N-terminal pro-brain natriuretic peptide measurement as a predictor of significant patent ductus arteriosus in preterm infants

Artem A. Porodikov

Cardiovascular surgeon, Federal Center of Cardiovascular Surgery, Perm, Russian Federation

Biography

Artyom A Porodikov, pediatric cardiovascular surgeon. He graduated from the medical University in 2009. In the year of 2011 got 2-year clinical studies at "Academician YE. Meshalkin Novosibirsk research institute of circulation pathology". Since 2012 has been working as a cardiovascular surgeon at the "Federal Centre for Cardiovascular Surgery n.a. S.G.Sukhanov", Perm, RF. An author of 9 scientific researches and one patent for invention. Deals with the problems of diagnosis and treatment of children with congenital heart disorders. Research interests are patients with univentricular hemodynamics, mathematical modeling of systemic pulmonary anastomoses, myocardium contractility disorders in premature infants, use of BNP in diagnosis for diseases in premature babies.

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Statement of the problem: Recent medical technologies help to raise the survival rate of infants with extremely low-birth-weight who are more likely to develop critical conditions. One of complications of the neonatal period in premature infants (gestation age less than 28 weeks) is hemodynamically significant patent ductus arteriosus (hsPDA). Echocardiography (ECHO) is the current gold standard for the diagnosis of PDA –its hemodynamic significance, anatomy and post-treatment follow-up. Obviously, researcher's experience as well as technical facility capability is important. At present extra markers, are being searched and they would help the practitioner to define the treatment of hsPDA patients. There are researches evidencing the diagnostic significance of natriuretic peptide in preterm infants with hsPDA what allow to optimize the therapeutic approach for very low-birth-weight (VLBW) and extremely low-birth-weight (ELBW) infants. The purpose of this research is to study natriuretic peptide to determine the PDA hemodynamic significance in preterm infants with ELBW. Methods and results: we examined 37 newborn babies with a body weight less than 1500gr on 3rd day after birth using echocardiography, defined the standard criteria of PDA hemodynamic significance, and compared them with the value of natriuretic peptide. It was evaluated with the level NT-pro BNP in blood serum defined by Chemi Luminescent Immuno Assay (CLIA), test system VITROS NT-proBNP, Ortho-Clinical Diagnostics, Inc. In compliance with echocardiographic measurements, hemodynamically significance of the PDA was determined in 54.0 % (20/37) of newborn. There was median value NT-proBNP 9180 pcg/ml [IQR 3505]; 21300). We established that echocardiographic measurements of hemodynamic significance correlates with level NT-pro BNP (r=0. 63). We used regression analysis and obtained a regression equation y=-1.85+0.00016x, where x-value of NT-pro BNP (pcg/ml). Through ROC-analysis defined the cut-off value of NT-pro BNP= 18000 pcg/ml (sensitivity Se=0.50, specificity Sp= 0.91). Positive Predictive Value (+VP) for BNP=18000 pcg/ml compounds 0.91 (Contour Interval 0.82-1.0). Likelihood ratio of LR (-) =0.54. Thus research revealed that hsPDA will be presented 5.5 times more often in VLBW infants (<1500gr) and the level NT-proBNP=18000 pcg/ml (determined with the test system VITROS NT-pro BNP). Conclusions: Natriuretic peptide pro BNP with high specificity and probability can be used as a predictive marker of hemodynamic significance of PDA in infants with very low-birth-weight.

Publications

1. The role of natriuretic peptides in management of premature infants with hemodynamically significant patent arterial duct Furman E Biyanov A Porodikov A et al. Voprosy Sovremennoi Pediatrii - Current Pediatrics (2019)

2. Hemodynamically significant functioning arterial duct in newborns with extremely low and very low body weight: A modern view on the surgical treatment Biyanov A Porodikov A Pediatriya - Zhurnal im G.N. Speranskogo (2018)

Citation: Artem A. Porodikov, N-terminal pro-brain natriuretic peptide measurement as a predictor of significant patent ductus arteriosus in preterm infants, Pediatric Neurology 2020: Global Summit on Advances in Pediatrics and Pediatric Neurology, Paris, 19-20 February 2020, pp: 03