Predictors of disease severity and outcomes in pediatric patients with croup and coronavirus disease 2019 in the pediatric emergency department

En-Pei Lee[1], Mu Chun-Ting[1], Chen-Wei Yen[1], Shao-Hsuan Hsia[1], Jainn-Jim Lin[1], Oi-Wa Chan[1], CHUN-CHE CHIU[2], Shen-Hao Lai[1], Wen-Chieh Yang[3], Chun-Yu Chen[3], Ya-Ting Su[1], and Han-Ping Wu[1]

[1]Chang Gung Memorial Hospital Linkou Branch Department of Pediatric Internal Medicine
[2]Chang Gung University College of Medicine
[3]China Medical University Hospital

January 24, 2023

Abstract

Background: Croup caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an emerging disease, and data on the risk factors associated with disease severity are still limited. The Westley croup score (WS) is widely used to assess croup severity. The current study aimed to analyze biomarkers associated with the WS and clinical outcomes in patients with croup and coronavirus disease 2019 in the pediatric emergency department (PED). **Population and Method:** Patients diagnosed with croup caused by SARS-CoV-2 were admitted at two PEDs. Clinical data including age, WS, length of hospital stay, initial laboratory data, and treatment were analyzed. Clinical parameters were evaluated via multivariate logistic regression analysis. The best cutoff values for predicting croup severity and outcomes were identified using the receiver operating characteristic curve. **Result:** In total, 250 patients were assessed. Moreover, 128 (51.2%) patients were discharged from the PED, and 122 (48.8%) were admitted to the hospital. Mild, moderate, and severe croup accounted for 63.6% (n = 159), 32% (n = 80), and 4.4% (n = 11) of all cases, respectively. A high mean age (years), neutrophil count (%), neutrophil-to-lymphocyte ratio (NLR), ALT (U/L), procalcitonin (ng/mL), and hemoglobin (g/dL) level, and length of hospital stay (days), and a low lymphocyte count (%) and blood pH were associated with croup severity and need for intensive care. Based on the multivariate logistic regression model, the NLR remained independent factors associated with croup severity and prognosis. Further, NLR was significantly correlated with WS. The area under the receiver operating characteristic curve of NLR for predicting a WS of [?] 3 was 0.895 (0.842–0.948, $p < 0.001$), and that for predicting ICU admission was 0.795 (0.711–0.879, $p < 0.001$). The best cutoff values for a WS of [?]3 and ICU admission were 1.65 and 2.06, respectively. **Conclusion:** WS is associated with the severity of croup caused by SARS-CoV-2. Furthermore, NLR is correlated with WS and is a cost effective, easily accessible prognostic biomarker in the PED.

Hosted file

`Manuscript.docx` available at https://authorea.com/users/579174/articles/620784-predictors-of-disease-severity-and-outcomes-in-pediatric-patients-with-croup-and-coronavirus-disease-2019-in-the-pediatric-emergency-department