

Correlation of Plasma B-Type Natriuretic Peptide with Left to Right Shunt (QP/QS)

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Abstract

Introduction: Natriuretic peptides including BNP, ANP and NT Pro BNP are secreted in response to increased wall tension of ventricle and atrium. Congenital heart disease with left to right shunt, such as VSD, PDA and ASD, based on the extent and severity of the shunt, are underwent medical treatment or surgery. The purpose of this study is to answer this question that is it possible to get information about the disease severity or perform surgery and medical treatment and prevent the morbidity and frequency of respiratory infections and severe heart failure, impaired growth and mortality and on the one hand to avoid hasty decisions for early surgical intervention by using serum levels of BNP.

Method: In this cross - sectional study, 30 cases of infants and children that been hospitalized cardiology or ICU ward of Tabriz Children's Hospital due to heart murmur, respiratory distress, failure to thrive (FTT), recurrent pneumonia, cardiomegaly on chest x-ray, entered in the study after the diagnosis of PDA, ASD and VSD by echocardiography and the serum BNP levels were measured in the same day. Then the rate of left to right shunt (QP / QS) based on echocardiographic findings was compared with serum levels of BNP to determine that is there a significant correlation between serum levels of BNP and the rate of the shunt on the echocardiographic findings and the hemodynamic disorder or not.

Results: Of 30 patients, 13 patients (43.3%) were males and 17 (56.7%) were female. Pro BNP serum levels had a significant correlation with the left to right shunt type ($P = 0.01$). The mean serum levels of Pro BNP has been in ASD=281.8 VSD = 208.5 and PDA = 74.6. The mean serum levels of Pro BNP had a significant correlation with the size of left to right shunt with $P < 0.0001$. A pro BNP serum level in all patients was 194.9 ± 21.2 . There was a positive correlation between serum levels of BNP and QP / QS in all patients ($P = 0.018$). The mean serum levels of Pro BNP in patients with QP / QS < 1.5 was 30.83 ± 2.4 and in patients with $1.5 \leq$ QP / QS < 2 was 217.88 ± 44.6 and for QP / QS ≥ 2 was 272.8 ± 51.8 . There was a significant correlation between serum levels of BNP and the rate of the shunt ($P = 0.006$). The sensitivity and specificity for the serum levels of BNP equal to 36.95 pg / ml in diagnosing patients with QP / QS > 1.5 were 100% and 83.3% respectively.

Conclusion: According to our results, to identify patients with QP / QS > 1.5 , the sensitivity and specificity for the serum levels of BNP equal to 36.95 pg / ml were 100% and 83.3% respectively. So, serum levels of BNP ≥ 36.95 pg / ml is helpful to identify patients who require further intervention such as surgery.

Keywords: B-Type Natriuretic Peptide, Heart Failure, Left to Right Shunt