Management of Patent Ductus Arteriosus in Premature Babies: The Art and The Sciences

Patent ductus arteriosus (PDA) is the most common cardiovascular abnormality in premature infants, with the incidence depending on the estimated gestational age. Although ductus arteriosus is important for prenatal and immediate postnatal circulation, its persistence beyond the transitional period is associated with neonatal morbidity and mortality. There is no consensus among neonatologists on the management of PDA; the reason for this variation is that current evidence does not mandate one treatment over any other. Therefore, to treat or not to treat, when to treat and how to treat are still the main questions.

To answer these questions, the best way is to establish treatment criteria. Some scholars have used clinical parameters to sum up a cardiovascular dysfunction score, and others have used serum biomarkers such as B-type natriuretic peptide to predict the course of PDA, whereas most researchers have preferred to apply echocardiography evaluation to quantify the impact of significant PDA. There are many echocardiographic criteria, such as increased left atrium to ascending aorta diameter ratio, increased end diastolic flow of the left pulmonary artery, left ventricular output (LVO) to right ventricular output (RVO) ratio (LVO/RVO), LVO to superior vena cava flow ratio, PDA size or its flow, and PDA/left pulmonary artery ratio. However, the indications for the treatment of premature very low birth weight infants (VLBWIs) with PDA have not been well established.

In the current issue of this Journal, Nagasawa et al report their experience using the value of the measured left ventricular end-diastolic dimension (LVDD), which was divided by the normal LVDD as an index (LVDD ratio), to compare 30 patients who underwent PDA ligation to 30 patients treated with indomethacin and 30 patients who did not undergo radical therapy. They found that the percentage of patients with <115% in the LVDD ratio was 90% in the no-radical-therapy patients. The LVDD ratios of 130% and 115% were regarded as cut-off values for surgical ligation and indomethacin treatment. Therefore, the LVDD ratio can be considered a useful measure to determine the treatment of VLBWIs with PDA.

Theoretically, it is very reasonable that the LVDD in PDA patients is commonly increased because of its extended pulmonary flow, as a consequence of the flow volume through the ductus arteriosus. Therefore, LVDD measurement could be a useful criterion for determining treatment in VLBWIs with PDA. However, due to different gestational ages and body weights, the size of LVDD varies. Therefore, the authors needed to establish a normal value for LVDD and use the LVDD ratio to set up the criteria. Before we adopt these novel criteria, there are some concerns with regard to applying the results of this study. The first one would be that this study was a retrospective design. Even if the inter- or intraobserver error was low, selection bias might still exist. As mentioned in the article, the treatment choice did not depend on the LVDD ratio, the sex and appropriate for gestational age/large for gestational age distributions were not similar between groups, and differences existed on the examination day. The second concern is that the authors collected the cases over a 13-year period (from February 1999 to February 2012); therefore, it is necessary to convince others that technical or advanced concepts did not change the clinical neonatal care practice over the decade.

Although these minor concerns exist, the authors provide many solid data to explain the results. In the future, we believe that a multicenter study, or a prospective randomized study using the LVDD ratio, may help to prove that ratio as a useful measure to determine the treatment of VLBWIs with PDA.

Conflicts of interest

The author declares no conflicts of interest.
References