Comorbidities that increase risk for severe acute COVID-19 in pediatric population

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BACKGROUND

- Little is understood about which comorbidities are associated with severe outcomes in children hospitalized with acute COVID-19. Some confusion lies especially for cancer or diabetes.

METHODS

- Data from 2 multicenter prospective cohort studies of hospitalized children (aged 0-18 years) with confirmed SARS-CoV-2 in Spain and Colombia were combined for this analysis.
- Data were obtained from 116 hospitals.
- Outcome was classified as (in decreasing order of severity): death, mechanical ventilation (MV), pediatric intensive care unit (PICU) admission, high flow/CPAP, oxygen therapy with nasal prong (NP) and hospitalization without respiratory support.
- Risk factors for severity, adjusting for age and gender, were identified using multinominal logistic regression and a backwards selection process.

RESULTS

- A total of 1,753 patients were included, 734 (41.8%) in Spain and 1,019 (58.1%) in Colombia. The most frequent comorbidities were asthma (9.0%), chronic neurological disorder (NRL) (7.4%), immunosuppressive medication (7.2%), malignant neoplasms (5.4%), and chronic lung disease (not asthma) (CLD) (4.5%).
- Asthma was associated with a significantly increased risk of death (OR: 4.17; 95%CI 1.34-12.97), MV (OR: 7.94; 95%CI 3.59-17.56), PICU admission (OR: 3.37; (95%CI 1.91-5.96), high flow/CPAP (OR: 6.65; (95%CI 2.69-16.46), and NP (OR: 3.85; (95%CI 2.57-5.77) compared to hospitalization without respiratory support.

Asthma, chronic neurological, cardiac and lung disease were consistently **associated with** multiple **severe outcomes** of **COVID-19 –** not cancer or diabetes

Table 1. Multivariable association between comorbidities on the odds of each outcome (compared to hospitalization without respiratory support). Color gradient across endpoints means red: risk factors, green: protective. MV, mechanical ventilation; PICU: Pediatric intensive care unit; CPAP, Continuous positive airway pressure.

Comorbidity	Death	MV	PICU	CPAP/High flow therapy	O2
Chronic cardiac disease	1.36 [0.29;6.49]	5.21 [1.76;15.41]	2.78 [1.27;6.08]	3.28 [0.87;12.32]	1.73 [0.92;3.26]
Chronic pulmonary disease	6.22 [2.28;16.94]	2.60 [0.73;9.22]	1.14 [0.41;3.17]	2.97 [0.83;10.59]	3.12 [1.74;5.58]
Asthma or recurrent wheezing	4.17 [1.34;12.97]	7.94 [3.59;17.56]	3.37 [1.91;5.96]	6.65 [2.69;16.46]	3.85 [2.57;5.77]
Chronic neurological disorder	7.34 [3.01;17.90]	3.07 [1.20;7.82]	1.52 [0.79;2.96]	4.36 [1.68;11.29]	1.10 [0.68;1.76]
Malignant Neoplasm	5.03 [2.09;12.12]	0.00 [-;-]	1.15 [0.59;2.21]	1.00 [0.22;4.41]	0.15 [0.06;0.37]
Chronic hematologic disease	2.67 [0.85;8.37]	1.44 [0.32;6.40]	0.68 [0.27;1.69]	0.75 [0.10;5.86]	0.35 [0.15;0.80]
Diabetes	2.99 [0.29;30.70]	0.00 [0.00;0.00]	5.67 [1.84;17.47]	0.00 [-;-]	1.19 [0.33;4.24]

- NRL was associated with increased risk of death (OR: 7.34; 95%CI 3.01-17.90), MV (OR: 3.07; 95%CI 1.20-7.82) and high flow/CPAP (OR: 4.36; 95%CI 1.68-11.29).
- CLD was associated with increased risk of death (OR: 6.22; 95%CI 2.28-16.94) and NP (OR: 3.1; 95%CI 1.74-5.58).
- Chronic cardiac disease was associated with increased risk of MV (OR: 5.21; 95%CI 1.76-15.41) and PICU (OR: 2.78; 95%CI 1.27-6.08).
- Risks of death (OR: 4.49; 95%CI 2.03-9.05), MV (OR: 2.97; 95%CI 1.52-5.81), PICU (OR: 4.27; 95%CI 2.89-6.33), and NP (OR: 4.67; 95%CI 3.64-5.99) were higher in the Colombia Cohort.

CONCLUSIONS

Asthma, chronic neurological, cardiac and lung disease; and belonging to the Colombia cohort were consistently associated with multiple severe outcomes of COVID-19. Cancer and diabetes association with selected endpoints rather than with most endpoints may be more related to the baseline disease than with the actual COVID-19.

ADDITIONAL KEY INFORMATION

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