Letters to the Editor

Letter to The Editor

Ventilator-Associated Event in A Neonate: Flaw in The Definition

The definition of pediatric ventilator-associated pneumonia (PedVAE) (1) is based on an increase in daily minimum FiO_2 of ≥ 0.25 (25 points) over the daily minimum FiO_2 of the first day in the baseline period and an increase in daily minimum mean airway pressure (MAP) values of $\geq 4 \text{ cmH}_2\text{O}$. However, this definition has a potential flaw: increase oxygen requirement and the need for increased airway pressures may not necessarily indicate VAE. It is a too generalized definition for a heterogeneous group of infants. (2) We will present a brief case to make our point.

The infant was delivered vaginally. Delivery was complicated by vacuum assistance and shoulder dystocia. The infant had mild respiratory distress and was given continuous positive airway pressure in the delivery room. He was then admitted to the NICU for transitional care. The cord blood gases: $7.27/31 \text{ CO}_2/33\text{O}_2/15 \text{ HCO}_3^-$ -12.5 base deficit (venous) and $7.14/51/15/24/-11$ (arterial). On the physical exam in the NICU, the infant was noted to be pale, lethargic, with continuous grunting and nasal flaring. A decision was made to intubate and place on a ventilator. Chest x-rays before and after intubation are displayed in Figure 1 A and B.

On the follow-up point of care blood gas result, the hemoglobin was noted to be low, further confirmed by the laboratory analysis. Figure 2 depicts the serial values of hemoglobin and hematocrit over time. The infant was transfused with packed red cells. The cause for blood loss was identified as subcapsular liver bleed (Figure 3 A). The infant continued to require increase oxygen to keep oxygen saturation above 95%. An echocardiogram was obtained that was compatible with high right ventricular pressure (Figure 3 B). Inhaled nitric oxide was started.

As the infant's FiO_2 and MAP requirement went up from the baseline, the infant was labeled as PedVAE per definition (1). Our counter-argument is with the evidence of other causes for hypoxemia in this infant (anemia, pulmonary hypertension), how confident are we in labeling this as a ventilator-associated event? Oxygen content and delivery are dependent upon hemoglobin level and cardiac output; therefore, these factors should be considered.

Due to the subjectivity in the definition, the pneumonia component has been taken away from the definition of ventilator-associated pneumonia (VAP). On the same token, we suggest looking into the definition of PedAEV in an infant with other causes of hypoxemia. Currently, in the definition of PedVAE, infants on ECMO are excluded. Based on the case presented, we suggest that infants with severe anemia and poor heart function should be eliminated from the surveillance definition of PedVAE.

Reference:

1. Cocoros NM, Kleinman K, Priebe GP, et al. Ventilator-Associated Events in Neonates and Children--A New Paradigm.

Crit Care Med. 2016; 44:14-22

2. Mhanna MJ. Ventilator-Associated Events in Neonates and Children: A Single Definition for a Heterogeneous Population. Crit Care Med. 2016 Jan;44(1):233-4

Figure legends:

Figure 1:

A: Chest X-ray before intubation

B: Chest X-ray after intubation

Figure 2: Serial hemoglobin and hematocrit levels displayed over time

Figure 3:

A) MRI abdomen showing hepatic subcapsular hematoma

B) Echocardiogram (subcostal view, 4-chamber view) showing septal flattening

Sincerely,

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NATIONAL PERINATAL ASSOCIATION

Update: **CORONAVIRUS**
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Figure 1

Figure 2

Figure 3

Dear Dr. Manzar:

This issue is very compelling but very common in medicine. It is all too often that a measure or a category is created to define a certain entity that is clinically manifest. While the initial nomenclature may seem to work well for all circumstances, as you have correctly pointed out, there are often a certain subset of clinical entities that are not adequately addressed by the definitions that have been "standardized" by various medical organizations and insurers.

To the extent that they interfere with patient care or misidentify causality, these terms should be avoided. However, often it is medical billing or other compliance related departments within the hospital that compel charting according to a diagnosis that may be inaccurate but in compliance with the required metric.

For this situation, an elevation to a higher level is required. Although coding experts can help, ultimately it will take a more significant effort to mitigate the effects of this situation or it will continue to occur.

Sincerely,

Mitchell Goldstein, MD
Editor in Chief

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