COVID-19 Post-acute Care Major Organ Damage: A Living Rapid Review

Key Findings

Major "Organ" of Interest	Pulmonary	Cardiac	Neurologic	Renal	Resource Use	MSK Endocrine	Gastro-intestinal	Hematologic
# Studies*	**12**	**4**	**6**	**3**	**22**	**0**	**1**	**3**
Outcomes	Pulmonary fibrosis: ***7-44%*** Reduced Pulmonary function: ***9-25%*** Reduced DLCO: ***47-53%*** Dyspnea: ***100%*** (severe); ***29%*** (mild to severe) Other: ***PaO_2/FiO_2, respiratory support, impairment***	Impaired EF: ***11%*** Pericardial effusion: ***1.5%*** Ultrasound; ***20% CMR*** LGE: ***22-32%*** Native T1, T2: ***elevated in COVID-19*** Elevated hsTNT: ***5%***	NIH Stroke scale: ***moderate symptoms*** MRS "moderate-to-severe" stroke sequelae: ***29-83%***	AKD: ***28-35%*** Need for KRT: ***31% survivors on KRT in hospital*** Impairment imaging: ***22%***	Positive SARS-CoV-2 (post DC): ***9-63%*** Readmission: ***2-12%*** Discharge: • Home: ***35-93%*** • Rehab other care: ***2-50%*** • Nursing home: ***6-15%*** Other: ***post-DC treatment***	N/A	Liver inflammation on imaging: ***16%***	DVT: ***12.5%*** Thrombo-embolism: ***0.5-2.5%*** Hemorrhage: ***3.7%***

Key: AKD=acute kidney disease; CMR: cardiac magnetic resonance imaging; DC=discharge; DLCO=diffusing capacity for carbon dioxide; DVT=deep venous thrombosis; EF=ejection fraction; Gastro=gastrointestinal; hsTNT=high-sensitivity Troponin; KRT=kidney replacement therapy; LGE=late gadolinium enhancement; MSK Endocrine= Musculoskeletal/Endocrine; MRS=Modified Rankin Scale; MRI=magnetic resonance imaging; N/A=not available
*Studies may appear in more than one column

Background

There have been numerous reports that people hospitalized for COVID-19 can experience damage to major organ systems including pulmonary, cardiovascular, renal, neurologic, hematologic, endocrine, and gastrointestinal systems. However, it is unclear what proportion of people hospitalized for COVID-19 continue to experience clinical symptoms or complications of major organ damage post-hospitalization, and what their post-hospitalization healthcare and service use needs are short- and long-term.

Goal

The goal of this living rapid review is to summarize evidence on the prevalence of post-acute major organ damage among adults who have been hospitalized for COVID-19 or who test positive for COVID-19 following hospitalization for another indication; determine whether prevalence varies by patient characteristics, COVID-19 disease severity and other factors; and ascertain the healthcare and service use needs for this population.

Methods

The ESP research team searched MEDLINE, Embase, and the Cochrane Library for articles published through October 2020. Observational studies (cohort, cross-sectional, and case series) that reported major organ

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damage among patients with laboratory-confirmed COVID-19 in the post-acute period (day of discharge or later) were included. Rapid review methods were utilized to review abstracts and full-text studies, extract data, and informally assess study quality. This living rapid review will be updated every 3 months. See the full ESP report for complete details on the methods.

Results

4,501 potentially relevant articles were published up to October 2020.

42 of these articles met criteria for inclusion.

Characteristics of Included Studies

Study characteristics	Total N=48,106 across 9 prospective studies, 31 retrospective studies, and 2 cross-sectional studies
Population	Adults who have been hospitalized for COVID-19
Comparators	No comparison group; adults hospitalized for non-COVID reasons
Outcomes	Prevalence of pulmonary, cardiac, neurologic, renal, gastrointestinal and hematologic symptoms or indicators; healthcare/service use
Settings	Studies set in United States (16), Europe (13), China (10), Middle East (1), or multiple regions (2)
Timing	At hospital discharge (17); post-discharge (22); both (3)

Conclusion

There is limited early published data on post-acute COVID-19 major organ damage and healthcare/service use needs. Among studies of major organ systems, pulmonary outcomes were the most commonly reported (12 studies) and typically included a measure of pulmonary function, though there were also reports on pulmonary fibrosis and imaging abnormalities. Outcomes related to healthcare/service use needs were also commonly reported (22 studies), particularly discharge disposition and readmission. Available data are from studies of convenience samples with poorly described study populations and primarily physiologic outcomes; few included control groups for comparison of COVID-19 and non-COVID-19 patients. Interpretation is difficult due to the absence of pre-COVID-19 data. Future updates are likely to identify additional relevant and more clinically informative data.

Future Research Needs

- Evaluating differences by patient characteristics (*eg*, age, gender, race/ethnicity, preexisting conditions, and residence type) as well as COVID-19 severity and COVID-19 specific therapies received.
- Comparisons between patients with COVID-19 and matched non-COVID-19 control groups as well as before and after hospitalization for or with COVID-19.
- Determining prevalence using outcome measurements that are based on accepted disease definitions.
- Standardized and longer (>1 month) follow-up periods.
- Evaluation of patients with acute COVID-19 that are not hospitalized.