otherwise CBC, CMP, q2-3d CRP, ferritin (if initial >300), LDH.
- Reiterate: Procal can be trended for concern bacterial PNA or other superinfection
    - Most useful to distinguish *new* bacterial infection when you have clinical suspicion.

Paul SO HOW ARE THESE LABS USED? A sampling of some (but not all!) risk calculators out there:

- PREDICTING MORTALITY
    - **QCOVID risk score** - predicts both COVID-19-specific mortality and hospital admission in adults
        - Validated risk score, on population of over 2 million adults
    - **4C Mortality Score** predicts in-hospital mortality in admitted adults
        - Isaric4C.net/risk/
        - Uses urea (on CMP), CRP along with several clinical and demographic variables
    - **COR+12** score predicts risk of in-hospital death in those admitted with COVID-19
        - Uses neutrophil-to-lymphocyte ratio; LDH, IL-6 level along with clinical and demographic data

- PREDICTING CLINICAL PROGRESSION
    - **Seven-factor nomogram** - predicts progression to severe disease in those with non-severe COVID-19
        - Uses LDH, CRP, coefficient of RDW (!), BUN, direct bili, and albumin
    - **CALL risk score** - predicts risk of progression to severe disease in hospitalized patients
        - Uses lymphocyte count and LDH along with clinical factors, age.
    - **COVID-GRAM risk calculator** - predicts risk of critical illness in hospitalized patients.
        - Uses neutrophil-lymphocyte ratio, LDH, direct bili, along with comorbidities, clinical, and demographic data.

Thanks for listening to this podcast...don't forget to check out other material we have on our site. It's all publicly available open access medical education, so please share with your colleagues and friends if you think they will find it useful. You can find all of this at COVID.HIPPOED.COM. Feel free to reach out to us on twitter with comments and questions. Thanks for listening!

References in AMA Format:

- Wang D., et al. Clinical characteristics of 138 hospitalized patients with 2019 novel Coronavirus-infected pneumonia in Wuhan, China. JAMA. 2020 Mar 17; 323(11):1061-1069.
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Tags:
Medicolegal, Infectious disease ID

FOR REFERENCE - Available tags:
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