

Use of the pleth variability index in children with obstructive respiratory disease

Demir G, Berksoy E, Bardak Ş, Elibol P, Çiçek A, Özön A, Nalbant T, Gökalp G. *Am J Emerg Med.* 2022 Mar 17;56:28-32. doi: 10.1016/j.ajem.2022.03.019

Introduction: The phenomenon of pulsus paradoxus (PP) develops at varying rates in relation to the severity of the disease in obstructive respiratory tract disease. The Pleth Variability Index (PVI) is the measurement value of perfusion index changes that occur with ventilation, which are determined during at least one respiratory cycle. Therefore, noninvasive measurement of PVI can help in the measurement of PP. The current study aims to determine the role of PVI measurements before and after bronchodilator therapy during admission to the hospital in children with obstructive respiratory tract disease.

Methods: Age, gender, Pulmonary Index Score (PIS), and PVI data of patients aged 2-18 years who applied to the pediatric emergency department with signs of obstructive respiratory tract disease were recorded in triage. The PVI and PIS scores of the patients, who were divided into three groups according to their clinical severity scores, were recorded before and after bronchodilator treatment, and they were compared to the PVI values according to the disposition results.

Results: A total of 133 patients were included in this prospective, single-center study. The PVI values before and after treatment were significantly higher in patients with severe disease compared to the mild and moderate groups ($p < 0.001$). Post-treatment PVI values were significantly lower than pre-treatment values in all clinical severity groups ($p < 0.001$). While a total of 95 (71.43%) patients were discharged from the emergency department, 31 (23.31%) patients were admitted to the relevant department, and seven (5.26%) patients were admitted to the pediatric intensive care unit. The PVI values before and after treatment were significantly higher in the hospitalized group compared to the group discharged from the emergency department ($p < 0.001$). The areas under the ROCs were 0.940, 0.865, and 0.843 for the PVI measurements in patients with severe disease, moderate disease, and hospitalization ($p < 0.001$).

Conclusions: Automated PVI measurement can be used as a noninvasive, rapid, and objective tool in the emergency department triage of patients admitted to the pediatric emergency department with signs of asthma attack or reactive respiratory tract disease.