COVID -19 – For the Hematologist and those who care for SCD patients

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SCD and COVID-19: No mention in the literature

But we know viruses pre-dispose SCD patients to ACS

SCD and Influenza/H1N1

- Influenza in SCD – increased risk for hospitalization and ACS
- H1N1 – Case series suggested an increase in ACS, particularly in adults
- Retrospective chart review of 123 SCD patients with Influenza (94 Influenza A or B, 29 H1N1):

  H1N1 influenza: Increased ACS (ACS; 34% vs 13%, \( P = .01 \)), ICU admissions (17% vs 3%, \( P = .02 \)) and mechanical ventilation (10% vs 0%, \( P = .02 \))

COVID-19: Risk for Severe ACS

• High risk for severe ACS - >50% FiO2, need for intubation
• Multi-organ system failure
• Rapidly progressive ACS: Highest risk in those with PH, multi-lobar disease, and thrombocytopenia
Rapidly Progressive ACS

• Retrospective cohort analysis to try to differentiate those with ACS who developed respiratory failure within 24 hours
• 173 patients – 97 < 20 yrs and 76 were adults
• In adults, those with rapidly progressive ACS:
  1) AKI (68.8% vs. 3.3%, P < 0.001)
  2) Hepatic dysfunction (75.0% vs. 15.0%, P < 0.001)
  3) Altered mental status (43.8% vs. 11.7%, P < 0.001)
  4) Multi-organ failure (93.8% vs. 10%, P < 0.001)
  5) Death (6.3% vs. 0%, P = 0.05)

In multi-variate analysis, thrombocytopenia was only predictor of rapidly progressive ACS [odds ratio 4.82 (95% CI 1.20-19.39), P = 0.027]

## Diagnosing Fat Emboli Syndrome

### Major Criteria
- Respiratory Distress
- Cerebral involvement
- Petechial Rash

### Minor Criteria
- Tachycardia (HR > 110 bpm)
- Fever (>38.5°C)
- Jaundice
- Renal Changes
- Retinal changes
- Drop in hemoglobin (> 20%)
- New onset thrombocytopenia (> 50%)
- Elevated ESR (> 71 mm/h)
- Fat macroglobulinemia

Diagnosis: 2 major criteria or 1 major criteria and 4 minor criteria
Fat Emboli Syndrome

• Rare, most of what is known is limited to small case series
• Pathophysiology – unclear
• Breakdown of fat within pulmonary vasculature leads to release of FFAs – sepsis, acute lung injury/pulmonary edema and hypoalbuminemia
• More common in HbSC than HbSS – Higher Hb is a risk factor
• Labs – None specific – worsening anemia, hemolysis, thrombocytopenia, hypoalbuminemia
• BAL – Fat laden macrophages >30%

Clinical Characteristics of Fat Emboli Syndrome

Fat Emboli Syndrome in SCD

• 1st described by Wade and Stevenson in 1941
• Bone Marrow necrosis, mobilization of BM – pulmonary vasculature
• Fat emboli – pulmonary micro-circulation, systemic vasculature
• No definitive way to make diagnosis – Classic triad: petechial rash, pulmonary edema and CNS depression – but all 3 don’t need to be present
• Usually presents with a rapidly progressive course – mortality rates >60% in 1st 48 hours

Treatment of Fat Emboli Syndrome

• Treatment is supportive
• Exchange transfusion associated with reduced mortality – 29% vs 91% in non-transfused
• Traditional treatment for ACS – antibiotics, bronchodilators
• Use of steroids – controversial
COVID treatment protocol

All Persons Under Investigation

- Contact/Droplet Precautions
- Comprehensive Respiratory Panel *
  - COVID-19 PCR*
  - Sputum Cultures*
  - MRSA Nares*
  - Procalcitonin
  - G6PD
  - Imaging: CXR, EKG
  - Continuous Pulse OX

*NOTE: N95 respirator specimen collection. Collect all at same time to minimize exposure

Hydroxychloroquine dosing:
- 400mg BID first day then
- 200mg BID for 4 days (total 5d)

Remdesivir dosing:
- 200mg first day then
- 100mg daily for 4 days (total 5d)

COVID PCR Negative AND Alternative Diagnosis

- Stop Hydroxychloroquine

Temp > 101F AND O2 sat <90%

- Start Hydroxychloroquine
- Trend QTc qD
- Trend Glucose qD

COVID PCR Positive

- Call Infectious Diseases
- Continue Hydroxychloroquine
- Request Remdesivir through online portal:
  - https://rdvcu.gilead.com
How to approach the SCD patient hospitalized with COVID-19 symptoms?

• Test everyone if possible
• Depending on where you are at, results may take several days to return
• CXR on admission for everyone with VOC or symptoms of COVID-19
• At BMC, we are going to repeat CXR 48 hours post-admission if test is positive or not back yet
Things to consider in management

• General respiratory measures for infected patients are to avoid aerosol-based interventions.
• Nebulizers should not be used in a non-negative pressure room, instead use metered-dose inhaler for Albuterol
• No non-invasive ventilation or high flow oxygen, or bronchoscopy on the general floors; should only be done in negative pressure rooms
• Non-invasive oxygen therapy should progress to intubation to limit aerosolization and infection risk.
ACS Management in COVID-19

- Early exchange transfusion
- Echocardiograms – Likely will have RV dysfunction/elevated PA pressures, can be transient. Inhaled NO helpful?
- Broad spectrum antibiotics – include MRSA coverage, atypicals, pneumococcus
- May be some benefit of plasmapheresis
- Stop L-glutamine in critically ill patients
• Randomized placebo controlled trial of 1223 patients with multi-organ system failure treated with L-glutamine (0.35 mg/kg), antioxidants or placebo

• Trend toward increased mortality at 28 days among patients who received glutamine as compared with those who did not receive glutamine (32.4% vs. 27.2%; adjusted odds ratio, 1.28; 95% confidence interval [CI], 1.00 to 1.64; P=0.05). In-hospital mortality and mortality at 6 months were significantly higher among those who received glutamine than among those who did not. Glutamine had no effect on rates of organ failure or infectious complications

Medical ICU Management of COVID-19 at BMC

• Centralization of ICU care – 1 of the 3 MICU teams will have the majority of patients until census is too high
• Patients will be in negative pressure rooms
• No BiPAP, no nebulizers, early intubation for all
• May need inhaled NO to improve oxygenation
• ARDS Management – low VT ventilation, proning, fluid management (keep patients dry)
• ECMO
Final Thoughts

• Landscape is constantly changing
• What I say today may be wrong next week
• Things we don’t know- NSAIDs, ACE inhibitors/ARBs, does exchange transfusion do anything