Post Acute Sequelae of COVID-19 (PASC)

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Objectives

• Understand theoretical causes of PASC
• Recognize the symptoms of PASC
• Understand the various treatment approached to PASC
• Call to ACTION regarding PASC/Fibromyalgia/Chronic fatigue syndrome
COVID-19 SARS-Co-V2

- > 177 million people infected
- Almost 4 million deaths
- 80% patients recover within 4 weeks
- < 15% require ICU stays which is over 6 weeks of medical care


Natural history of post-COVID-19 syndrome, the COVERSSCAN study in low-risk individuals (N=201) and policy recommendations.

Andrea Dennis et al. BMJ Open 2021;11:e048391
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Theories behind PASC

- Chronic COVID-19 associated immune exhaustion
  - Continuous release of senescence-associated secretory phenotype (SASP) from the residual senescent cells
- Altered microbiome
- Abnormal immunometabolism and mitochondrial dysfunction
  - T Cell exhaustion
- Viral induced autoimmunity
- Imbalance in the renin-angiotension system
Definition of PASC

• > 12 weeks of symptoms that cannot be explained by an alternative diagnosis
• Heterogenous multi-organ symptoms
• Similar to many other post-viral chronic syndromes

Rev Neurol. 2021 Jun 1

Organs affected in COVID long haul similar to chronic fatigue syndrome

Geir Bjerklund et al, Biomedicine & Pharmacotherapy, 2019
Common Symptoms

- Myalgic encephalomyelitis/chronic fatigue
- Fibromyalgia
- Dysautonomia
- Anxiety/depression
- Sleep disturbances

Myalgic Encephalomyelitis / Chronic Fatigue Syndrome

https://solvecfs.org/about-the-disease/
Other Infections that Cause Similar Symptoms

- Lyme disease
- Epstein-bar virus (EBV)
- HIV
- Cytomegally virus (CMV)
- Severe acute respiratory syndrome (SARS)
- Middle East respiratory syndrome (MERS)
Multi-Disciplinary Treatment for PASC

Supporting patients
Coping skills
Rehab

BMJ Summary
Long COVID in primary care: assessment and initial management of patients with continuing symptom

https://www.bmj.com/content/370/bmj.m3026/infographic
PASC Blood Tests Considerations in Primary Care

Investigations
Clinical testing is not always needed, but can help to pinpoint causes of continuing symptoms, and to exclude conditions like pulmonary embolism or myocarditis. Examples are provided below:

**Blood tests**
- Full blood count
- Electrolytes
- Liver and renal function
- Troponin
- C reactive protein
- Creatine kinase
- D-dimer
- Brain natriuretic peptides
- Ferritin - to assess inflammatory and prothrombotic states

**Other investigations**
- Chest x ray
- Urine tests
- 12 lead electrocardiogram

Post-Acute Chronic COVID-19 Management Considerations in Primary Care

Safety netting and referral
The patient should seek medical advice if concerned, for example:
- Worsening breathlessness
- \( \text{PaO}_2 \text{ } < 96\% \)
- Unexplained chest pain
- New confusion
- Focal weakness

Specialist referral may be indicated, based on clinical findings, for example:
- **Respiratory** if suspected pulmonary embolism, severe pneumonia
- **Cardiology** if suspected myocardial infarction, pericarditis, myocarditis or new heart failure
- **Neurology** if suspected neurovascular or acute neurological event
- **Pulmonary rehabilitation** may be indicated if patient has persistent breathlessness following review

Medical management
- Symptomatic, such as treating fever with paracetamol
- Optimise control of long term conditions
- Listening and empathy
- Consider antibiotics for secondary infection
- Treat specific complications as indicated

Self management
- Daily pulse oximetry
- Attention to general health
- Red and relaxation
- Self pacing and gradual increase in exercise if tolerated
- Set achievable targets

Diet
- Sleep
- Quitting smoking
- Limiting alcohol
- Limiting caffeine

Mental health
In the consultation:
- Continuity of care
- Avoid inappropriate medicalisation
- Longer appointments for patients with complex needs (face to face if needed)

In the community:
- Community linkworker
- Patient peer support groups
- Attached mental health support service
- Cross sector partnerships with social care, community services, faith groups

article by Greenhalgh and colleagues for a list of external resources to help with these problems
**PASC-Dyspnea Treatments**

- Pulse oximeter. SpO2 >92% on RA.
- 6 minute walk test
- Imaging generally not necessary unless hypoxic
- Incidence of post-COVID-19 VTE in patients recovering from mild to moderate disease not known but probably not high risk
- Reassurance with recommendation for modest exercise, breathing techniques and adequate sleep. Recovery generally the rule, but time course prolonged (weeks to months)

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**Chronic Abdominal Pain**

**STEP-UP APPROACH**

[Diagram of step-up approach to pain management]

- **General Measures**
  - Supportive environment
  - Validation of symptoms
  - Patient education
  - Agree & set realistic treatment goals

- **Pharmacological**
  - Tricyclic antidepressants
  - Serotonin noradrenergic reuptake inhibitors

- **Psychological interventions**
  - Cognitive behavioural therapy
  - Hypnotherapy

- **Step-up therapy**
  - Gabapentin
  - Pregabalin
Refer to Rehabilitation if unable to return to ADLs in COVID-19 Recovery Period

<table>
<thead>
<tr>
<th>Deconditioning/Dyspnea on exertion</th>
<th>Decreased balance/Fall risk</th>
<th>Brain fog/Cognitive issues</th>
<th>Chronic fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle weakness</td>
<td>Myalgia</td>
<td>Joint pain</td>
<td>Vertigo, dizziness</td>
</tr>
<tr>
<td>Headaches</td>
<td>GI issues</td>
<td>Difficulty swallowing</td>
<td>Anxiety/depression/PTSD</td>
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</tbody>
</table>

Approach to Therapeutics

- Risk: Benefit analysis
  - PT, Pulmonary Rehab, CBT

- Listen Intently
  - Validation of concerns

- Remain open to other diagnostic considerations
  - Avoid Anchor bias especially with prolonged symptoms

- Consider Palliative approach when appropriate
Call to Action

- Physicians need to recognize and validate patients' symptoms
- We do not have a pill or an easy button
- Destigmatize that a person may not be the same after an infection
- Discuss lifestyle modifications focusing on exercise, diet
- Focus patients on what a new normal looks like
- Funding outcomes and trials for fatigue and chronic pain