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CORRESPONDENCE

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Comparison of laboratory data between children with COVID-19 and influenza

The novel coronavirus has been designated as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and the resulting disease has been designated as coronavirus disease 2019 (COVID-19). In a systemic review of 45 papers published between January 01, 2020 and March 18, 2020, children comprised only 1–5% of diagnosed cases of COVID-19. Common presenting symptoms include cough, pharyngeal erythema, and fever. [1] Because there is considerable overlap of symptoms in patients with COVID-19 and patients with influenza, identification of laboratory markers which may be indicative of COVID-19 disease would be highly useful in an acute care setting.

In this study, we compared laboratory data of patients with 67 pediatric patients with confirmed influenza and 24 pediatric patients diagnosed with COVID-19. Data of the 67 patients with influenza were obtained via chart review from the Department of Emergency and Pediatrics, Shenzhen Baoan Women's and Children's Hospital, Jinan University, Shenzhen, China in 2019. We also included laboratory data from 24 pediatric patients with COVID-19 available from published articles on Pubmed.[2–4] Median and interquartile range were used to describe the measurement data that did not conform to the normal distribution. Nonparametric Mann–Whitney's *U* rank sum test was used for comparison between the two groups. *N* and percentage were used to describe the counting data, and Pearson chi-square test (χ^2) was used to compare the counting data. Multivariate analysis was then performed using multivariate logistic regression. We found that patients with COVID-19 had statistically lower levels of procalcitonin, aspartate aminotransferase (AST), and lactate dehydrogenase on univariate analysis; only AST was found to be statistically significant after multivariate analysis (Table 1).

AST is an enzyme associated with amino acid metabolism and is found in a variety of cells including the liver, skeletal muscles, heart, kidneys, and brain. In a review article of 14 studies published in between December 11, 2019 and February 20, 2020, which examined the risk of liver dysfunction in COVID-19 patients, found that men were more likely to have elevated AST levels when compared to women, and that none of the children included in the review had elevated AST levels.[5] Our results also suggest pediatric patients with COVID-19 have lower AST levels when compared to those with influenza, which may reflect the degree of overall organ inflammation.

TABLE 1 Comparison of laboratory data between children with COVID-19 and influenza

Univariate analysis	COVID-19 (*N* = 24)	Influenza (*N* = 67)	*t*/*Z*/*c*2	*p* Value
Age (months)	54 (16–105)	35 (22–51)	−1.860	0.063
Male gender, *n* (%)	12 (50%)	45 (67.2%)	2.224	0.136
Leukocyte count (10^9/l)	6.60 (3.88–9.57)	6.4 (5.1–9.2)	−0.248	0.804
Lymphocyte count (10^9/l)	2.03 (1.21–3.6)	2.46 (1.89–3.55)	−1.234	0.217
Neutrophil count (10^9/l)	3.0 (1.3–5.33)	3.03 (2.13–4.55)	−0.603	0.546
Platelet count (ng/ml)	207 (156–301)	228 (172–300)	−0.104	0.918
Hemoglobulin(g/l)	122 (113–135)	118 (113–123)	−1.672	0.094
C-reactive protein (mg/l)	10.85 (5.82–30.0)	11.8 (2.95–39.12)	−0.163	0.870
Procalcitonin (ng/l)	0.07 (0.05–0.1)	0.31 (0.09–0.63)	−3.353	0.001*
Aspartate aminotransferase (U/l)	31.5 (20.35–40.0)	46.5 (36–59.3)	−3.961	<0.001*
Alanine aminotransferase (U/l)	18.5 (13.7–42.3)	17.5 (13.8–23.2)	−0.744	0.457
Lactate dehydrogenase (U/l)	300.5 (206.0–394.0)	369 (319–467)	−2.095	0.036*
Multivariate analysis	**β-Coefficient**	**95% Confidence interval for β-coefficient**	**SE**	***p* Value**
Aspartate aminotransferase (U/l)	0.950	0.911–0.991	0.021	<0.001

Procalcitonin is a precursor of calcitonin that is constitutively secreted by thyroid gland and lungs. Procalcitonin can serve as severity index of pneumonia, lower procalcitonin in COVID-19 maybe indicate less lung involvement. Body temperature also could be a noninvasive tool for differential diagnosis between COVID-19 and influenza. In the 24 cases of COVID-19 enrolled in this study, there were only 10 cases with body temperature available and 30% (3/10) with a body temperature less than 38.0 centigrade. In conclusion, the results of our study suggest that COVID-19 should be suspected in pediatric patients with flu-like symptoms without elevation of AST. We hope these results will be useful for identifying COVID-19 patients in an acute pediatric care setting.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

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ETHICS STATEMENT

The study was conducted in accordance with the Declaration of Helsinki. The Institutional Review Board of Baoan Women's and Children's Hospital, Shenzhen, China approved the study (IRB No. LLSCKS 2020-02-01).

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