

**Address for Correspondence:** Dr. Cansu Bulut Aşar  
Ege Üniversitesi Tıp Fakültesi Enfeksiyon Hastalıkları ve  
Klinik Mikrobiyoloji Anabilim Dalı  
İzmir- Türkiye

E-mail: cansu.bulut@ege.edu.tr

©Copyright 2017 by Turkish Society of Cardiology - Available online  
at [www.anatoljcardiol.com](http://www.anatoljcardiol.com)

DOI:10.14744/AnatolJCardiol.2017.8024



## Assessment of hemodynamic changes in preterm infants with respiratory distress syndrome

To the Editor,

Although the cardiac effects of invasive and noninvasive ventilation have previously been investigated separately (1), we aimed to investigate the right and left ventricular systolic and diastolic dimensions and functions of preterm infants who were treated with surfactant and who received mechanical ventilation support due to respiratory distress syndrome (RDS).

Preterm infants with birth weight of  $\leq 1500$  g and/or born at  $\leq 32$  gestational weeks within the first 6 h of life and requiring mechanical ventilation for at least the first 24 h of life due to RDS were considered. The first echocardiographic evaluation of the infants was during invasive ventilation. The second echocardiographic evaluation was in nasal continuous positive airway pressure (NCPAP) 24 h after infants were extubated, and the positive end-expiratory pressure (PEEP) was 6 cmH<sub>2</sub>O. Forty infants were studied (22 males and 18 females); mean gestational age was  $27.2 \pm 2.1$  (mean  $\pm$  SD) weeks, and mean birth weight was  $1050 \pm 270$  (mean  $\pm$  SD) g. A significant decrease in systolic blood pressure was observed in infants with patent ductus arteriosus (PDA), but no change was observed in left ventricular sizes and functions. In addition, no significant change was observed in right ventricular functions and cardiac output (CO) and fractional shortening values. For this reason, PDA is thought to have no effect on ventricular functions.

In preterm infants, incorrect measurements may be obtained due to paradoxical septal wall movements and left ventricular distortion due to right ventricular dominance. In healthy infants, right ventricular cavity dimension at end-diastole (RVEdD) and right ventricular cavity dimension at end-systole (RVESd) decrease in the first 2 days of life, and this is similar for ventilated infants (2). We found that RVEdD, RVESd, and CO values of infants followed up in mechanical ventilators were lower than those obtained in infants after taking them to NCPAP. This difference was due to a decrease in right ventricular function, which was in the first 2 days of life, and due to a negative effect on the right ventricular function, which was caused by severe RDS (3). All infants were monitored with the same PEEP value, and improvements were determined in the hemodynamic and echocardiographic evaluations during noninvasive ventilation. This

situation may be related in the recovery of lung problems rather than in the PEEP effect.

We did not find any difference in hemodynamic parameters in relation to PDA. We noticed that PDA was associated with an increase in left atrial diameter and decrease in aortic root diameter while on invasive and noninvasive ventilation. We hypothesized that PDA may not be clinically characterized in the first days after delivery as the flow through it is generally not turbulent, wherein, as no physical sign is audible, it was not statistically significant. We believe that the treatment of RDS rather than of PDA in the first days of life is better based on hemodynamic and echocardiographic findings.

Mechanical ventilation reduces the right and left ventricular preload and improves the left ventricular afterload (4). Mechanical ventilation should be used with the most optimal methods possible and the lowest mean airway pressure value for preterm infants in the presence of RDS. Preterm infants should be extubated as soon as possible and should be tried to be made with noninvasive ventilation.

**Senem Alkan Özdemir, Esra Arun Özer<sup>1</sup>, Ali Rahmi Bakiler<sup>2</sup>, Özkan İlhan<sup>3</sup>, Sümer Sütçüoğlu<sup>3</sup>, Mustafa Mansur Tatlı<sup>4</sup>**

**Department of Neonatology, Behçet Uz Children's Hospital, İzmir-Turkey**

**<sup>1</sup>Department of Neonatology, Faculty of Medicine, Muğla Sıtkı Koçman University, Muğla-Turkey**

**<sup>2</sup>Departments of Pediatric Cardiology, <sup>3</sup>Neonatology, Tepecik Training and Research Hospital, İzmir-Turkey**

**<sup>4</sup>Department of Neonatology, Faculty of Medicine, İzmir Katip Çelebi University, İzmir-Turkey**

## References

1. Tang S, Zhao J, Shen J, Hu Z, Shi Y. Nasal intermittent positive pressure ventilation versus nasal continuous positive airway pressure in neonates: a systematic review and meta-analysis. *Indian Pediatr* 2013; 50: 371-6. [CrossRef]
2. Clark SJ, Yoxall CW, Subhedar NV. Measurement of right ventricular volume in healthy term and preterm neonates. *Arch Dis Child Fetal Neonatal Ed* 2002; 87: 89-93. [CrossRef]
3. Clark SJ, Yoxall CW, Subhedar NV. Right ventricular volume measurements in ventilated preterm neonates. *Pediatr Cardiol* 2004; 25: 149-53. [CrossRef]
4. Havranek T, Thompson Z, Carver JD. Factors that influence mesenteric artery blood flow velocity in newborn preterm infants. *J Perinatol* 2006; 26: 493-7. [CrossRef]

**Address for Correspondence:** Dr. Senem Alkan Özdemir  
Behçet Uz Çocuk Hastanesi, Neonatoloji Bölümü  
İzmir- Türkiye

E-mail: drsenemalkan@yahoo.com

©Copyright 2017 by Turkish Society of Cardiology - Available online  
at [www.anatoljcardiol.com](http://www.anatoljcardiol.com)

DOI:10.14744/AnatolJCardiol.2017.8148

