SEVERITY CLUSTERS AND LIKELIHOOD OF RECOVERY FROM POST-COVID-19 CONDITION

CROI '23
723

Mateu L[1,2,3,4], Tebe C[5], Loste C[1,2], López C[1,2], España S[1,2], Santos JR[1,2], Lladós G[1,2,4], Nevot M[6], Muñoz-López F[6], Clotet B[1,2,3,6], Paredes R[1,2,3,6], Massanella M[4,6] for the Long Covid Unit

[1]Department of Infectious Diseases Department, Hospital Germans Trias i Pujol, Badalona, Spain. 2 Fundació Lluita contra les Infeccions, Badalona, Spain. 3 Universitat Autònoma de Barcelona, Spain. 4 REICOP, Spain. 5 Institut d'Investigació Biomèdica de Bellvitge, Hospitalet de Llobregat, Spain. 6. IrsiCaixa Institute for AIDS Research, Badalona, Spain.

BACKGROUND

- The **Post-COVID-19 Condition (PCC)** is a novel, long-lasting, poorly understood, and highly disabling post-viral syndrome, which poses enormous healthcare, economic, and socio-political challenges.
- Lack of validated biomarkers forces clinical management to be based on clinical definitions, which are imprecise. In the clinic, symptoms tend to present in clusters, which have yet to be properly defined.
- It is unclear how often PCC resolves, and which factors influence PCC resolution.

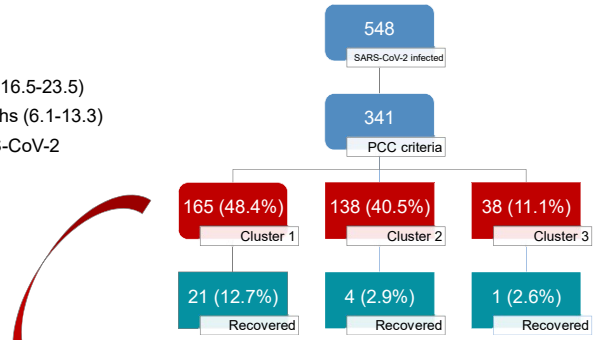
METHODS

- To delineate PCC presentation clusters and explore factors related with PCC resolution, we performed a 2-year prospective cohort study (KING Cohort extension) in individuals who recovered from acute COVID-19 regardless of its acute and post-acute severity. All subjects were systematically followed in the outpatient post-COVID-19 clinic of a tertiary care hospital in Spain.
- PCC was defined as per the WHO 2021 definition. Persistent symptoms were those present >3 months after acute COVID-19, and lasting for >2 consecutive months. PCC recovery was the absence of PCC symptoms during >3 consecutive months.
- Hierarchical cluster analysis was used to cluster the patients according to their symptoms. A directed acyclic graph (DAG) approach was used to assess a clinical model of factors related to PCC recovery.

RESULTS

Study flowchart

- Follow-up time, median (IQR): 23 months (16.5-23.5)
- Time to recovery, median (IQR): 11.4 months (6.1-13.3)
- All PCC participants, except 2, were SARS-CoV-2 infected prior vaccination



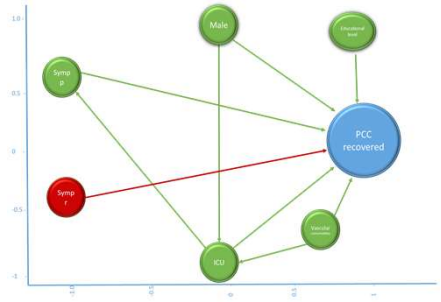
CHARACTERISTICS OF SEVERITY CLUSTERS

	CLUSTER A	CLUSTER B	CLUSTER C
	165 (48.4) N (%)	138 (40.5) N (%)	38 (11.1) N (%)
Age, median (IQR)	49 (40-56)	46 (38-55)	49.5 (43.5-56)
Sex, male	61 (37)	38 (27.5)	4 (10.5)
Hospitalization	37 (40.6)	51 (37)	12 (31.6)
Comorbidities			
Allergy	46(27.9)	45 (32.6)	16 (42.1)
Obesity	36 (21.8)	36 (26,1)	12 (31.6)
Dislypemia	39 (23.6)	32 (23.2)	11 (28.9)
Hypertension	39 (23.6)	22 (15.9)	6 (15.8)
Lung disease	26 (15.8)	22 (15.9)	10 (26.3)
Persistent symptoms			
Fatigue	93 (56.4)	128 (92.8)	28 (73.7)
Dyspnea	46 (27.9)	109 (79)	35 (92.1)
Neurocognitive complain	27 (16.4)	74 (53.6)	27 (71.1)
Headache	37 (22.4)	83 (60.1)	30 (78.9)
Myalgia	25 (15.2)	84 (61)	20 (52.6)
Arthralgia	20 (12.1)	81 (58.7)	27 (71.1)
Chest pain	19(11.5)	60 (43.5)	18 (47.4)
Tachycardia	16 (9.7)	53 (38.4)	28 (73.7)
Cough	23 (13.9)	36 (26.1)	31 (81.6)
Neurosensitive	8 (4.8)	33 (23.9)	24 (63.2)
Diarrhea	15 (9)	58 (42)	9 (23.7)
Low grade fever	20 (12.1)	22 (15.9)	11 (28.9)
Recovered	21 (12.7)	4 (2.9)	1 (2.6)

FACTORS ASSOCIATED WITH LONG COVID RECOVERY – CAUSAL MODEL (DAG)

Predictors	Risk Ratios	std. Error	Confidence Interval	*p-value*
Sex (Male)	3.24	1.21	1.56 – 6.75	***0.002***
ICU admission	8.3	4.54	2.84 – 24.27	***<0.001***
Educational level	2.34	0.93	1.08 – 5.09	***0.032***
Vascular comorbidities	1.99	0.69	1.01 – 3.92	***0.048***
Symptoms p	0.28	0.1	0.14 – 0.57	***<0.001***
Symptoms r	2.53	1.01	1.16 – 5.51	***0.02***

ICU: Intensive care unit
Vascular comorbidities: hypertension, diabetes, dyslipidemia
Symptoms p: hyporexia, smell and taste alterations in the acute phase
Symptoms r: myalgia, dyspnea, tachycardia, neurocognitive disorder in the acute phase



CONCLUSIONS

- At least 3 severity clusters can be identified in the PCC.
- Over the first 2 years, only a minority of subjects fully recover from PCC.

Main findings:

- 548 subjects were evaluated: **341 (62%) had PCC.**
- PCC participants were mostly **females** (69.8%) with mean age of **47.9 (SD 12.2) years**. Only 38.1% required hospitalization during acute COVID-19, and 9% required high-flow oxygen.
- Their **most frequent comorbidities** were allergy (31.4%), obesity (24.8%), dyslipidemia (24.0%) and hypertension (19.6%).
- At least **3 symptom clusters** with additive symptoms were identified: considering only symptoms present in >40% of subjects:
  - **Cluster A** was enriched in fatigue and dyspnea
  - **Cluster B** had Cluster A symptoms plus headache, arthralgia, chest pain and neurocognitive complains
  - **Cluster C** had Cluster B symptoms plus tachycardia, neurosensitive symptoms, and cough
- **PCC recovery** was achieved only by 26 (7.6%) participants over 2 years.
  - Male sex (RR 3.24; CI 1.56-6.75), ICU admission (RR 8.3; CI 2.8-24.3), vascular comorbidity (RR 1.99; CI 1.01-3.92), and hyporexia, smell and taste alterations in the acute phase of SARS-CoV-2 infection (RR 0.28; CI 0.14-0.57) increased the likelihood of PCC recovery.
  - Conversely, participants with muscle pain, impaired attention, dyspnea, and tachycardia in the acute phase were less likely to recover from PCC (RR 2.53; CI 1.16-5.51).

CONTACT

lmateu@lluita.org

Germans Trias i Pujol Hospital
IDIBELL
Fundació Lluita contra les Infeccions
IrsiCaixa Institut de Recerca de la Sida
Unitat Covid Persistent
Grant RYC2020-028934-I funded by:
YoMeCorono